Science, scientism, and pseudoscience in *die Reihe*



Nigel Samuel Mark McBride

Magdalen College

University of Oxford

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Abstract

This thesis examines the association of science and musical thought that surrounded the Anglophone reception of the West German publication *die Reihe* (German publication: 1955 – 1962; English edition: 1957 – 1968). While *die Reihe* presented the early writings of what would become some of the central figures in European compositional circles, the journal's initial reception was damned through the association of writings of *die Reihe* with pseudoscience, therefore suggesting that the work was false and to be dismissed. In order to examine the various roles of scientific thought and processes in *die Reihe* three central areas are explored: to what extent can the epistemological stance of scientism account for the science-like content of the journal? Can a musical journal be considered as a work of pseudoscience? And how did the journal's portrayal of the composer Anton Webern assist in codifying the musical practices of the authors with the processes and structures of scientific work? It can be seen that scientism can permeate thought and society in multiple and discreet ways, and that scientism can be seen to have influenced policy-makers in post-Second World War West Germany by encouraging a wider application of scientific ideas than had been seen previously. In the same way, the rhetoric of *die Reihe*'s chief editor, Herbert Eimert, indicates an epistemological stance that is consistent with scientistic values. The initial reception that accused *die Reihe* of being a work of pseudoscience is critically examined, and it is found that there is insufficient justification for the journal to be

considered a work of pseudoscience, because that while it bears a superficial similarity with scientific writing, *die Reihe* is not itself engaged with scientific work. Finally, it is seen that the way in which Webern's work and legacy is depicted in the journal is quite unlike how Webern's work was actually conceived, and as such the framing of Webern as a proto-scientistic composer is another indication of scientism in the thought of *die Reihe*'s contributors.

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1 Introduction

1.1 Background context

Die Reihe (German publication: 1955 – 1962; English publication: 1957 – 1968) was a journal dedicated to documenting the developments of serial music-making in West Germany. The journal focused on both technical and aesthetic analysis, and had a large and distinguished cohort of contributors. Herbert Eimert (1897 – 1972) and Karlheinz Stockhausen (1928 – 2007) served as co-editors, until a split occurred in 1958 due to what Stockhausen perceived as a 'betrayal of serial music' in Eimert's support of Hans Werner Henze's opera *Elegy for Young* Lovers.[1] Stockhausen's break from Eimert resulted in the former to contributing to a new rival publication, the *Darmstädter Beiträge zur Neuen Musik*. Not only was Stockhausen able to exert more influence on the *Darmstädter Beiträge* and the corresponding Internationale Ferienkurse für Neue Musik, Darmstadt (the Darmstadt International Summer Courses for New Music) through his closer working relationship with the festival's director, Wolfgang Steinecke, but he was also able to feud with Eimert in a more publically acceptable way.[2]

Die Reihe had enjoyed a close association with the Darmstadt up until this stage, but with the festival having begun its own publication in 1958, the aforementioned *Darmstädter Beiträge*, Eimert was faced with cuts to *die Reihe*'s budget by Universal Edition, its publisher.[3] Composers such as Pierre Boulez, Henri Pousseur, György

[1] Cott, Jonathan, and Karlheinz Stockhausen. *Stockhausen: Conversations with the Composer*. New York: Simon and Schuster, 1973. 111.
[2] Custodis, Michael. *Die Soziale Isolation Der Neuen Musik: Zum Kölner Musikleben Nach 1945*. Stuttgart: Franz Steiner Verlag, 2004. 86 – 87.
[3] Ibid., 86.

Ligeti, Gottfried Michael Koening, John Cage, and Giselher Klebe all contributed articles to *die Reihe*, and in many instances, on more than one occasion. Not all of the contributors were primarily known as composers: the eminent Dutch physicist, Adriaan D. Fokker, contributed an article in the eighth volume, *Retrospectives*, and other volumes saw contributions from information theorists, music critics, town planners, and architects. Many of *die Reihe*'s contributors were significant musical figures: Stockhausen, Ligeti, and Boulez became some of the most widely performed European composers during the latter half of the twentieth century, while the American John Cage became globally influential for his then radical approaches to the ontology of music.

The influence of some of these figures was felt outside of the art music world. Ligeti's works reached a broad and diverse audience through the use of his work in several of the films of Stanley Kubrick.[4] The collision of the high modernist music of Ligeti and the world of popular culture, as seen in the works of Kubrick, was an unusual occurrence, but it was not unique. Stockhausen managed to infiltrate popular culture in an even more subtle way. The genre of 'Krautrock' was indirectly indebted to Stockhausen and the Darmstadt International Summer Courses; Stockhausen taught Holger Czukay of the experimental Krautrock band 'Can', and Stockhausen later appeared on the front cover of The Beatles' *Sgt. Pepper's Lonely Hearts Club Band*, sandwiched between the comedians Lenny Bruce and W.C. Fields.[5]

[4] Heimerdinger, Julia. '"I Have Been Compromised. I Am Now Fighting against It." Ligeti vs. Kubrick and the Music for 2001: A Space Odyssey', *Journal of Film Music*, 3/2 (2011), 127–43. 140.

[5] Albiez, Sean. *Kraftwerk: Music Non-stop*. London: Continuum, 2011. 6.

1.2 *Die Reihe*'s early reception

Die Reihe is a source that is valuable for both its own content, and for the documentation of the early thoughts and writings of these influential composers and critics. It is, however, not without some significant underlying issues. The journal was reviewed inconsistently by Anglophone scholars around the time of its English publication in 1958, with one reviewer stating that:

> *Die Reihe* is written in a mixture of musico-technical, pseudo-philosophic, aesthetic and acoustical considerations and language that is intelligible only to the "initiated" (who don't agree among themselves, either) or perhaps only to the authors themselves.[6]

Similarly, speaking of a subsequent volume, another reviewer claimed that:

> The second, and longer, half of the book [sic] is termed analytical, and […] progressively gets more and more depressing in the absolute musical stupidity of the contributions.[7]

Even reviews that were generally positive still took issue with the technical language. Speaking of the original German language version, the academic, composer, and performer Dika Newlin wrote:

> It is good to find Universal Edition publishing a contemporary music serial work of quality and interest. This is a highly technical publication for the specialist; casual browsing is discouraged […] very stimulating if a trifle appalling to the non-scientific-minded composer. A slight air of mutual back-scratching which pervades some of the articles seems inseparable from a venture of this kind and should not be taken seriously. It is more important to note the role of German radio in furthering such experimentation. [8]

Significantly, Newlin also reviewed the English translation, which did not fare so well:

> In principle I applaud the idea of making the interesting material in this and subsequent issues of *Die Reihe* available to the reader whose German skills are nonexistent or insufficient for the technical language of these articles. It would still be more helpful, however, if the translation had been made into English rather than "Englisch". Thus, Pierre Boulez (or Bouzel as he is called in the translator's preface) is made to say, "Taken

[6] Helm, Everett. "Review of Die Reihe. Vol. I: Electronic Music; Die Reihe. Vol. II: Anton Webern." *Journal of Music Theory* 3.1 (1959): 155-60. 155.
[7] Carewe, John. "Die Reihe, Vol. 2 by Anton Webern." *The Musical Times* 100.1395 (1959): 265.
[8] Newlin, Dika. "Review of Die Reihe; Information über Serielle Musik." *Notes* 13.3 (1956): 432-33.

> in this sense the sound object appears to enable the composer to attenuate the confusion with which a dimension of absolutely differentiated timbre confronts him." At this point, my confusion was not attenuated.[9]

These reviews characterised the kinds of responses that *die Reihe* received, namely ones that bristled at the seemingly impenetrable technical language, and others that dismissed the writings polemically. The surface causes for these reviews are quite apparent: *die Reihe* had a limited number of contributors who were all interconnected either by their geographical, artistic, or technical, proximity to one another, resulting in what could appear to be a clique vanity publication. While it has been seen that some reviewers were concerned with *die Reihe*'s presentation of musical analysis and aesthetic issues, ideological positions likely influenced the responses to varying degrees. *Die Reihe*'s reception in the United States was particularly notable in this regard. The twenty-fifth year retrospective edition of *Perspectives of New Music* published in 1987 contained an interview between composers Arthur Berger and Benjamin A. Boretz, two of the original founders of *Perspectives*. To put their interview in context: once the new music journal *Modern Music* ceased to publish in 1946, there was no American journal focused on twentieth century music, and *die Reihe* was internationally advertised as being 'A periodical devoted to developments in contemporary music'.[10] [11] It is unfortunate that the anonymous translator of *die Reihe* Vol. 1 did not take more care in preserving the publication's original subtitle: *Information über serielle Musik* translates as 'information on serial music', certainly not the much more general subtitle

[9] Newlin, Dika. "Review of Die Reihe; A Periodical Devoted to Developments in Contemporary Music. Vol. I: Electronic Music." *Notes* 15.3 (1958): 405.
[10] Forte, Allen. "Review: Perspectives of New Music, Vol. 1, No. 1." *Journal of the American Musicological Society* 17.1 (1964): 110-13. 110.
[11] Eimert, Herbert, and Karlheinz Stockhausen. "Translator's Preface." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 1 (1958): vi.

that appeared in the English editions. It seems likely that *Perspectives*' editors were not aware of the subtitle to the German edition, or otherwise chose to ignore it:

> And Die Reihe was a particular issue because of its just about complete wipeout of any of what we were interested in as well as anything we were identified with over here, so I think some of our criticism of Die Reihe was particularly sharp because they had an antagonistic feel to us.[12]

The mistranslation of the subtitle curiously turned the publication from being in part an analytical text into a political one. In its original German format, *die Reihe* existed simply as a specialist publication, but upon translation and publication into English, it became a source of antagonism for non-German readers, and as such became a somewhat political publication, due to its failure to report on non-German-based contemporary music, effectively ignoring musical efforts from outside Germany.

Aside from the political implications of a supposed general new music journal ignoring the musical efforts coming from America, the editorial board of *Perspectives*, and other reviewers elsewhere, took issue with the analytical and aesthetic language of the Serialists' journal. *Perspectives* was conceived as a solution to several of the perceived problems in *die Reihe*. While *die Reihe*'s format and technical analysis were admired, at least by some, it was also seen to be 'bullshit, technically, and […] seemed to George [Perle] like a key piece of intellectual/political journalism'.[13] The response to this was to commission John Backus, a professional acoustician, to perform a 'scientific evaluation' of *die Reihe*.[14] The analytical language employed was found to be, more or less, wanting for its lack of clarity and adherence to international scientific standards in its use of

[12] Boretz, Benjamin A., Arthur Berger, and Marjorie Tichenor. "Arthur Berger and Benjamin Boretz: A Conversation about Perspectives." *Perspectives of New Music* 25.1/2 (1987): 594.
[13] Ibid.
[14] Backus, John. "Die Reihe - A Scientific Evaluation." *Perspectives of New Music* 1.1 (1962): 160-71.

specialist terms; Backus did not take into account the fact that the text was translated (M. J. Grant has since addressed the nature of the translation and Backus' review), but this notwithstanding, the technical language had appeared to be conclusively debunked by Backus in his evaluation.[15] The significance of the scientific evaluation was not the public shaming of *die Reihe*'s authors, but that the language had become sufficiently far removed from a standard musicological language as to require a specialist scientific evaluation as opposed to a more traditional musical-analytic review. Despite the initial concerns raised by reviewers, *die Reihe* functioned as the main means of encountering critical writings from the then German avant-garde in English.

Backus' review of *die Reihe* is the starting point for the present thesis. It is not remarkable for specialist publications to require much technical and specialised knowledge for their comprehension, but as seen in *die Reihe*'s reception history, even well qualified and specialist readers had issues with the journal's presentation of its content, and these issues did not exclusively pertain to its problematic translation. This thesis seeks first to address the origins of the science-like presentation of *die Reihe*'s materials, analysis, and discussions, which is an unexpected feature in a journal dedicated to music. I will be examine the musical and aesthetic position of *die Reihe*'s chief editor, Herbert Eimert, in the context of the ideology of scientism, in order to try to identify the ways in which the ideas, protocols, and vocabularies of science became applied to *die Reihe*. The second main function of this thesis is to re-evaluate and address Backus' initial criticisms of the journal. The scholar M. J. Grant in her book *Serial Music, Serial Aesthetics: Compositional Theory in Post-War Europe* has set out a

[15] Grant, Morag J. *Serial Music, Serial Aesthetics: Compositional Theory in Post-war Europe*. Cambridge: Cambridge University Press, 2001.

preliminary re-evaluation of Backus' scathing reading of *die Reihe*, yet fails to deal with the most damaging claim that Backus made: that *die Reihe* was a work of pseudoscience, and as such its technical writings had no value, and should be ignored.[16]

1.3 Defining scientism

The use of scientific language and notation in musical texts does not originate in *die Reihe*. Music has been considered scientifically and mathematically since at least the late fifth century BC, with the emergence of Pythagoras and the Pythagoreans.[17] The Pythagoreans had an understanding of the ways in which ratios (in the work of the Pythagoreans these ratios were understood to be lengths of string) defined musical intervals, and could be expressed numerically:[18]

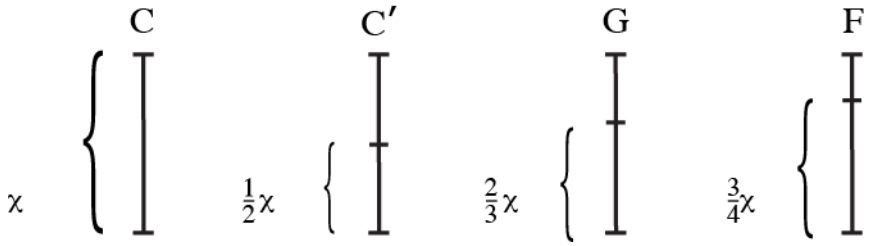


Figure 1

In Figure 1, x is the frequency corresponding to the scientific name of the pitch, for example C, or C'. In the first column we have the fundamental frequency x, which corresponds to the vibrations produced by a length of string, and a designator of the note name 'C'; in the second column the same length of string is divided in two, producing the ratio of 2:1, and thus a pitch an octave higher. A length of string 2:3 of x

[16] Backus, 161.
[17] Guthrie, William Keith Chambers. *A History of Greek Philosophy: Volume 1, the Earlier Presocratics and the Pythagoreans*. Cambridge: Cambridge University Press, 1962.146
[18] McKirahan, Richard D. *Philosophy before Socrates: An Introduction with Texts and Commentary*. Indianapolis: Hackett Publishing Co., 1994. 28.

produces a perfect fifth, 'G', and a length of string 3:4 of x produces a perfect fourth. The specific frequencies produced by lengths of string were not known to the Pythagoreans, and they were generally considered irrelevant until the widespread adoption of standard pitch. In the same vein as the Pythagorean writings, various theorists and composers, such as Rameau and Werckmeister, have over the centuries produced theoretical works detailing methods and approaches to achieving varying kinds of temperaments presented via ratios and mathematical notations. These texts employed scientific and mathematical writing to ensure the clarity of the instructions were maintained in spite of the absence of standardised pitch. However, in *die Reihe* mathematical and scientific-style language went a step further: not only did function as a means of defining the mechanical basis for the production of sound and pitch, it also described musical works in a technical manner.

The various articles in *die Reihe* exhibit two kinds of science-based or science-influenced writing; one kind is of the sort seen in the musical treatises described previously, concerned with the articulation of how sound is produced electronically by the authors of *die Reihe* working in the Studio for Electronic Music of the West German Radio in the Cologne. It is worth noting that these discussions did not promote new knowledge as to the production and proliferation of sound in physical space, rather, they functioned as a snapshot of the then current understanding of sound production and its manifestation. The other kind of scientific and mathematical writing is more abstract in its nature: rather than using the tools of mathematics and science to articulate acoustical properties, it is used to articulate compositional plans and analytical schemes. Backus, in his scientific evaluation, was critical of both approaches, which will be examined in more detail in chapter 3.

By virtue of the fact that *die Reihe* exhibited scientifically influenced writing outside of simply describing acoustic phenomenon, it indicates a 'scientification' of what had been until then a discipline comfortably situated within the broad field of the humanities. One possible way to account for the seemingly scientific conceptions outside of their more typical applications can be seen by examining the journal within the historical and intellectual context of the ideology of scientism. For the purposes of a preliminary definition, intuitively scientism can be thought of as a belief in which science and the methods of science are advantageously applicable to all forms of knowledge, or even more simply: science can be used to understand everything. To inform and refine this preliminary definition, it will be necessary to examine the scholarly literature on the topic.

There are two broadly defined approaches in scholarly writing on scientism: the first of these tends to depict scientism as being largely positivistic, and as such is focused on exploring the technical consequences of scientism within philosophical thought. The influential essay 'The Origins of Scientism', by Eric Voegelin, a German-born political philosopher, situates the basic idea of scientism in a historical context:

> By *scientism* we shall understand an intellectual movement of which the beginnings could be discerned as early as the second half of the sixteenth century. […] They began in a fascination with the new science to the point of underrating and neglecting the concern for experiences of the spirit; they developed into the assumption that the new science could create a world view that would substitute for the religious order of the soul; and they culminated, in the nineteenth century, in the dictatorial prohibition, on the part of scientistic thinkers, against asking questions of a metaphysical nature. The results of this development lie before us today in the form of the scientistic creed, which is characterized by three principal dogmas: (1) the assumption that the mathematized science of natural phenomena is a model science to which all other sciences ought to conform; (2) that all realms of being are accessible to the methods of the sciences of phenomena; and (3) that all reality that is not accessible to sciences of phenomena is either irrelevant or, in the more radical form of the dogma, illusionary.[19]

[19] Voegelin, Eric, and Ellis Sandoz. *Published Essays: 1940-1952*. Columbia, MO: U of Missouri, 2000. 168-169.

Voegelin's exposition creates an antagonistic dichotomy between two forces: 'new science', and 'the concern for experiences of the spirit', in which the 'new science' is seen as means by which a world view would be formed from the processes of science, and not from metaphysical investigation. The more critical part of Voegelin's discussion is the third dogma that he identifies: '(3) that all reality that is not accessible to sciences of phenomena is either irrelevant or, in the more radical form of the dogma, illusionary'. It is this caveat that begins to characterise scientism as a positivistic ideology towards knowledge: it claims that anything which is not observable through science is either not worth observing, or entirely unobservable and therefore unreal. The consequences that Voegelin draws from his presentation of scientism are particularly relevant in areas of philosophical investigation, but nonetheless serve to illustrate some of the issues in abiding by a scientistic ideology:

> The creed implies two great denials: It denies the dignity of science to the quest for substance in nature, in man and society, as well as in transcendental reality; and, in the more radical form, it denies the reality of substance.[20]

Jürgen Habermas, an eminent social philosopher, likewise notes the scientistic attitude toward knowledge:

> For the philosophy of science that has emerged since the mid-nineteenth century as the heir of the theory of knowledge is methodology pursued with a scientistic self-understanding of the sciences. "Scientism" means science's belief in itself: that is, the conviction that we can no longer understand science as *one* form of possible knowledge, but rather must identify knowledge with science. [21]

Both Habermas and Voegelin situate scientism as an epistemological attitude, that defines one kind of knowledge (scientific knowledge), achievable through one methodology (the scientific method). We can now update our definition of scientism: scientism can be thought of as a belief in which science and the methods of science are

[20] Ibid., 169.
[21] Habermas, Jürgen. *Knowledge and Human Interests*. Boston: Beacon, 1971. 4.

the only means by which knowledge is obtainable, therefore the methods of science can be applied to all human interests. This broader synthetic definition begins to illustrate the potentially far-reaching consequences of a scientistic ideology. If it were the case that scientism was a purely epistemological concern that was only relevant to philosophers and other scientists, then the ideology would not be the basis of a useful analysis in the present thesis, or elsewhere. However, other scholars have already argued for a model of scientism that is pertinent beyond the remits of just philosophical or scientific investigation.

The second approach taken towards understanding scientism in scholarly writing relies on a method that could be considered to be less philosophically focused: it concentrates instead on the ways in which scientism influences and frames thought in society. The political philosopher, Tom Sorell, presents a definition of scientism, that while maintaining the epistemological basis of the definitions presented by Voegelin and Habermas, also characterises the more widely relevant issues associated with the ideology. Sorell states that:

> the belief that science, especially natural science, is much the most valuable part of human learning—much the most valuable part because it is much the most authoritative, or serious, or beneficial.[22]

This broader definition allows for an understanding of scientism that is not so closely bound by the core philosophical issue (science is knowledge), but allows for an understanding of the ideology in which science is privileged because it is the best means of arriving at valuable knowledge, that it is the most authoritative, or serious, or beneficial. It is through this broader understanding that Sorell is able to claim that

[22] Sorell, Tom. *Scientism: Philosophy and the Infatuation with Science*. London: Routledge, 1991. 1.

scientism is an ideology that permeates either discretely or directly into society and social policies:

> it can hardly be doubted that, until recently, scientistic beliefs have been strongly held in [scientific, political, and business] circles and indeed throughout society, not only in the West but in the Soviet bloc, not only in the industrialized world but also in the developing countries.[23]

Scientism's success in influencing thought in society is chiefly due to the success that science itself has had at predication, explanation, and control.[24] When applied to the arts, the deployment of science and scientific procedures may not seem to be comparatively beneficial. In the context of producing or attempting to understand creative works, the benefits conferred by science seem to be less applicable.

However, in the following chapter we will see the ways in which the traditional models for understanding musical works were replaced by Eimert with a newer model that borrows from scientific conceptions. In analysing scientism, the ideas of control and mastery over natural domains becomes more evident. Hugh P. McDonald states most lucidly that:

> Scientism is the judgment that there can be one valid and universally true standard for all of knowledge, that science in some sense that only scientism can properly define provides this standard, and that every other perspective is false unless found true within this privileged system.[25]

If it were the case that knowledge is only gained from the application of the scientific method in the context of scientific investigation, then this easily gives rise to the high social emphasis placed on science that Sorell described. Furthermore, if the belief is to be held that all valuable knowledge is only obtainable through scientific enquiry by means of the scientific method, then it stands to reason that these methods, and these

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[23] Ibid., 2.
[24] Ibid., 4.
[25] McDonald, Hugh P. *Radical Axiology: A First Philosophy of Values*. Amsterdam: Rodopi, 2004. 182.

methods alone, should be employed in all areas that are dependant on knowledge systems, as other methods of enquiry fail to provide knowledge of value, or in the more extreme readings of scientism, knowledge at all. Consequently, it can be seen that not only is scientism an ideology unto itself, but it is also a condition for other ideologies.

Not all applications of science and scientific methodologies in the traditional realms of the humanities were beneficial. Although the specific terminology differs from the more typical, although not unproblematic, term 'scientism', Hannah Arendt identifies scientism as antecedent for totalitarian regimes:

> Scientificality of mass propaganda has indeed been so universally employed in modern politics that is has been interpreted as a more general sign of that obsession with science that has characterized the Western world since the rise of mathematics and physics in the sixteenth century; thus totalitarianism appears to be only the last stage in a process which "science [has become] an idol that will magically cure the evils of existence and transform the nature of man."[26]

By limiting the worthiness of intellectual investigations outside of science by the process of removing value from knowledge pertinent to those fields, such as philosophy or other humanities subjects, a sinister situation arises whereby knowledge and subsequently social value is limited to one discipline, therefore silencing the concerns and contributions of other fields and the interests of those involved with them. Arendt clearly identifies scientism as being not only one possible ideology under which totalitarianism can flourish, but one of the central underpinning ideologies that permitted the totalitarian Nazi and Stalinist regimes to justify and enact gross human violation and genocide:

> Their hideous discoveries in the realm of the possible are inspired by an ideological scientificality which has proved to be less controlled by reason and less willing to recognize the factuality than the wildest fantasies of prescientific and prephilosophical speculation.[27]

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[26] Arendt, Hannah. *The Origins of Totalitarianism.* New York: Harcourt, Brace & World, 1966. 346.
[27] Ibid., 436.

Scientism implies a reductionist attitude towards knowledge, whereby complex networks of knowledge, such as moral, social, and historical knowledge are delineated to the point that in isolation they lose their complex contexts, and as such lose much of their meaning. On the scientistic underpinnings of totalitarianism, Rabkin and Mirskaya state:

> science was clearly a constitutive, i.e. more than merely instrumental, element of totalitarian forms of political oppression. While different degrees of rejection of modernity characterized all totalitarian ideologies, they were, at the same time, permeated by scientific discourse. Their common trait is reductionism, i.e. the reduction of complex political and societal issues to a limited number of variables that are then presented as part of a scientific problem. Social and political tensions were reduced to a "problem" for which solutions, preferably final, were enthusiastically sought. The very use of the word "problem" presupposes that a solution exists and should be found. Scientific language was adapted to totalitarian uses, thereby conferring the air of objectivity on value judgments of most serious nature.[28]

Two points of major significance have been illuminated from my closer reading of scientism: the language used by Sorell present in the above extract (*the most valuable*; *the most authoritative*, *serious*) begins to characterise attitudes that can be observed in *die Reihe*. Sorell has observed that by branding a discipline as a *science (*for example, *creation science*), and incorporating scientific or science-like methodologies, the status of the discipline becomes both legitimised and its social worth elevated, often independently of its perceived success at the application of these methods.[29] Secondly, it has been seen that while scientism is an ideology that is mostly concerned with the state of knowledge and investigation, its philosophical implications are far reaching into general aspects of life and work by creating a monopoly on authority and value. The model of scientism that I have outlined can be refined further:

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[28] Rabkin, Yakov M., and Elena Z. Mirskaya. "Science and Totalitarianism: Lessons for the Twenty-first Century." *Science and Ideology: A Comparative History*. Ed. Mark Walker. London: Routledge, 2003. 17-35. 22.
[29] Sorell, 2.

1) that scientism can be thought of as a belief in which science and the methods of science are the only means by which knowledge is obtainable, or the only means by which valuable knowledge is obtainable;

2) the methods of science can be beneficially applied to all human interests, due to their success at prediction, explanation, and control; scientific methods confer authority and legitimacy through the belief in points 1 and 2.

It is conceivable that the two claims do not need to be held simultaneously in order to be subject to a scientistic ideology. The first claim will logically imply the second claim, but the second claim does not necessarily imply the first. This model reflects both the core epistemological belief that is characteristic of scientism, while also identifying the logical consequences of such a tenet.

2 Eimert's musical model and scientism

2.1 Chapter overview

Having just previously considered the context for the present thesis, as well as of the journal *die Reihe* itself, it will now be necessary to examine the context of Herbert Eimert's intellectual climate, and the ways in which his work might demonstrate a scientistic mindset. In this chapter we will briefly consider some factors that may have influenced Eimert's conception of science, and of music, in the context of a post-Second World War, and post-Nazi, Germany. As illustrated in our synthetic model of scientism discussed previously, science is seen to be of enormous benefit, and for those choosing to employ science for the betterment of any one thing, be it governmental policy, medical treatment, or indeed, musical composition, it should not be overlooked how science might be seen as a means of improvement through a particular medium. And with desire for bettering comes a moral discussion, and as such I will later examine how the application of science or even the belief in the application of science can be characterised in terms of moral forces.

2.2 Germanness and the 'young generation'

During the late nineteenth century, the rise of modernist aesthetic concerns in music had been closely linked with Germanness, both as a political and a nationalistic identity.[30] The establishment of a unified German state in 1871 started and greatly accelerated the process of cultural modernisation that saw economies grow, borders

[30] Frisch, Walter. *German Modernism: Music and the Arts*. Berkeley: University of California, 2005. 8.

change, and cultures intermingle; modernisation was integral to having a strong Germany, and a strong German identity.[31] However, Germany after the Second World War was again a non-unified state, and not only did the Germans have to contend with the radically different living conditions of East and West Germany, but they also had to find strategies for dealing with the social and physical devastation left in the wake of the war. The concept of the 'young generation' became a central concern in post-war German literature, referring to young German adults who were implicated in a political situation that was not of their own construction; M. J. Grant stated that:

> it was a generation which, because of the intense physical and emotional upheaval it had experienced, could no longer abide by the traditional framework of German culture.[32]

The young generation of Germans had inherited the cultural legacy of the Nazis, and sought to find a means of not only rebuilding Germany as a country, but also Germanness as a national identity. During the Nazi era, as part of a larger process of censorship, the Third Reich took control of musical institutions, thereby also controlling not only the kinds of music that were performed and taught, but also the analytical methods by which music could be understood.[33] The Nazification of German culture, and in particular the reimaging of Beethoven as an Aryan hero, had a profound effect on the German people. As the Nazi government had control of the German academy, it was easy for the government to fabricate scholarship on Beethoven that supported a portrayal of him as a *Volk* hero, while simultaneously suppressing conflicting research. [34] The exaggeration of Beethoven's Germanness, and the

[31] Ibid.
[32] Grant, 13.
[33] Dennis, David B. *Beethoven in German Politics: 1870-1989*. New Haven: Yale University Press, 1996. 144-145.
[34] Ibid., 146.

sanitisation of his image so as to comply with the policy of racial hygiene, was an important part of incorporating Beethoven into the cultural identity of the Third Reich. Descriptions of Beethoven as a conquering hero accompanied the usage of the Third Symphony as a 'sonic emblem of the Third Reich'.[35] At virtually every level in culture, Beethoven was depicted as the Nordic Hero; the usage of his music in Nazi propaganda films, and in full features, created an indelible association between Beethoven as a historical German composer and as a Nazi figure.[36]

2.3 The moral character of music, before and after the Nazi regime

The appropriation of canonical German composers left the young generation with an ethical dilemma. They had seen how a 'great composer's' music was used to propagate a message they did not believe in, and they sought to create work that would not be associated with it. After the fall of the Third Reich, Nazi censorship of the arts stopped, and the young generation were able to explore artistic and creative avenues that had previously been unavailable to them.[37] Science was widely seen as a means to achieving a more moral society, despite the atrocities that had only just occurred being fuelled by the scientifically driven program of racial hygiene.[38] The belief was that science would forge a moral community which would not allow for the disruptions experienced in World War II to be repeated; at the point of *Stunde null*, the rationalisation of action as informed by scientific knowledge appeared to be the basis for a fair and moral society.[39]

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[35] Ibid.
[36] Ibid., 158.
[37] Grant, 12.
[38] Beyler, Richard H., and Morris F. Low. "Science Policy in Post-1945 West Germany and Japan: Between Ideology and Economics." *Science and Ideology: A Comparative History*. Ed. Mark Walker. London: Routledge, 2003. 97-124. 105 – 106.
[39] Sorell, 2.

[40] However, it was the same pragmatic and rational belief in the methods of science that led to the policy of racial hygiene. The continued investment in scientific practices to define moral stances indicates that scientism was still a prevalent ideology in post-war West Germany. It has been stated that scientism was widely influential during most of the twentieth century (with Sorell emphasising the 1950s and 1960s),[41] and as such the belief that science was 'ideologically pure, and therefore conductive to a nascent anti-totalitarian political culture', even after the policies of racial hygiene, indicates a naïve scientistic mindset, that in part formed and shaped the post-war German social and political climate:

> the leaders of the scientific professions and their defenders in other disciplines also asserted claims of science's ideological desirability. Countering the critiques of technical-scientific modernity such as Junger's, they frequently portrayed science as a contributor to a political culture of freedom. In popular articles, university addresses, memoranda to officials asking for public support - and not a few Persilscheine (testimonials for denazification proceedings) - scientists argued that scientists, too, had been victims of Nazism and therefore now deserved better treatment.[42]

Scientism can be traced even earlier than the immediate post-war era. The revolution of German culture following the First World War is not dissimilar to that after the German Unification in 1871. German musical culture was at this stage not truly anti- or post- romantic, but counter-romantic movements had begun to emerge. Perhaps most significantly, Robert Hill draws attention to the emergence of the Baroque revival, and historically informed performance practice. From a moral perspective, the figures of Bach and Handel represent the unblemished German spirit, offering nationalistic German figures that have not been mired by Nazi-era appropriations.[43]

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[40] Beyler and Morris, ibid.
[41] Sorell, 1.
[42] Beyler and Morris, ibid.
[43] Gilliam, Bryan Randolph. *Music and Performance during the Weimar Republic*. Cambridge: Cambridge UP, 1994. 38.

In the context of Nazi appropriation, Eimert's position in the 'young generation' is more questionable than some of *die Reihe's* other contributors. Born in 1897, Eimert's eligibility for the special exemption from collective guilt that the young generation felt entitled to is doubtful.[44] At the outbreak of the Second World War in 1939, Eimert was already forty-two years old, and by the first publication of *die Reihe* in German, he was fifty-eight. With this consideration, and in the light of the obvious Nazi appropriation of canonical musical figures, Eimert's desire for an absolute, objective musical language is perhaps a compelling case that he wanted to establish a musical framework that could not be part of a nationalist propaganda campaign in the future.

Collective guilt as a personal motivator for Eimert is but one factor. More widely, there was a process of increasing abstraction occurring in art in Germany, as part of denazification.[45] Abstract art, by virtue of its qualities, is a foil to many kinds of Anglophone popular culture, a culture that had begun to move into Germany by the 1950s, thanks in part to the Allied occupation of Western Germany, and also the continuing growth of mass communication technologies. Situating Eimert's musical framework in terms of a formalist musical discourse allows us to more easily engage with the moral arguments that concern it, and its dialectical opposition to popular music. To this end, Kantian aesthetic models become valuable for their focus on moral character, as opposed to their aesthetic criticism. While Kant does not explicitly feature in the writings of *die Reihe*'s authors, his position as one of the central philosophical figures, and his monolithic contribution to the study of aesthetics, makes him a writer whose contribution in German thought should not be overlooked. Kant acknowledged

[44] Covach, John. "Eimert, Herbert." *Grove Music Online*. Oxford Music Online. Web. 18 Apr. 2016. <http://www.oxfordmusiconline.com/subscriber/article/grove/music/08647>.
[45] Grant, 20.

the genius of all fine art, and thus its value, but he did not equally distribute that value universally between all forms of fine art. Sorell states that according to Kant music ranks highly for its agreeableness, but a closer reading of Kant's *Critique of Judgement* actually assigns value to the art's moral character.[46] First among the fine arts stands poetry, as it:

> expands the mind by setting the Imagination at liberty; and by offering within the limits of a given concept amid the unbounded variety of possible presentment of this concept with a wealth of thought, to which no verbal expression is completely adequate; and so rising aesthetically to Ideas.[47]

Most critically, Kant claims poetry loses its status when it is used to rhetorically deceive in a civil context.[48] It is for this exact reason that 'the art of tone' is assigned a lower position than poetry. According to Kant, music, being unable to rhetorically communicate, simply '[plays] with the sensations'.[49] *The Critique of Judgement* makes it clear that the function of music is to please, not edify, effectively reducing its application to that of a health tonic.[50] Curiously, Kant's conception of the 'art of tones' does not consider the value of a medium in which both the senses are pleased and the mind's Imagination set at liberty, such as can be found typically in vocal music, but also any music that can be understood semiotically, or emblematically. In a more nuanced model of morality in art, Peter Kivy establishes three categories of moral force: *epistemic*, a force that can impart moral character via its own 'power' (which is taken to mean characteristics of its composition), *behavioural* moral force, such as the moral-forming influence of a parent, or a behaviour-altering drug. *Character-building* force,

[46] Sorell, 60.
[47] Kant, Immanuel. *Critique of Judgement*. Ed. Nicholas Walker. Trans. James C. Meredith. Oxford: Oxford University Press, 2008. §53, 216.
[48] Ibid., §53, 217.
[49] Ibid., §51, 321.
[50] Ibid., §53-54, 217-223.

which is considered the third category, is any moral force that is considered to be capable of influencing moral character.[51] As the third category is not genuinely a category, rather a behaviour of the preceding two categories, it will not be considered in this discussion. If poetry and literature can be epistemic, then absolute (instrumental) music, by virtue of the fact it does not contain lingo-semantic content, cannot.

How, then, can one account for the Nazi appropriation of sonically absolute music? It is conceivable that the Third Reich functioned as a behavioural moral force by appropriating canonical German works and associating them with Nazi actions. Kant's model does not account for the possibility of a music that also 'expands the mind by setting the imagination at liberty' in the way that Nazified music did, but it does clearly illustrate the moral dimension encountered in works of art, and specifically, the opportunity for works to be used as rhetorical devices. It is one thing to discuss the Nazification of culture, but when reduced to its fundamental components, the Nazification was the mechanism by which oppression, racism, and genocide became acceptable. The expression of German nationalism as Nazism led Theodor Adorno to write:

> Genocide has its roots in this resurrection of aggressive nationalism that has developed in many countries since the end of the nineteenth century.[52]

The Kantian model of artistic morality previously suggested, when extended to allow for the moral-affective nature of music and in combination with Kivy's epistemic and behavioural moral forces, clearly illustrate the seriousness of an artistic medium's moral

[51] Kivy, Peter. Antithetical Arts: On the Ancient Quarrel between Literature and Music. Oxford: Oxford University Press, 2009. 219.
[52] Adorno, Theodor W. *Critical Models: Interventions and Catchwords*. New York: Columbia UP, 1998. 191.

character. Thus Eimert's musical model, which he defines as being rational and objective, is in a position of relative moral security, as it evades any rhetorical and moral associations by its abstract musical construction – an abstract construction that was achievable through situating the compositional processes in rational processes (see **2.5** for further discussion on this topic).

2.4 Modernisation and science in Germany

The anti-traditionalism seen in *die Reihe* is in part thanks to scientism's presence, but it is also part of the broader ongoing modernist project that had been developing in Germany from the 1870s.[53] Modernism, the process of de-ruralising the populace and encouraging social modernisation, in Germany becomes more evident after each period of political upheaval. After the establishment of the second Reich, an 'ambivalent modernism' emerged, characterised by a 'positive outlook toward the rapidly changing social, economic, and scientific German landscape',[54] as well as holding onto romantic notions of the *Volk* as an essentially rural and crafts based population. In the late 1880s, some German aesthetic considerations begin to turn to science and naturalism as a means of returning to the *Volksgeist*. Of the writers from this period, Nietzsche is perhaps the most vocal on the position of science and art in culture. For him, science (*Wissenschaft*) is the means by which Wagnerian-Schopenhauerian metaphysics can be overcome, by employing man's natural capacity for judgement, in order to allow for culture to reflect reality.[55] However, Nietzsche's science is not the kind of formal science that later writers invested in (and it is certainly not the kind of empirical science that

[53] Frisch, 7.
[54] Ibid., 8.
[55] Ibid., 21.

the writers on scientism described), but it is a method of thinking that 'endorses a broadly scientific conception of the world.' [56] The solution to Wagnerian-Schopenhauerian metaphysics, and presumably the Wagnerian musical model, is an art that reflects reality.[57] It is this conclusion that allows us to connect the early modernism of Nietzsche and his generation – the anti-romantic aesthetic and return to the *Volksgeist* – with the development of science in the German political situation. A solution to the decadence of the romantic style was neo-classicism, the 'deceptive naiveté combined with great subtlety; refined awareness of its own modernity and a conscious delight in the deliberate exploitation of tradition'.[58]

2.5 A rational and objective musical language

Thus far we have seen how scientific practices had been considered a possible solution to human problems in society. Rationalism and objectivity were not only seen as useful to society more generally, they were also an integral aspect of Eimert's aesthetic vision. In discussing Eimert's musical conceptions, the theorist and critic Hans Heinz Stuckenschmidt (1901 – 1988) says of Eimert:

> He is opposed to all metaphorical synaesthetic interpretation – that is, he is opposed to the idea of composition and interpretation by association and reference.[59]

The attitude that Stuckenschmidt described draws attention to the core ideas that characterised Eimert's musical interests. Stuckenschmidt does not state what Eimert hopes to achieve musically, but rather illustrates what Eimert opposes, namely

[56] Cox, Christoph. *Nietzsche: Naturalism and Interpretation*. Berkeley: University of California, 1999. 5.
[57] Frisch, 23.
[58] Love, Frederick R. "Nietzsche's Quest for a New Aesthetic of Music: "Die Allergrösste Symphonie", "grosser Stil", "musik Des Südens"." *Nietzsche-Studien* 6.1 (1977): 154-94. 171.
[59] Stuckenschmidt, Hans Heinz. "The Third Stage." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 1 (1958): 11-13. 11.

'metaphorical synaesthetic interpretation', which is then qualified as a compositional model that relies on association and reference. What Stuckenschmidt's statement can be taken to mean is that music which is programmatic violates Eimert's musical interests due to the mapping of extra-musical meaning, such as a lyrical or pictorial narrative, onto a musical experience. Support for this interpretation is found in Eimert's own prose, where he states that:

> Clearly there can be no private self-portrayal identifying itself with Art within the broadly 'objective' historical context of music and of masters of non-subjective music; there can be none of that 'pathetic-bourgeois' pose which associates and presents Art as arrant, tragic-daemonic play-acting.[60]

Here Eimert is arguing against the notion of an artist constructing meaning (*private self-portrayal*) and of presenting 'Art' as 'arrant, tragic-daemonic play-acting' (Romanticism). Rather, Eimert suggests that in music of the past 'material played an active role, as if a secret rationality was contained within it'.[61] The 'secret rationality' is not an obvious idea, and is perhaps even more elusive when the repertoire that Eimert states exemplifies the 'secret rationality' was found predominantly in the theoretical tracts of the 14th and 15th centuries.[62] Eimert does offer some further explanation for his statement:

> pre-expressive music [pre-Romantic] appears to be subjectively under-developed. It has other traits in common with electronic music; most significant its distinctly material character. The material itself is made to 'speak' — not because it has found voice but because it has been arranged by human device, even if with theological help, at least without pathos and subjectivity in the modern sense. [63]

As such, the 'secret rationality' of the pre-expressive and pre-Romantic era was the characteristic of musical material speaking for itself. According to Eimert, the ability

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[60] Eimert, Herbert. "What Is Electronic Music?" *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 1 (1958): 1-10. 6.
[61] Ibid., 7.
[62] Ibid.
[63] Ibid.

for material to 'speak' is due to the fact that it has been composed and conceived by human minds. Eimert is making a parallel between his new medium of electronic music and music of the past in that, according to him, they both 'speak', which I take to mean that they express musical material as opposed to any other form of narrative such as pictorial or lyrical, without 'pathos and subjectivity in the modern sense.' While Eimert's intentions are clear, the parallel he drew is not without its own issues. If 'pre-expressive' music is devised with 'theological help', then it is expressing theological ideas, which in turn results in a musical work whose material character is also a theological character, and as such assumes a narrative of worship, or other theological theme; the act of mapping extra-musical meaning onto a musical work that Stuckenschmidt claimed that Eimert was opposed to still takes place. Despite this inconsistency in Eimert's argument, his musical desires are quite clear: musical works should express their own abstract musical content that is inherent in the 'secret rationality' of their own 'material character'.

To turn to the idea of a rational music more explicitly, it is necessary to see on what grounds such an argument is possible. Eimert described electronic music as 'a meeting of acoustical and compositional developments which are particular to our epoch'.[64] Acoustics is a field of investigation within physics which seeks to clarify and explain the physical nature of how sound works. Eimert's writing on electronic music clearly contains both acoustical and compositional thinking due to the technical nature of electronic music's production. But in addition to the pragmatic application of science for the production of electronic tones, the kind of musical rationalism that Stuckenschmidt and Eimert make reference to can be attributed not only to the medium

[64] Ibid.

of electronic music, but also to the aesthetic desire for a music that is free from 'private self-portrayal' or 'arrant, tragic-daemonic play-acting'. A model of scientific empiricism which Sorell proposed to characterise the scientistic mindset may have a potential role in understanding how the processes of science might have influenced Eimert'

> 1) science is unified; (2) there are no limits to science; (3) science has been enormously successful at prediction, explanation and control; (4) the methods of science confer objectivity on scientific results; and (5) science has been beneficial for human beings. [65]

It is Sorell's fourth point which is the most immediately relevant to Eimert's thinking: without an objective stance on scientific results, the data and the ensuing knowledge would be seen as considerably less valuable by Eimert. Among philosophers there is a fundamental dispute between those who are Rationalists and those who are Empiricists (one being concerned with the validity of *a priori* knowledge, and other concerned with *a posteriori*). In scientific discourse, however, rationalism is a precursor to empirical investigation: a hypothesis is obtained by intuition and informed by current knowledge, and is then empirically tested and verified. Scientific discourses are more likely to conflate rationality and objectivity, as both mentalities are integral to the scientific process.[66] In *die Reihe* the terms rationality and objectivity are used interchangeably, but form an integral part of the aesthetic discussions, as illustrated above with Eimert referring to a 'secret rationality'. Indeed, the Rationalist-Empiricist discourse itself is indirectly referenced when Eimert, referring to the active role of material and secret rationality, states:

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[65] Sorell., 4.
[66] Reiss, Julian. *"Scientific Objectivity."* Stanford University. Stanford University, 25 Aug. 2014. Web. 18 Apr. 2016. <http://plato.stanford.edu/entries/scientific-objectivity>.

> The validity of this impression is enhanced by the way in which the material itself is hesitatingly, almost blindly tested, leading finally to a logical, conscious procedure directed by intellectual principle.[67]

Eimert has constructed a narrative that suggests the imposition of the artist (or artistic meaning) onto material is redundant, citing that historically the material itself was an active agent of meaning, due to its own abstract qualities, derived from intuition and experimentation. Eimert reaches the conclusion that:

> Objectivity stipulates objects, but the material of Art is objective in a sense which is different from that of Nature.[68]

'Objectivity stipulates objects' is an obvious statement, but the conflation of objectivity with Art and objectivity with Nature is not so clear. The juxtaposition of Art and Nature can be read as the difference between an object whose semantic content is informed by cultural practices, and those which are not, which may or may not even exist. Like many of the other writings in *die Reihe*, the crux of Eimert's essay is not transparent. However, we are left with the impression of an aesthetic model that Eimert is advertising: one that is chiefly concerned with preserving the abstract nature of musical material, and its ordering based upon its inherent natural characteristics as observed through scientific methods, and not those of which that have been artificially constructed by human imagination.

If we return to the five tenets of scientific empiricism, then we again observe that 'the methods of science confer objectivity on scientific results'.[69] In an aesthetic model where the objectivity of material is desired then the application of a scientific methodology to achieve them is a logical conclusion. Sorell proposes a self-fulfilling

[67] Eimert, 7.
[68] Ibid.
[69] Sorell, 4, 8, 25.

analysis of the five tenets, stipulating that thesis (4) if true, fulfils thesis (3), which in turn is a possible cause for (5), (2), and (1).[70] The third thesis, that 'science has been enormously successful at prediction, explanation, and control' is undoubtedly true,[71] and without scientific innovations, electroacoustic music would have remained a theoretical idea.

Speaking of scientific innovations, Eimert enthusiastically describes the micro control that the composer now has over acoustical elements:

> He now has at his disposal the entire range of frequencies from 50-15,000 c.p.s., 40 or more precisely calculated dynamic levels and an infinite number of durational values, measured in centimetres on tape.[72]

While Eimert does caution the use of technology for technology's sake, and is not as direct as some of the other contributors to *die Riehe*, his anti-traditional viewpoint suggests that affected (concert or conservative) music is retrogressive, and that unaffective or objective (by Eimert's model, electronic, and perhaps pointillist) music is the future.[73] Point (5) of Sorell's model ('science has been beneficial for human beings'), supports the history of scientism in post-war Germany that Beyer and Morris presented, and was shown in the previous section.

2.6 Scientism and Eimert

In Eimert's writings it is necessary to distinguish between the pragmatic needs associated with his new medium of electronic music, and his aesthetic ideas that run in tandem with them. In **3.1** we will see the confusion that arose from Backus'

[70] Ibid., 8.
[71] Ibid., 4.
[72] Eimert, 3.
[73] Ibid., 2-5.

misinterpretation of Eimert's statement about the possibilities of electronic music and acoustic descriptions, but for now we will examine what factors in Eimert's writing shown signs of a scientistic ideology. To briefly remind ourselves of the definition of scientism being used in this argument, it has been defined as the following:

> 1) that scientism can be thought of as a belief in which science and the methods of science are the only means by which knowledge is obtainable, or the only means by which valuable knowledge is obtainable;
>
> 2) the methods of science can be beneficially applied to all human interests, due to their success at prediction, explanation, and control; scientific methods confer authority and legitimacy through the belief in points 1 and 2.

The first point of our definition implies the second point, but the second point does necessarily not imply the first. And in the case of Eimert's writings, the second point can be clearly observed by the enthusiasm in which he approaches the medium of electronic music and the ways in which science allowed and defined its existence at that time. However, scientism as an ideology is primarily an attitude towards knowledge, as illustrated by the first point, and is secondarily an attitude regarding the application of science or scientific knowledge to other human pursuits. Eimert does not directly state his epistemological stances, and as such any such stances must be inferred from his writings and the corpus of his works.

Eimert routinely wrote about his thoughts on music as a dichotomy, presenting aesthetic facets that he viewed as being valuable, and those that he did not (as can been seen in **2.5**). By arguing against 'expressive music', he was in effect arguing against the tradition of the compositional practices most closely associated with Romanticism, and Neo-Romanticism, which Eimert had described as being effectively false and contrived.

In turn, Eimert was arguing for a rational approach to composition, in which the significance of the musical material is situated in the material itself, and not in extra-musical narratives that were attached to the works. As such, the most effective means of producing a rational musical practice was to remove the irrational elements from it, and this was achieved in part by rooting the compositional practices in processes which had their own overt rationality. By opting to situate a humanistic practice such as musical composition in a framework that was so indebted in its appearance and substance to the methods most commonly associated with the sciences, Eimert was effectively underplaying the humanistic part of the compositional act by diminishing the role of human intuition and irrationality in the creative process. While it is still a matter of debate as to whether or not musical works can be considered to be knowledge in their own right, and as such whether they can be obviously scientistic or not, the act of composition itself relies on certain kinds of knowledge, and as such can be considered at least as a source of knowledge. David Elliot writes on the notation of music as knowledge, offering the following in summary:

> Is music a form of knowledge? Is music a source of knowledge?
> Taken as a verb, music in the fundamental sense of musicing or musical performing is both a form of knowledge and a source of knowledge. To know how "to music" musically, to possess musicianship, is to possess a rich form of procedural knowledge. People who know how to interpret and perform musical compositions know these compositions as both products and performative presences. Musicianship provides direct access to the musical work (the composition) and to the art of musicing the musical work (the performance-interpretation of the composition).[74]

While Elliot focuses on the necessary display of knowledge as a prerequisite to musical performance, the same qualities and categories equally apply to composers and composition. For Eimert to argue for a compositional process that is grounded in

[74] Elliott, David J. "Music as Knowledge." *The Journal of Aesthetic Education* Special Issue: Philosophy of Music and Music Education 25.3 (1991): 21-40. 38.

rationality, he is in effect arguing that rational knowledge, which is most closely associated with the sciences, is more valuable than irrational knowledge, and as such it is possible to view Eimert's ideology towards music and musical knowledge within the framework of scientism.

The observations above suggest that Eimert's discourse was both strongly scientistic, and also shared common traits with a commonly referenced model of scientific empiricism. However, it is somewhat contentious for Eimert to be considered emblematic of all of the writings in die Reihe. Despite his position as co-editor with Stockhausen, Eimert was the senior figure among the contributors, both in terms of age and status. In addition, thanks to his position as head of the new music department of the Nordwestdeutscher Rundfunk (later the Westdeutscher Rundfunk), Eimert was the initial disseminator of serial music in West Germany.

3 Science, pseudoscience, scientific methods

3.1 Chapter overview

The previous chapters have focused on setting a historical and intellectual context for *die Reihe* as a publication, and for the works of its authors. This chapter will seek to make clear the fallacies and confusions that arose from the acoustician John Backus labelling the writings of Eimert and Karlheinz Stockhausen as a pseudoscientific endeavour – a derogatory term that implies poorly executed science - in the first issue of *Perspectives of New Music*.

3.2 The demarcation of scientific writing and technical writing

As previously stated in the introductory chapter, Backus was commissioned by the editors of *Perspectives* to evaluate the technical language and apparent scientific content in *die Reihe*. Backus focused on the articles by Eimert (*What is electronic music?*) and Stockhausen (*Actualia*, and *…how time passes…*), with Backus stating that his intention was to:

> […] therefore examine *Die Reihe* with a critical eye in order to evaluate it from this [scientific] point of view. We wish to see if the scientific terminology is properly used, to see if the charts, graphs, and tables have any real significance, and to determine the technical competence of the material from the scientific stand point. If it measures up creditably [sic] to these criteria, all well and good; if it does not, we will be quite justified in dismissing as worthless all of it that does not make sense by ordinary standards.[75]

Over the course of Backus' article, he finds many of the terminologies and concepts in *die Reihe* to be unscientific and flawed in their application, stating that:

> the articles in this periodical conform to all the best traditions of pseudo-scientific writing in their disregard of accepted meanings of scientific terms, their unintelligibility, and their complete lack of any reference to the results of other workers as support for their statements.[76]

[75] Backus, 161.
[76] Ibid., 171.

Backus states that the writings in *die Reihe* do not credibly measure up to his scientific standards, and that the content must therefore be dismissed as an example of pseudoscientific writing. Later in this chapter I will further question Backus' use of the term 'pseudoscience', but for now we can see that the Oxford English Dictionary defines pseudoscience to mean:

1. As a count noun: a spurious or pretended science; a branch of knowledge or a system of beliefs mistakenly regarded as based on scientific method or having the status of scientific truth.
2. As a mass noun: spurious or pretended science; study or research that is claimed as scientific but is not generally accepted as such. Chiefly *derogatory*.[77]

I want to challenge Backus' assertions by arguing that *die Reihe* is not an example of pseudoscience and consequently that the technical writings, even in spite of their flaws, must be examined as a constitutional part of the journal and the creative practices that it describes. In Backus' evaluation, there is an implicit conflation between the ideas of technical writing and scientific writing, with the value and worth of the journal resting on its scientific proficiency irrespective of the use and function of the scientific and technical elements. Additionally, I will later argue through the use of specific case-studies that the scientifically-influenced technical language in *die Reihe* was a vehicle for the musical ideas expressed in the journal, and that it was not a scientific journal concerned with conducting or refining scientific research. In order to illustrate that *die Reihe* was not a scientific journal, or at the very least that the articles that Backus focused on were not examples of scientific writing, the next section of this chapter will examine some of the differing functions of scientific and technical writing. Following this, an understanding of pseudoscience in the context of the history of science will be

[77] "pseudoscience, n." *OED Online*. Oxford University Press, September 2015. Web. 3 December 2015.

examined in order to evaluate whether or not it had been usefully applied by Backus to *die Reihe*.

When examining the differences between scientific and technical writing, it is worth first considering some of their superficial similarities: both types of writing generally use formal languages, tools, and notations to precisely convey their contents. It is typical in scientific writing that the use of formal languages, specifically mathematics, is the primary means by which any relevant content can be most accurately and unambiguously communicated to a recipient, with the goal of presenting or representing scientific knowledge along with the necessary data and processes needed to comprehend it. The biologist Robert M. May usefully writes on the mathematics in biological sciences:

> A paradigmatic account of the uses of mathematics in the natural sciences comes, in deliberately oversimplified fashion, from the classic sequence of Brahe, Kepler, Newton: observed facts, patterns that give coherence to the observations, fundamental laws that explain the patterns.[78]

May's account, which he admits is oversimplified, illustrates that mathematics is a tool to represent and explain observational facts in a coherent way. To attempt to explain exactly what science is as a discipline is beyond the scope of the present discussion, and indeed the question of what constitutes science is the core enquiry of many areas of study, such as the philosophy of science, and science and technology studies. A simple description by a philosopher of science, Richard Purtill, will at least offer a rudimentary definition:

> It is now generally accepted that the purpose, or at least the central purpose, of science is to explain, or perhaps to explain and predict.[79]

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[78] May, Robert M. "Uses and Abuses of Mathematics in Biology." *Science* 303.5659 (2004): 790-93. 791.
[79] Purtill, Richard. "The Purpose of Science." *Philosophy of Science* 37.2 (1970): 301-06. 301.

Purtill's definition is arrived at by questioning the purpose of scientific work. Thomas Kuhn, another scholar of science, has a definition based on what science *is*, as opposed to its purpose:

> 'normal science' means research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice.[80]

Being similar to scientific writing, technical writing, a kind of writing that focuses on specialist and technical issues, also often relies on specialist vocabularies, and formal and artificial languages, despite often being situated outside of science and scientific writing. The starkest contrast between scientific and technical writing is seen in the marked difference in their respective functions. To illustrate but one example of this, architectural plans, while being technical, do not constitute works of science as they neither present nor explicitly engage with scientific discourses, despite many of architecture's developments having a basis in scientific investigations. The same argument can be presented for a number of other kinds of technical writing: wiring diagrams, instructional pamphlets, and musical scores, to name just a few.

There are some key canonical texts in scientific literature and in other disciplines which most clearly demonstrates the independence of technical writing from writing on science. To give just two examples: Darwin's *On the Origin of Species* is a notable example of a text that is scientific (in so far as it contributes to the body of scientific knowledge), which does not feature technical writing or notation; Palladio's *Four Books of Architecture* features many types of technical writing and notation, such

[80] Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago: University of Chicago, 1970. 10.

as measurements, ratios, and technical construction details, yet does not present speculative or predictive claims that Purtill stated was the primary function of science.

Having briefly considered the similarities and differences between technical and scientific writing, it is now possible to try and evaluate whether or not *die Reihe* is indeed an example of scientific writing, or if it simply makes use of technical writing and some terminologies from the sciences. Electronic music was the theme of *die Reihe*'s first issue, and in 'What is electronic music?' Eimert clearly stated that the function of electronic music is not to emulate traditional instrumental music, but it exists as an independent form of music making.[81] On an elementary level, the mechanical means of musical production forced a transition from the model of having a notated work that was interpreted by a performer, to a composer-machine model which eliminated the need for either traditional musical notation, or indeed performers. Such a radical shift in compositional models required different sets of concepts and vocabularies to accommodate the new timbral and musical options that were available to composers. Eimert's equipment enabled him to divide a tone into fifty-two equal divisions, which he conceded could not have been rendered via traditional notation, nor any extension of traditional notation.[82] The solution that Eimert found was to render electroacoustical 'scores' as semi-acoustical diagrams which then necessitated the inheritance of acoustical and diagrammatic terminology:

> The multiplicity of forms of electronic elements far exceeds the possibilities of graphic notation. It is thus necessary to notate differentiations, which are unknown to traditional music, in a way which corresponds to acoustical phenomena. This cannot be effected by an extension of traditional notation; it is better to present the sound procedures of electronic music graphically in the form of an 'acoustical' diagram. Thus

[81] Eimert, 1.
[82] Ibid., 3.

> 'scores' of electronic compositions resemble precise acoustical diagrams with their co-ordinates, frequency (cycles per second), intensity level (measured in decibels) and time (cm.p.s.). The composer is required to have a certain amount of acoustical knowledge. In this respect it is to be observed that acoustical conceptions do not always correspond to those of musical theory.[83]

From this quotation it is clear the ways in which traditional musical terminology was deemed unsuitable to describe electronic music, and as such the adoption of certain ideas and terminologies from acoustics, a branch of physics, was a useful means of articulating the parameters of the musical practice. It seems that for Backus the use of terminologies from science present in *die Reihe* also implied that a scientific investigation was underway, but significantly it is seen from Eimert's writing that the use of acoustical terminologies corresponded directly to the creative practice that he was discussing.

In the previous chapter I argued that Eimert's aesthetic ideas as illustrated in *die Reihe* can been seen as having a basis in scientific thought and culture. It will later be analysed to what extent science and technical conceptions had influenced the understanding of musical analysis and composition in *die Reihe*, focusing particularly on Stockhausen's 'Two Lectures', Lewinski's analysis of works by Giselher Klebe, and Fokker's scientific evaluation of *die Reihe*. In the case of the articles by Stockhausen and Fokker, they presented thinking and writing that epitomised the science-like framing of the ideas that Backus was critical of, and in Lewinski's article it is argued that musical materials need to be situated in abstract mathematical processes so that the musical materials can have an objective coherence without being arbitrarily defined by the composer. However, before approaching the analysis of these three articles, the issue of pseudoscience must be addressed. As seen previously, Backus in his *A Scientific*

[83] Ibid.

Evaluation stated that the ideas in *die Reihe* were not science, or at the most generous, not good science. The foremost issue lies with Backus' expectations of the journal and the language employed therein. For the most part, *die Reihe* may have the appearance and language of scientific document, but beyond the technical language that is typically associated with scientific writings, *die Reihe* is concerned entirely with aesthetic issues and, as the series' subtitle notes, developments in serial music. Consequently, Backus' evaluation demonstrates that the technical language in *die Reihe* is indeed flawed due to its inconsistent use of standardised acoustical terminology, but a much more significant aspect of Backus' evaluation is the implicit demarcation of science from pseudoscience.

3.3 Understanding *pseudoscience*

The demarcation of science from pseudoscience is one of the core concerns in the philosophy of science, and there is extensive literature on the distinction between pseudoscience and science which defines the characteristics that separate a science from a pseudoscience.[84] The need for a clear demarcation between the two returns us to one of scientism's key characteristics as defined in the previous chapter: that science and scientific knowledge legitimise and authenticate whatever idea or activity they are applied to. If an idea is presented in a scientific manner then, reasonably, certain expectations will accompany it. Scientific data implies the deployment of mechanisms

[84] See Mahner, Martin, 2007. "Demarcating Science from Non-Science." pp 515-575 in Theo Kuipers (ed.) *Handbook of the Philosophy of Science: General Philosophy of Science – Focal Issues*, Amsterdam: Elsevier; Pigliucci, Massimo, 2013. "The demarcation problem. A (belated) response to Laudan." pp. 9–28 in Pigliucci and Boudry (eds.) 2013; for an alternative narrative that refutes any attempt to demarcate science from pseudoscience, see Laudan, Larry, 1983. "The demise of the demarcation problem." pp. 111–127 in R.S. Cohan and L. Laudan (eds.), *Physics, Philosophy, and Psychoanalysis*, Dordrecht: Reidel.

or schemas to ensure that the results are repeatable, rational, and precise. Pseudoscience typically seeks to capitalise on these legitimising characteristics without necessarily observing the mechanisms that confer credibility onto the scientific data. In light of Backus' evaluation of *die Reihe*, and his accusations of pseudoscience, a clearer understanding of how the term pseudoscience could potentially apply to *die Reihe* is important. If it is the case that *die* Reihe is pseudoscientific, then the scientifically influenced technical writing that it contains would be valueless. However, a closer analysis of pseudoscience both as terminology and as a concept suggest that Backus' application of the term might be in error.

Sven Ove Hansson's entry in the *Stanford Encyclopedia of Philosophy* on 'Science and Pseudo-Science' highlights the complexity of the demarcation: it is overly simplistic to state that the delineation of science's boundaries reveals pseudoscience.[85] The contents block of Hansson's article is a useful tool for navigating the issues that surround the science/pseudoscience dichotomy, providing headings such as 'The "science" of pseudoscience', 'Non-, un-, and pseudoscience', 'Non-science posing as science', and 'A wider sense of pseudoscience'. Hansson states that there are two fundamental criteria that an activity or idea must hold in order to be pseudoscientific:

> A phenomenon is *pseudo-scientific* if and only if:
> (1) it is not scientific, and
> (2) the person(s) responsible for the phenomenon try to create the impression that it is scientific.[86]

die Reihe is challenging to examine in the context of Hansson's definition: broadly speaking, *die Reihe* is not a scientific journal (it does not engage in the activity of

[85] Hansson, Sven Ove. "Science and Pseudo-Science." *Stanford University*. Stanford University, 03 Sept. 2008. Web. 18 Apr. 2016.
[86] Hansson, Sven Ove. "Defining Pseudo-Science." *Philosophia Naturalis* 33.1 (1996): 169-76.

scientific discovery or documentation), yet its contributors presented their material in a fashion that is unmistakably technical in style and conception. Significantly, *die Reihe* makes few claims of a genuinely scientific nature. The claims of Eimert and Stockhausen in 'What is electronic music?' and 'Actualia' that troubled Backus are not presented as scientific discoveries, rather they account for compositional processes, no matter how unsatisfactorily. Backus was critical of Eimert's description of the new compositional possibilities afforded by electronic music, having written:

> [Eimert] states that there are 52 pitch levels between A4 (440.00 cycles/sec.) and B4 (493.88 cycles/sec.). (This is the recommended terminology. A4 is the standard pitch of 440 cycles/sec. and C4 is middle C. The notation a', b', etc. is not recommended by the Acoustical Society of America.) Eimert is obviously ascribing a separate "pitch" level to each unit increment of frequency - 441, 442 . . . etc., taking (for reasons unknown) B4 as exactly 492 cycles/sec. This is absurd, as there is a continuum of frequencies between these two levels; 441.01 cycles/sec. is just as specifiable a frequency as is 441.00 cycles/sec., and corresponding to this continuum of frequencies is a continuum of pitches.[87]

Backus misread this as an empirical statement, as opposed to what was actually a description of a processes that Eimert had been working with:

> Every musician is familiar with the note a' at 440 c.p.s. The next whole tone above is b' (492 c.p.s.). Within this major 2nd from a' to b', we are able to generate 52 different pitch levels of which, when ordered in a scale, at least each fourth level is heard as a different pitch interval. [88]

M.J. Grant clarifies this particular concern, first by stating that the equipment that Eimert used could only be set to rounded frequencies, indicating that Backus was not aware of Eimert's cycles-per-second figures accurately reflecting his working methods.[89]

As also observed in the article by Backus on Eimert's 'What is electronic music?', and Stockhausen's 'Actualia', the main focus of Backus' article is Eimert and

[87] Backus, 163.
[88] Eimert, 3.
[89] Grant, 3.

Stockhausen's improper application of terminology, as well as some dubious mathematics. There is however a significant difference between 'What is electronic music?' and 'Actualia' that Backus overlooked: Eimert's article serves as a survey of the then-current state of electronic music and its technologies, differing significantly in function to Stockhausen's 'Actualia', which functioned as a personal account of Stockhausen's compositional processes.

Stockhausen's article contains multiple features that set it apart from both Eimert's writing and the standards that Backus evaluated it by. Stockhausen's puzzling choice of title sets an unlikely context for a piece of scientific writing; it is possible that Stockhausen intended to create a not unfitting comparison between the existential aims of the *Gesang der Jünglinge* (1955-56) and the ontology of German philsopher Alexius Meinong, but is perhaps more likely that Stockhausen employed the Latin as a means of either referencing Trinitarian Ontology, or simply exoticising the article itself. Unlike in 'What is Electronic Music?', 'Actualia' employs a much more elaborate writing style, detailing a compositional process in vague terms, as opposed to analytically, let alone scientifically. While Eimert wrote primarily in continuous prose, Stockhausen presented his exposition as a series of short points, later further fragmenting the prose by utilising ellipses before literally trailing off mid-sentence:

> a timbre does not remain the same if its intensity or the frequency of a partial is altered, that … that … [90]

[90] Stockhausen, Karlheinz. "Actualia." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 1 (1958): 45-51. 50.

Koenig comments on the nature of Stockhausen's writing in volume VIII of *die Reihe*, stating that '[…*how time passes*…] is consequently not theoretical in an analytical way, but more programmatic'.[91]

These factors lead to the conclusion that 'Actualia', and 'What is Electronic Music?' do not represent scientific documents: the writings are not science, and their authors do not attempt to present it as science in the most literal sense. If 'Actualia' and 'What is Electronic Music?' are examined against the model of pseudoscience as suggested by Hansson and quoted previously, it is possible to see that (1) these articles are not scientific, but make use of terminologies from the sciences, and (2) the authors of these articles do not try and *create the impression* that they are science, rather they simply use the terminologies inherited from science, which in turn may falsely give rise to the impression that 'Actualia' and 'What is Electronic Music' are science. As such, it seems that these articles fail to satisfy the conditions for Hansson's model of pseudoscience as presented earlier. Backus' assessment does prove useful in showing us that the technical writing is not substantive and does not meet the exacting standards of scientific literature, but in referring to the journals as pseudoscience any potential critical value they might have is cast in an unfavourable light, as is much more likely to be unfairly dismissed.

[91] Koenig, Gottfried Michael. "Commentary on Stockhausen's …how Time Passes… on Fokker's Wherefore, and Why? and on Present Musical Practice as Seen by the Author." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 8 (1968): 80-98. 80.

3.4 Technical language in *die Reihe*

The influence of science and technical writings in *die Reihe* can be observed not only in the articles themselves, but also in the hierarchies and social models that the contributors have adopted from the scientific world. The scientist-composer archetype is established early in *die Reihe*, with Eimert's opening article, 'What is electronic music?', establishing the composer as a studio-based technical innovator. Within the first couple of pages of the article, Eimert states that the composer 'is required to have a certain amount of acoustical knowledge. In this respect it is to be observed that acoustical conceptions do not always correspond to those of musical theory.'[92] It is certainly understandable that composers working directly with sound ought to have at least some theoretical knowledge of acoustics, but the distinction Eimert makes between 'acoustical conceptions' and 'musical theory' is more significant. Superficially the distinction is obvious: 'acoustical conceptions' are observations of natural phenomena, and 'musical theory' is a set of formal languages devised to articulate how musical materials are formulated and organised. In various places in *die Reihe*, which will be detailed in the following case studies, we will see how the traditional formal languages of music theory were supplanted and replaced with 'acoustical conceptions' or other mathematical/scientific procedures. The resulting shift in formal language had two direct and related consequences: firstly, by opting to move to systems of composition that were defined primarily by mathematical or acoustical systems, it was possible to create compositional models that were more objective, as they relied less on the composer's own intuition. Secondly, the resulting musical models moved towards

[92] Eimert, 3.

a more abstract and objective musical experience by virtue of partly removing the composer (and thus removing the possibility to be influenced by non-abstract and non-objective materials), and by the comparative novelty of the then new modes of composition.

The previous discussion of pseudoscience has presented a means by which certain kinds of technical writings in *die Reihe* might not necessarily have to be viewed as works of pseudoscience, and that the writings can be of substantial musical and technical value. While I have rooted the cause of the science-like and technical language in *die Reihe* as a consequence of a wider culture of scientism prevalent in West Germany at the time of the journal's publication, this culture of scientism does not account wholly for the ways in which *die Reihe* presented its materials. By using three case studies from the journal (one article by Karlheinz Stockhausen, one by Wolfgang-Erberhard von Lewinski, and one by the Dutch physicist Adriaan D. Fokker), I will draw attention to some of the ways in which the technical language used by specific authors in *die Reihe* was not primarily to obfuscate readers, but was a significant to the ways in which musical practices were conceived. Stockhausen provided *die Reihe* with several technically dense articles on compositional techniques, but his 'Two Lectures' provides a specific opportunity for further analysis as it was the subject of two separate scientific critiques: one by John Backus, and one by Adriaan D. Fokker. Unlike Stockhausen's article, Lewinski's review of Giselher Klebe's music does not feature a highly technical discussion of compositional parameters, but it does however make an argument for more parameterised and technically conceived music, favouring that model of composition aesthetically over other alternatives. Lewinski's article echoes Eimert's opening discussion in the first issue of *die Reihe* that questioned the aesthetic statements

implicit in the works of Eimert's contemporaries. Like Eimert, Lewinski proposes that compositional practices should be situated in rational and mathematical processes. Lastly, the article by Fokker is notable for examining *die Reihe* in a similar vein to Backus' earlier critique, and serves to demonstrate that some of Backus' critiques were not simply a case of stylistic conflict, but did illustrate some technical issues in the journal. Additionally, Fokker's article provides a useful counterpart to Backus' critique due to Fokker's position as both an eminent physicist, and also as an active figure in the European musical community. Both Stockhausen and Lewinski were regular contributors to *die Reihe*, and the articles which we will examine come from the middle period of *die Reihe*'s run; Fokker only contributed once to the journal. These case studies will illustrate that the technical language was integral to how the music they discussed was conceived, and will also indicate the extent to which Backus' label of pseudoscience would have undermined the analytical and compositional value of the writings.

3.4.1 Case study I: A technical conception of music in Stockhausen's 'Two Lectures' from *die Reihe Reports-Analysis*

While electronic music evidently required a new set of terminologies to describe it adequately, the same cannot be said so readily of the instrumental music discussed in *die Reihe*'s later volumes. As detailed previously, due to the methods of producing electronic music in the 1950s being so closely associated with the technical apparatus required for its realisation, the technical language *die Reihe* employed in describing music of that sort was necessary. Yet, as instrumental music went through no similar shift in its medium of execution, human performers continued to interpret scores of

one sort or another, an explanation of technical language appearing in the domain of instrumental music must be sought. A prime example of the kinds of technical language used to discuss the composition of instrumental works can be seen in a later volume of *die Reihe*, in which another article from Stockhausen, 'Two Lectures', discussed the compositional process in mathematical and scientific terms.[93] 'Two Lectures' presents the material of two public lectures Stockhausen gave during 1958 in America: the first lecture, 'Electronic and Instrumental Music', provides an overview of the development and realisation of electronic music and a brief discussion of how the composers of electronic works continued writing instrumental music in parallel.[94] The second lecture, 'Music in Space', focuses primarily on solutions for distributing audio, generated either electronically or amplified from acoustic performances, in a three-dimensional space. Additionally, and more relevantly to the current analysis, Stockhausen uses extensive technical language to discuss elements of musical composition. In both of the sections Stockhausen divided the discussions under numbered headings; beginning under the third heading, Stockhausen identified a hierarchical model of musical notation, privileging the notation of pitch as the primary focus of traditional music:

> In traditional music a hierarchy ruled which had been developed during the course of history; […] The most marked difference was in the case of all pitch-relationships in harmony and melody (differentiation of the pitch-scale up to 88 steps); they were also the first to develop, and developed furthest, in notation and correspondingly in the construction of instruments. [95]

[93] Stockhausen, Karlheinz. "Two Lectures." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 5 (1961): 59-82.
[94] Ibid., 65-67.
[95] Ibid., 72.

In his model, duration has a significantly more impaired notational capacity: there are '88 steps' available for the notation of pitch, while (according to Stockhausen):

> [...] ca. 40 distinguishable durations can be defined and played in traditional notation for durations between 8 seconds and ⅛ of a second.[96]

In these two examples, it can be seen that Stockhausen had conceived music in terms of its constituent parts (that 88 pitches and 40 durations can be notated), with an acute specificity as to the potential cardinality of individual musical elements. Shortly thereafter in the article, Stockhausen discussed how adjusting proportions within a compositional system can effect change. In the discussion, rather than using scientific note names, or presenting us with musical notation, F sharp is described as '92 cps', then 'duration: 1 second', and so on. Here begins a complex and confusing account of proportional organisation. After establishing the initial tone described previously, we are instructed that the tone is 'in the 3:1 ratio', which Stockhausen fails to contextualise adequately by omitting what exactly the pitch or tone is in a ratio with:

> We can represent a change by means of a proportion. If we change, for example, an initial tone:
>
> pitch: 92 cps (F sharp)
> duration: 1 second
> timbre: a formant-area from 200 to 1000 cps
> loudness level: 80 phons
> locality: 0°/5 metres (see below)
>
> in the ratio 3:1, then at the smallest change-degree V_1, on the basis 3:1, only one parameter would change in the ratio 3:1; at the change-degree V_2, two parameters would change; at V_3, three parameters, and so on.[97]

Stockhausen proposes that changes within the ratio be referred to as V_n, with each subsequent change within the ratio being referred to as a distinct iteration, such as V_1, or V_2. While the parameterisation of musical data in this fashion is certainly useful for

[96] Ibid.
[97] Ibid.

performing computations, Stockhausen did not refer to the change-degrees again within the context of *die Reihe*, which questions the potential relevance or importance of the process entirely.

His scheme described 'timbre' as 'a formant-area from 200 to 1000cps'. As our initial pitch has been described as 92 cps, then the formant-area above can only be understood to be the spectrum of higher partials and frequencies that provide musical tones with their timbral qualities. Stockhausen readily admitted that modifying such timbral properties within the context of the proportional system he is describing was not possible in instrumental music:

> It is not possible to perform such a change of timbres in the prescribed ratio by means of the instruments used hitherto, as the latter can not be accurately defined in their 'colour' and can be still less accurately influenced.[98]

The rest of Stockhausen's article continues in this fashion; dynamics, rhythm, spatialisation, and timbre are all parameterised and treated by means of ratios and multiplications. While Stockhausen's writing does not clearly articulate the ideas and concepts he writes about, it does demonstrate a conception of compositional technique that is categorically distinct from what could be understood as historical compositional norms. Stockhausen has instead adopted terminologies and processes from mathematics and science to generate and develop his musical ideas, most likely influenced by the virtually unlimitedly precise control of parameters possible in electronic composition. Stockhausen's highly technical discussion of spatial parameterisation followed an introduction demonstrating historical instances of spatial awareness in composition:

> In the middle of the 16th century, works involving several choirs were written for St Mark's Church, Venice. In 1527, Adrian Willaert arrived there as 'Maestro di capella',

[98] Ibid., 73.

> bringing with him from the north stimulating ideas of poly-choric music. […] There are reports of celebrations on the occasion of the meeting of the French and English kings in 1520 when a mass was performed, in the course of which the performance was distributed alternately between the two nations' choirs. […] Alternating question and answer had long been a tradition in mediaeval church music; but, in the development via spatial antiphony, Cipriano de Rore was the first to transfer the outer alternation of parts to the inner structure of the madrigal. […] Polychoric style attained effects of sound and timbre which open up an entirely new world of musical imagination, and indicate that the Renaissance is at an end. [99]

The examples of spatially-aware composition that Stockhausen chose differed enormously from the highly complex scheme he later devised to indicate the sound's locality:

> In order to define 0 [the sound's locality being perceived as in front of the listener] and 1 [the sound's locality being perceived as coming from behind the listener], let us again use a comparison with durations. With the orientation-point 'in front', we can compare a particular duration; we call it 1. The duration can become shorter; we represent this analogous to our experience in one- dimensional spatial orientation in the right-hand semicircle. 1/2 is then at 90°, 1/3 at 120°, 1/4 at 135°, etc. Near 180° we approach the value 0. 2/3 is at 60°, 3/4 at 45°, etc. We approach the value 1. We have multiplied the value 1 by the fractions 1/2, 1/3, 1/4 … $\frac{1}{n} \rightarrow 0$ and 1/2, 2/3, 3/4, 4/5 … $\frac{n-1}{n} \rightarrow 1$. If we make the initial value 1 greater, we divide it by the same fractions and obtain 2 at 270° (90° left), 3 at 240° (120° left), 4 at 225° (135° left), etc., at 180° we approach the value ∞. 3/2 is at 300° (60° left), 4/3 at 315° (45° left), etc. At 0° we again approach the value 1. At 180°, then, infinitely great and infinitely small merge; we can define this field as the 'blind spot'.[100]

Stockhausen's ambition for his technical model for spatialisation was to be able to serially control all musical parameters by the same processes. In the above example, the plan illustrates that a duration (here as '1', with no indication as to whether that pertains to a second, or a more abstract rhythmic unit) can be modified simultaneously with the perceived locality of a sound-source in a semi-circle using the same proportions that describe the harmonic series ($\sum_{n=1}^{\infty} \frac{1}{n}$; 1+ 1/2 + 1/3 + 1/4 + … + 1/n), specifically: 1/2 (of the duration '1', and of a semicircle's arc of 180°) is then at 90° while the duration

[99] Ibid., 68.
[100] Ibid., 81.

of the sound to which this process is also applied is '0.5', 1/3 at 120° and '0.3', 1/4 at 135° and '0.25', etc. Near 180° we approach the value 0 for both the arc and value of the duration 2/3 is at 60° and '0.6', 3/4 at 45° and '0.75', and so forth.[101]

The formal scheme that Stockhausen outlined demonstrated an occupation with a far more technical and complex solution to spatialising audio compared with the less technical model that he observed from the 16th century, as well as from his own earlier work:

> In my 'Gesang der Jünglinge', I attempted to form the direction and movement of sound in space, and to make them accessible as a new dimension for musical experience. The work was composed for 5 groups of loudspeakers, which should be placed around the listeners in the hall. From which side, by how many loudspeakers at once, whether with rotation to left or right, whether motionless or moving - *how* the sounds and sound-groups should be projected into space: all this is decisive for the comprehension of this work.[102]

In light of the extensive model that Stockhausen presented in which timbre, pitch, and loudness, alongside duration and spatial location, suggests that the earlier approach to spatialising audio as demonstrated in the *Gesang der Jünglinge* was no longer adequate, and a more precise model, influenced by the techniques of scientific and technical rigour, was needed. The process that Stockhausen deployed represents a radical shift in compositional thinking from earlier modes of composition. The heightened focus on serial organisation, in this case through the parameterisation of many different musical and acoustical elements, proposed a method of composition that allows the uniform application of mathematical or scientific processes (as demonstrated in Stockhausen's use of the harmonic series-like sequence above) across multiple parameters, and as such enables a larger-scale formal organisation that can follow rational and precise methods.

[101] This is an annotated statement of the quotation seen previously. Ibid., 81.
[102] Ibid., 68-69.

3.4.2 Case study II: von Lewinski on Giselher Klebe from *die Reihe Young Composers*

Lewinski's article on Giselher Klebe in the third volume of *die Reihe* begins by reiterating many of Eimert's claims from 'What is Electronic Music?'. Initially, we are reminded that the Young Generation are no longer concerned with trivial music, instead:

> [. . .] they no longer write any 'minor works', meant purely as entertainment, unconcerned with artistic standards [. . .] I shall also be selecting pieces that are characteristic of [Klebe's] generation, of the attempt to develop a generally valid, suprapersonal style.[103]

The suprapersonal style, which can be thought of as the 'rational' style, epitomises the scientific desire for rational and accountable material that is justified on the basis of its abstract musical qualities, as opposed to its musical context. Lewinski pursues the notion further, making the blanket statement that 'Music – or rather music that is good, demonstrably good – has no content'.[104] Lewinski does not directly define what he means by content, but indicates that it is something external to the way in which the music is constructed:

> What interests me in Klebe's music is its formal problems, and also its expressive language (the two are closely linked). I shall investigate the form of two works, and see what relation it bears to the audible musical communication encountered by the listener. Let it be made clear at once that this 'communication' has nothing to do with the 'content' of music as generally misunderstood. [105]

This extract shows that Lewinski equates 'content' with programmatic or otherwise pictorial narratives, and that the expressive language of the music is defined by the formal construction, as opposed to other factors. The consequences of this statement

[103] von Lewinski, Wolf-Eberhard. "Giselher Klebe." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 4 (1960): 89-97. 89.
[104] Ibid.
[105] Ibid.

do much to undermine Lewinski's argument. For example, Stockhausen's *Gesang der Jünglinge* can only be thought of as having 'content'; the title immediately places the work in the context of a musical narrative, and the content that forms the piece (namely, a young boy singing) cannot shake the extra-musical connotations of young boys' voices, or the metanarrative that is formed by Stockhausen's treatment of them. Despite Lewinski's rejection of content, his initial description of Klebe's *String Quartet, Op. 9*, makes repeated reference to historical, and thus content-laden, descriptors. To list but a few, Lewinski references 'fugal', 'passacaglia', 'cantabile', and so on.[106] When the technical analysis ensues, a scheme detailing the relationship between the square root of the series' permutations, its resulting value, and the rhythmic group associated with the series is presented.[107]

Series	$\sqrt{12}$	$\sqrt{11}$	$\sqrt{10}$	$\sqrt{9}$	$\sqrt{8}$	$\sqrt{7}$	$\sqrt{6}$	$\sqrt{5}$	$\sqrt{4}$	$\sqrt{3}$	$\sqrt{2}$	$\sqrt{1}$
Values	3.5	3.3	3.2	3.0	2.8	2.6	2.4	2.3 (2.32)	2.0	1.7	1.4	1.0*
Time												

(Values x 10 semiquaver units) *To nearest decimal place

Although the figures in the above table are actually incorrect in the English translation (they are correct in the German edition), the application of rudimentary mathematics in this instance reflects the nature of Kelbe's construction. Furthermore, the construction of Klebe's *String Quartet, Op. 9* certainly satisfies Lewinski's desire to see a formally constructed musical work that can be analysed in a rigorous and, most

[106] Ibid., 90.
[107] Ibid., 92.

importantly for him, rational manner, which in turn further undermines Backus' initial claim that the use of technical language in the journals was:

> […] a microscopic residuum consisting of nothing more than a mystical belief in numerology as the fundamental basis of music.[108]

3.4.3 Case study III: Fokker's scientific evaluation of *die Reihe*

The eighth volume of *die Reihe* contains an article of significant importance by Fokker. The article, 'Wherefore, and Why? Questions relating to new music', functions as a parallel to Backus' earlier article.[109] Much like Backus, Fokker evaluates the technical language of one of the papers from earlier in *die Reihe*. More significantly, however, Fokker was able to produce a coherent analysis of the technical language employed whilst also engaging more fully with the aesthetic and compositional imperatives that the language was intended to facilitate. While Fokker chose not to name the authors of the articles he was evaluating, the authors were Cage and Stockhausen, which can be seen from Fokker's discussions of chance composition, and the use of Stockhausen's terminology. The majority of Fokker's analysis focuses on the obtuse language employed by Stockhausen in '…how time passes…', in particular making sense of Stockhausen's complex descriptions of periods, proportions, and metric calculations. It is however unfortunate that in doing so Fokker fatally misappropriated English terminology, further adding confusion to Stockhausen's already problematic use of terms. While Backus and Fokker agreed on the inappropriate deployment of 'phase' by Stockhausen in lieu of the unambiguous term 'period' to refer to a measure of time,

[108] Backus, 171.
[109] Fokker, Adriaan D. "Wherefore, and Why? Questions Relating to New Music." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 8 (1962): 68-79.

Fokker's use of the word 'while' in place of 'phase' suffers from all of the same trappings that he seeks to highlight:

> [Stockhausen] begins from quite a general point of view and talks of changes in a field of sound. Between these events he discerns intervals of time, and proposes: "let these time intervals be called phases".
> But stop! Why this term and on what grounds? Phase is a word with an exact definition. It means an instant, a momentary state […] Let us look, then, for another term. I find in my dictionary the English word "while" for the Dutch word "poos". I venture this proposition; let time-intervals be called "whiles". [110]

'While' as a noun does denote the passage of time, but it is more typically employed in conversation to indicate an unspecified duration, and its alternative and more integral application as a conjunction does not lend itself to well to Fokker's designs. Fokker fails to draw a definite conclusion as to why Stockhausen pursued unorthodox and non-standard terminology, but he does succeed in identifying Stockhausen's deliberate toying with language:

> It seems that the author has some motives in avoiding the word "period". Has it the stigma of being handed down by tradition?[111]

Fokker's illustration of Stockhausen's reluctance to employ more standard terminology corroborates the argument that was presented earlier in this chapter: Stockhausen's use of language disorientates and serves the function of obfuscating the technical language. Stockhausen's reasons for doing this are unclear, but on the basis on the evidence presented thus far, there are two likely explanations for this: Stockhausen sought strategically to disorient the reader by defamiliarising standard musical concepts in order to exoticise or poeticise the analysis and the compositional process; or, by obfuscating his terminology Stockhausen might have been trying to present his working method as a paradigmatic shift in compositional technique and

[110] Ibid., 69.
[111] Ibid.

thought, either following the model of discovery more familiar to those in scientific circles or, as Fokker suggests, to further distance himself from more traditional musical conceptions. The further redundancy in analytical language non-withstanding, Fokker continues analysing the ideas from '…how time passes…' in a thorough way, illustrating how natural phenomena work in scientific terms, and then relating it directly to Stockhausen's analysis:

> We take a steel ball and a horizontal marble slab. We drop the ball from some height. It falls down perpendicularly and after the impact on the plate it rebounds. […] A bound up and down of 20 cm height, say, takes about 0,4 sec. A bound of 2 mm height takes 0,04 sec, and one of $\frac{1}{2}$mm takes 0,02 sec. […] There are micro[periods] between the impacts in the final state, which we no longer hear separately, perceiving a note instead. This experiment shows the similitude of macro[periods] and micro[periods]; of course and of fine-grained temporal division. That is the subject with which the author of this article is engaged.[112]

In contrast to the evaluation of Backus, Fokker, by pursuing the analysis in the fashion illustrated in the previous excerpt, indicated that he found value in Stockhausen's application of technical language in his writings, as opposed to dismissing their analytic and musical implications.

Fokker's article does not make Backus' evaluation redundant, but Fokker's article succeeds in elucidating the issues associated with the improper terminologies where Backus' did not. If we compare Backus' assessment of the same paragraph as Fokker (Backus, 168; and Fokker, 73), Backus fails to look beyond the superficial issues in Stockhausen's discussion and observe the process by which Stockhausen derived rhythmic material from the proportions of the harmonic series.[113] The issue that both Backus and Fokker agreed on is the arbitrariness by which Stockhausen manipulates

[112] Ibid., 69-70. Fokker's original text used the term 'while' in place of the term 'period' in the quoted extract; the decision to use period in its place is to aid in the reading and comprehension of the extract.

[113] Stockhausen, Karlheinz. "…how Time Passes…." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 3 (1959): 10-40. 13-16.

the specific ratios of the harmonic series in order to facilitate performance by humans as opposed to a realisation on magnetic tape, which can be virtually infinitely accurate.

In this chapter I have argued that while Backus' scientific evaluation of die Reihe usefully illustrated some flaws in the English translation's technical writing, he may have applied the term pseudoscience to the writings in an inappropriate way. By doing so, Backus underestimated the flawed but fascinating analytical and compositional writing in the texts by applying the term pseudoscience to them. Despite Backus' claims, the case studies presented earlier in this chapter do illustrate the technical conceptions in the analytical and compositional writings of Stockhausen and Lewinski, two of *die Reihe*'s key authors. Perhaps most significantly, Fokker's scientific evaluation, while having reservations similar to those of Backus regarding the technical writing in *die Reihe*, saw that the writings were integral to how the authors were conceiving musical content, and he did not seek to dismiss it. As such, we have seen some of the differing positions and perspectives on *die Reihe*'s technical language – both on the part of the journal's exponents and its detractors.

Two immediate observations are clear: first, the comprehension of the journal's content was not aided by its problematic technical style; and second, the technical presentation, despite its flaws, highlights many of the key aesthetic and musical goals of its authors. Having questioned the label of pseudoscience and identifying that this is not the only way of looking at *die Reihe*'s content, it is hoped that the substantial yet problematic writings can be reassessed as an integral part of the various authors compositional and musical processes.

4 The patriarchal embodiment of Webern as a proto-scientist

4.1 Chapter overview

We have now seen the ways in which science has most evidently influenced *die Reihe*, through the ideology of its chief editor, and through the technical language of the individual contributions. There is one further way in which scientific discourse is an influence on *die Reihe*, and that is the ways in which the composer Anton Webern was portrayed in the journal. This chapter will seek to clarify the ways in which Webern was presented by *die Reihe*'s authors, and comment on the consequences and repercussions of his legacy as presented through *die Reihe*.

4.2 Serialism after Schoenberg

The emphasis on rationality and the ensuing parameterisation of musical features were essential facets in the aesthetic model within which *die Reihe*'s contributors located their work. By appearing to reject historical modes of composition, new strategies were required to find means of structuring musical content. Perhaps the most obvious example of such a strategy is Schoenberg's use of text in the 2nd String Quartet as a way of directing the freely atonal material he used. The tension that arose from Schoenberg's compositional methods, and the resulting music can be seen clearly in the incendiary essay by Boulez, 'Schoenberg is Dead':

> In Schoenberg's serial works, furthermore, the confusion between theme and series is explicit enough to show his impotence to foresee the sound-world that the series demands. Dodecaphonism, then, consists of only a rigorous law for controlling chromatic writing; playing only the role of regulating instrument, the serial phenomenon itself was not, so to speak, perceived by Schoenberg.[114]

[114] Boulez, Pierre, Paule Thévenin, Stephen Walsh, and Robert Piencikowski. *Stocktakings from an Apprenticeship*. Oxford: Clarendon, 1991. 271-272.

Boulez, like most of *die Reihe*'s contributors, saw Webern's brand of serialism as the preferred aesthetic model to inherit. In the simplest examples, the twelve-tone technique replaced the primary instruments of tonal composition (harmonic function was no longer derived from tonal keys but rather from the ordered tone-row), but the compositional process was largely unchanged. Schoenberg was concerned with continuing the tradition he was part of, and largely his output can comfortably be situated within it.[115]

Conversely, for Eimert and the contributors in *die Reihe*, particularly Lewinksi and Stuckenschmidt, Webern's use of serialism represented not only a minor shift in compositional technique, but also a paradigmatic shift in terms of aesthetic domains. Alastair Williams described Webern as a point of departure from which further serial parameterisation is possible, paraphrasing Boulez' comments in 'Schoenberg is Dead'.[116] The trajectory from Schoenberg's practice to the works described in *die Reihe* is mostly straightforward, and it can be observed how the later generation of serialists used extensive parameterisation and mathematical/scientific models to fulfil the function of historical forms. The absence of compositional tropes left a space in which ever increasingly formal models partly drawn from the surrounding technical language employed in studio music, created a fertile bed in which formalism could flourish.

[115] Lessem, Alan. "Schoenberg, Stravinsky, and Neo-Classicism: The Issues Reexamined." *The Musical Quarterly* LXVIII.4 (1982): 527-42.
[116] Williams, Alastair. *New Music and the Claims of Modernity*. Aldershot, England: Ashgate, 1997. 46.

4.3 The use of Webern as a patriarchal figure

In the first chapter it was argued how the writings contained in *die Reihe* were not so much ignored by the United States, as completely rejected. Martin Iddon notes that the Anglo-American reception of Darmstadt, *die Reihe* and the parallel Donaueschingen festival, frames the serialist publication and festivals as antagonistic 'others'. Elsewhere in Europe, and particularly in the Germano-Italian reception, Darmstadt, Donaueschingen, and *die Reihe* were actually viewed as a part of a wider European community of practitioners, and not particularly demarcated from other traditions.[117] *Die Reihe*'s influence was felt to a varying degree in the wider musical community, but West Germany, and particularly Darmstadt and Donaueschingen, continued to be the centres for the extended serial techniques described in *die Reihe*.[118]

It is understood why *die Reihe* failed to gain significant traction in the United States, but there is little compelling evidence as to which aesthetic tenets, or other musical features, enabled *die Reihe*'s considerable European following as described by Iddon. If we return to the essay 'What is electronic music?' we can clearly see the hierarchical relationships between Eimert as editor of *die Reihe* and the director of the Cologne Studios, electronic music, and *die Reihe*'s other contributors. Eimert, being in control of one of the only electronic music studios sufficiently equipped to produce *elektronische Musik* made him the *de facto* figurehead of the movement.[119] *Die Reihe*'s initial volume appears really to be a companion piece to the developments happening in the studio of the Westdeutscher Rundfunk, to the extent that the initial volume of

[117] Iddon, Martin. "Darmstadt Schools: Darmstadt As A Plural Phenomenon." *Tempo* 65.256 (2011): 2.
[118] Lachenmann, Helmut. "Composing in the Shadow of Darmstadt 1." *Contemporary Music Review* 23.3-4 (2004): 43-53.
[119] Eimert, 5.

the journal advertised in its preface three long-playing records of the electronic music discussed therein. As the journal's preoccupation with electronic music would not survive much beyond the first volume, instead choosing to focus on German serial music more widely, the core aesthetic, ideological, and philosophical arguments that can be traced throughout the evolution of the series required another vehicle to facilitate them. To this end, the focus on Webern as the forefather of serial music is a particularly significant facet of the journal. One of Webern's most important contributions to musical innovation was a distinct compositional approach to space and time, quite different to the works of Schoenberg or Berg.[120] Jennifer Doctor closely associates the sense of space in Webern's music to his use of silence:

> The sparse quality of this movement [Bagatelle No. 1, *Mässig*] gives an unusual sense of depth to the texture, both when sounding and when silent. This is effected in part by the range of pitches, each sound gesture *noticed* for its place within the pitch spectrum, low and high in some senses more important in performed effect than the actual pitch itself.[121]

Eimert, Lewinski, and Stuckenschmidt situated their work in the legacy and context of Webern's work, but in some ways he was an unlikely candidate as the leader of the avant-garde. In Webern, the serialists found, or perhaps more accurately formed the image of, a figurehead who fastidiously and mathematically parameterised his musical materials sufficiently to allow him to become a representational ideal of their new musical aesthetic. [122] Julian Johnson acknowledges the increased tendency to

[120] Doctor, Jennifer R. "The Texture of Silence." *Silence, Music, Silent Music*. Ed. Nicky Losseff. Aldershot, Hampshire, England: Ashgate, 2007. 15-37. 28.
[121] Ibid., 30.
[122] Bailey, Kathryn. *The Twelve-note Music of Anton Webern: Old Forms in a New Language.* Cambridge: Cambridge University Press, 1991. 1.

organisation in Webern's work, but attributes it to Webern's living circumstances more than any ideological interests:

> […] the apparent inability to order his life outwardly almost certainly intensified his compulsion towards order within his music.[123]

Furthermore, Johnson presents quite a different picture of Webern's compositional interests than the ones that were depicted in *die Reihe*; while Lewinski argued that 'music that is good, demonstrably good – has no content'[124], Johnson suggests that:

> Webern's music reworks (in specifically musical terms) the cultural context in which it originated; a central part of that cultural context is the maternal construction of nature.[125]

The contention between Lewinski's ideas about what constitute 'good music' and the apparent 'content' present in the music of Webern poses a problem when examining the way in which the idea of Webern was constructed in *die Reihe*. In many ways, Webern subverted the discourse of radical change that was rife around the journal. Through his unfortunate death, a Romantic hero could be found:

> We must hail not only this great composer but also a real hero. Doomed to a total failure in a deaf world of ignorance and indifference he inexorably kept on cutting out his diamonds, his dazzling diamonds, the mines of which he had such a perfect knowledge.[126]

A broader and more gradual shift from the nineteenth century conception of the composer-hero to the mid-twentieth century conception of the composer-scientist was evidently well under-way, but Eimert's 'A Change of Focus', from volume II not only firmly establishes Webern as the tragic hero, but also presumes to excuse Webern's inability to himself be part of the *elektronische Musik* project:

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[123] Johnson, Julian. *Webern and the Transformation of Nature*. Cambridge, UK: Cambridge University Press, 1999. 212.
[124] von Lewinski, 89.
[125] Johnson, 86.
[126] Stravinsky, Igor. "Foreword." *die Reihe* 2 (1958): vii.

> Because Webern was bound to the twelve semi-tones and the fixed sound-spectra of his instruments, the process of 'sound-composition' in his work had to remain an un-realisable ideal.[127]

and echoed later by Lewinski in Volume IV.[128]

In the fourth volume of *die Reihe*, Webern was used as a cohesive force, by frequently being referred back to by the authors as an aesthetic ideal, especially when discussing the works of young composers. By virtue of the fact that an entire issue was dedicated to Webern long after his death, and the high adulation that it contained, it is evident that Webern held a special place for these composers and critics; Ernst Krenek said of Webern:

> Under [Webern's headstone] rests the prophet of a new musical cosmos, torn from this world by a dastardly fate.[129]

The rest of volume II, Webern's volume, contains similar sentiments, but these sentiments can be observed throughout the series. Lewinski states that:

> The young composer of today cannot bypass Anton von Webern, cannot ignore the way he condensed the material of music . . . Webern's music is a turning-point; looking one way, it is the end of romantic and also of 'new' music, because it condensed music's material down to the very thresholds of perception.[130]

The fourth volume of *die Reihe*, *Young Composers*, functions as a survey of some of the more favoured serialists encountered in Darmstadt, many of them already writing for the journal. Virtually all of the accounts of their compositional practices describe them in terms of what they have or have not obtained from Webern – how

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[127] Eimert, Herbert. "A Change of Focus." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 2 (1958): 29-36. 36.
[128] von Lewinski, Wolf-Eberhard. "Young Composers." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 4 (1960): 1-4. 3.
[129] Krenek, Ernst. "The Same Stone Which The Builders Refuse Is Become The Corner Stone." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 2 (1958): 12.
[130] Lewinski, Young Composers, 2.

close or how far they are from Webern's legacy. Reinhold Schubert goes as far as equating the then current state of music as indelibly caught up in Webern:

> We say 'concentration' since what has called forth and made relevant Zimmermann's own language is a creative effort toward the current stage of musical consciousness fixed in the work of Anton Webern.[131]

In a later volume Hans Rudolf Zeller again uses Webern as a point of reference, arguing that:

> [. . .] the contemporary writer can no more overlook a study of phonetics and phonology than the composer ('after Webern') can overlook those of acoustics and the information-theory.[132]

Zeller not only marks out the new era of the composer as being 'after Webern', but also states that the post-Webern composers ought to have a knowledge of acoustics and information-theory, recalling Eimert's earlier claim that the composer of electronic works is required to have some acoustical knowledge.

The turn to Webern was to be a fruitful appropriation. As Webern's 'cult' emerged, so then did *die Reihe* and Darmstadt become more indelibly associated with his legacy.[133] Until comparatively recently, the depiction of Webern as the epitome of rational and serialist thought was the only reading of Webern and his work to be found, due to the Darmstadt festival, and *die Reihe* holding a subsidiary role as the mouthpiece of the Darmstadt events, being instrumental in the early broadcast and dissemination

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[131] Schubert, Reinhold. "Bernd Alois Zimmermann." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music*. 4 (1960): 103-14. 103.
[132] Zeller, Hans Rudolf. "Mallarmé and Serialist Thought." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music*. 6 (1964): 5-32. 9.
[133] Osmond-Smith, David. "New Beginnings: The International Avant-garde, 1945–62." *The Cambridge History of Twentieth-century Music*. Ed. Nicholas Cook and Anthony Pople. Cambridge: Cambridge University Press, 2004. 336-63.342. For a survey of Webern's rise to prominence, and the growth in the body of Webern scholarship from the 1950s, see Bailey, Kathryn. "Coming OF Age." The Musical Times 136.1834 (1995): 644-649.

of Webern's music.[134] An all-Webern programme was held in Darmstadt on 23 July 1953, commemorating what would have been the composer's seventieth birthday, which was subsequently broadcast by the Nordwestdeutscher Rundfunk.[135] Iddon suggests that before this point Webern was not yet so well known by the younger composers at Darmstadt. In particular Stockhausen, one of the foremost upcoming figures at Darmstadt, did not know Webern's work well before the Webern evening.[136] As can be seen from Johnson's work, Webern's music may not have been as objective as *die Reihe*'s authors thought, and as such may have not been as suitable a figurehead for asserting the necessity of absolute and rational music as they thought. Despite the misconstruing of Webern's musical motivations, his legitimacy became *die Reihe*'s legitimacy through the close association Webern would have with the journal and with Eimert's editorial policy.

Webern's position of prominence for the serialists is more complex than simply representing an aesthetic ideal; Iddon suggests that Eimert was, at least initially, the main originator of enthusiasm for Webern, but it becomes apparent that Webern's music was also used as a tool to oppose attacks coming from Adorno over the future of new music:

> [. . .] the way in which Eimert constructed both Webern and the young composers too found resonance in Adorno's response a few years later in 'Das Altern der Neuen Musik' [. . .] It would exaggerate only a little to suggest that the composers who spoke at the Webern evening were, unknowingly, deployed by Eimert in this ongoing private dispute with Adorno […] [137]

[134] Johnson, 85.
[135] Iddon, Martin. *New Music at Darmstadt: Nono, Stockhausen, Cage, and Boulez*. Cambridge, UK: Cambridge University Press, 2013. xvii, 90.
[136] Ibid., 89-90.
[137] Ibid., 92, 93.

The specific dispute between Adorno and Eimert was over the direction that new music was going in, with Adorno reacting against Webern's work:

> In Webern's Piano Variations and in his String Quartet the fetishism of the row is blatant. They feature nothing more than monotonously symmetrical presentations of serial marvels […] In Webern the musical subject, falling silent, abdicates; Webern abandons himself to the material, which assures him indeed of nothing more than the echo of muteness.[138]

It is clear from this extract how Adorno's way of describing Webern's music goes contrary to the vision that Eimert and Lewinski shared. Curiously, Adorno states that Webern's work has no 'content', by saying that 'the musical subject, falling silent, abdicates', and that it 'assures him indeed of nothing more than the echo of muteness', which for Adorno can be clearly seen to be a negative evaluation of contentless music, whereas for Lewinski it was integral to his aesthetic model.

Aside from the compelling draw of a figure such as Webern, *die Reihe*'s aesthetic tenets proved to be sufficiently broad to encourage participation from more than just serial composers.[139] While the first two issues of *die Reihe* proved to be an exclusive affair, attracting contributions largely from those involved at the Westdeutshcer Rundfunk, or who otherwise had a sufficiently close association with Eimert and Stockhausen to draw their attention (particularly through participation at the Darmstadt Summer School), later issues broadened in scope, encouraging more diversity from a range of contributors. Volume III, *Musical Craftsmanship*, featured a contribution from Cage, analysing the process he used in generating the material for *Music for Piano 21-52.*[140] Volumes IV and onward began to feature articles from

[138] Adorno, Theodor W. *Philosophy of New Music*. Trans. Robert Hullot-Kentor. Minneapolis: U of Minnesota, 2006. 89-87.
[139] Iddon, Darmstadt Schools: Darmstadt As A Plural Phenomenon., 2.
[140] Cage, John. "To Describe the Process of Composition Used in 'Music for Piano 21-52'." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 3 (1959): 41-43.

composers who did not represent the previously expected serial ideas and methodologies. Even if the later issues could be interpreted as a departure from the initial aims of the journal (*Information über serielle Musik*), a case can be made that the ever-diversifying content does not contradict its ideological stance, but rather demonstrates the slowly expanding definitions of what could be categorised as 'serial' music. Lewinski damningly insinuated that composing electronic music merely served the function of maturing a composer's craft to the point where one might be able to return to writing instrumental music, suggested then as a higher form than that of electronic music, but with newfound insight into musicality:

> It is elsewhere that one finds the surprising feature; these same composers suddenly found a chance to return (with their newly-won insights and experience) to instrumental and vocal music, and to resume composing in this field with new confidence. Musical imagination had at last found a possible way to clothe the acoustic skeleton that is pointillist music[.][141]

Although Lewinski and Eimert might have surely disagreed over the importance of electronic music, Lewinski's arguments do return to Eimert's opening claims:

> To think, even so, that synthesising music will do anything but produce a merely synthetic style (and thus an artificial, sterile culture); to believe it will strike the happy medium which is said to have vanished, and which nobody can prove ever existed[.] Does it not seem, then, that composers are no longer able to write in a supra-personal idiom?[142]

The rhetorical swipe at the 'synthetic style' supported Eimert's call for a rational music, but from a different perspective; in 1955, Volume I: *elektronische Musik* suggests a language of reason, in line with the sorts of musical advances as put forth by Eimert. Lewinski instead was addressing the challenges for the young generation, both as a commentary on the continued progress and development of the musical climate, as well

[141] von Lewinski, Young Composers, 3.
[142] Ibid.

as a brief retrospective on what had occurred so far.[143] There is no clear definition as to what is meant by the 'synthetic style', but from the context provided by Lewinski later in the same article, it might be a reference to the neo-classical styles that had emerged earlier in the century:

> And does this bring chaos finally and unavoidably upon us? Certainly, if the mixture of styles during the last fifty years and more were to continue: were there not a few young composers who have not only the vision but also the technique needed to produce music evincing creative fullness and life, genuinely free of superfluous notes, in a way that is individual but not tied to personality[.][144]

What can be observed from Lewinski's commentary is a diminution of electronic music as a worthwhile medium in itself (reducing it to the position of essentially a pedagogical tool), and moving emphasis from one stylistic medium of choice, to a newer and more preferable idiom: pointillism. Pointillism is perhaps best typified in Stockhausen's *Klavierstücke* and Boulez's *Structures*, but is certainly exhibited, if less consistently, in the works of other 'Late Serial' composers.[145] It may have been disappointing for *die Reihe*'s editorial team that their early agenda in promoting their radio workshop had been so quickly forgotten (Lewinski having written the above in 1958, a mere four years after the German publication of volume I, *Elektronische Musik)*.

Webern solved more than one problem: not only was he a canonical figure behind which the serialists could rally, he was also a distinctly European figure. With America continuing to dominate the latter half of the twentieth century, politically and financially, tensions grew between compositional activities in Europe and America. One American mouthpiece for new music was the emerging *Perspectives of New Music*,

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[143] Ibid.
[144] Ibid.
[145] See *die Reihe* Vol. IV: *Young Composers* for other instances of pointillist style, and further reflections on its use as an idiom.

which quite deliberately framed itself antagonistically against *die Reihe*, with Benjamin Boretz of *Perspectives* having stated:

> There was something new going on in American music that urgently needed a voice, that even needed an international voice because of the sense that this whole serious American music movement was pretty well being stonewalled in Europe. And Die Reihe was a particular issue because of its just about complete wipeout of any of what we were interested in as well as anything we were identified with over here, so I think some of our criticism of Die Reihe was particularly sharp because they had an antagonistic feel to us. So while the criticism was surely responsible it was also motivated by a sense of conflict in that funny (but familiar) realm where intellectual and aesthetic convictions are very difficult to extricate from political circumstances. If the editors of Die Reihe had, say, not been so implacably unfriendly to our interests we might not have been so alert to the deficiencies of their discourse.[146]

In the above passage Boretz refers to Europe, but only specifically to *die Reihe*, a German publication, illustrating the way that the American author saw *die Reihe* as a kind of mouthpiece for European music and practices. Darmstadt was the foremost European meeting point for those involved in contemporary music-making in the post-war period, and the close affiliation that *die* Reihe initially enjoyed with Darmstadt resulted in *die Reihe*'s narrative of Webern permeating the mindset of those who had become affiliated with the festival. Ironically, by elevating a figure to a position of canonical authority, as the serialists did with Webern, they moved further away from their ideals of rationalism by establishing a 'head of house' figure in their midst, one who can be seen to be part of the 'old guard', not of the new.

I have shown here that the authors in *die Reihe* - particularly Eimert, Lewinski, and Stuckenschmidt - framed Webern's work as they framed the work of their colleagues: as radical, rational, and objective. While I have shown how the technical conception of their own works aligned with their writings, the framing of Webern as a technical and almost proto-scientific innovator less accurately reflected Webern's work

[146] Boretz, Berger, and Tichenor, 594.

and compositional interests, and more accurately reflected the need that the serialists had for a suitable patriarchal figure.

5 Conclusion

The four chapters preceding this conclusion have each sought to address some key problems necessary for understanding the uncomfortable relations between science and the articles in *die Reihe*. The introductory chapter gives context for the present investigation, by illustrating the initial reception to *die Reihe*'s English publication, noting the resistance and previous hostility to the technical presentation of *die Reihe*'s content from its reviewers. Additionally, I have argued scientism is a lens through which we can examine Eimert's aesthetic stance, and as a consequence gain further insight into both his aesthetic stances, and into *die Reihe* as a whole. As scientism itself is still not a thoroughly researched topic, with little primary material dealing with what scientism is, and very little secondary literature exploring its application outside of the philosophical tradition, it has been necessary to survey the current state of knowledge on the topic, and from there to form a model that connects many of the major understandings of scientism (either as an epistemological, axiological, or social concern) into a unified model that can be applied to the current project. The understanding of scientism I present functions as a sub-text to the whole investigation. If Eimert's musical and artistic desires were to dismantle and abandon the neo-Romantic construction of the Nordic Hero as created by the Nazi regime – the kinds of works Eimert described as 'tragic-daemonic play-acting' – his belief in the ability of science to create rational, and thus more beneficial, works is a general indication of a scientistic ideology.[147] Eimert had set-up a dichotomy between works that were rational, and those that were subjective and irrational; the 'tragic-daemonic play-acting' he

[147] Eimert, What Is Electronic Music?, 6.

referred to. For Eimert, situating his creative practice in musical materials that he viewed as being rational was a means to bypassing what he deemed as the subjective and irrational tendencies that he identified in the 'tragic-daemonic play-acting' of others.

In the third chapter I address another way in which science and *die Reihe* became associated. John Backus' 'A Scientific Evaluation' treated *die Reihe* as if it were a standard scientific publication, going as far as claiming it was a pseudoscientific work. However, *die Reihe* lacked the necessary characteristics to truly allow for it to be evaluated as a work of pseudoscience: the journal was not a vehicle for scientific or mathematical knowledge or discoveries. Any such discussions pertaining to the sciences were discussions of the application of scientific and mathematical processes or knowledge toward realising musical works, and many of those discussions were indeed mangled by either poor understanding on the part of the author, or poor understanding by the translators.

The fourth chapter examines the way in which Webern was presented in *die Reihe* as a proto-scientist figure. By over-emphasising the rational, objective, and absolute character of Webern's music, the authors sought to portray Webern as the epitome of the serious composer, both as a means of capitalising on his emerging posthumous prominence in the musical world, and as part of a dispute regarding the future of music.

This thesis ultimately attributes many of *die Reihe*'s defining characteristics as being a consequence of scientism. That is not to say that all of *die Reihe*'s contributors were part of a Machiavellian secret club to which only the scientifically-minded were elected. Rather, it acknowledges that these individuals saw and made use of the

incredible opportunities that the sciences and scientific knowledge could bestow on creative practices. In the era before home computing enabled casual users to create sound and music electronically, it was necessary for composers to have at least some understanding of the physical reality of sound and sound production, which accounts for some of the scientific-styled technical discussion in these journals. However, it does not account for the discussions and works of Stockhausen and others which presented technically fearsome compositional plans and analyses. Even in the case of the acoustic instrumental works that were discussed, scientific and scientifically-influenced knowledge was consciously applied in a domain that was outside the purview of the sciences. As such, it can read that the methods of science and scientific knowledge were viewed by the contributors to be more beneficial in the conception and creation of their musical works, in what they viewed as a new musical epoch, than they did a knowledge of their own recent musical heritage.[148]

Length: 21581 words.

[148] Eimert, What is Electronic Music?, 7; Metzger, Heinz-Klaus. "Intermezzo I (Just Who Is Growing Old?)." *die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 4 (1960): 63-80. 66; Metzger, Heinz-Klaus. "Abortive Concepts in the Theory and Criticism of Music." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 5 (1961): 21-29. 24.

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die Reihe and the portfolio

Nigel McBride

The journal *die Reihe* forms an interesting backdrop to my compositional interests. Due to the historical climate that *die Reihe* was written in, many of the claims regarding the nature and status of the works of the authors are highly polemical, but nonetheless there is much to glean as a composer from their writings. I will focus on two main areas, and reflect on how the writings have influenced and permeated into my work.

1. Content

The ways in which several of the authors write about the idea of a musical work and its content are particularly of interest to me, but not without certain caveats. Two authors in particular, Wolfgang-Eberhard von Lewinski and Herbert Eimert, discuss the nature of musical work and content at length. They are both opposed to the idea of a work having 'content', by which they mean programmatic or other non-musical narratives. Writing about the music of Giselher Klebe, Lewinski states:

> What interests me in Klebe's music is its formal problems, and also its expressive language (the two are closely linked). I shall investigate the form of two works, and see what relation it bears to the audible musical communication encountered by the listener. Let it be made clear at once that this 'communication' has nothing to do with the 'content' of music as generally misunderstood. Music — or rather music that is good, demonstrably good — has no content.[1]

While Lewinski's account of Klebe's work is not without its problems (more can be read on this topic in section **3.4.2** of the accompanying thesis), there are two aspects of this quotation that are particularly relevant to my own compositional work. First is the statement: 'What interests me in Klebe's music is its formal problems, and also its expressive language (the two are closely linked).'

[1] von Lewinski, Wolf-Eberhard. "Giselher Klebe." *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 4 (1960): 89-97. 89.

In my own compositional work, the expressive qualities of the music are absolutely a result of the formal processes I use to construct them. For example, in *uncompromisingness with which dogma is held*, the formal construction is primarily concerned with the structure and flow of the work. To this end, a highly formalised process was devised to generate a structure. More can be read on the construction of the piece in the accompanying portfolio overview, but I will briefly reflect on the formal properties of this work and how they relate to musical expression.

The structure of the piece was conceived as a formal system, which I describe both as a constraint system (anything which stops a system from achieving its goal, which in this case is to get from one node to another – there is always a node in-between which must be passed), and a topological space, due to its convenient mapping as a visual network. Each node was ascribed a durational value in seconds, and a characteristic behaviour, which was an indication to me as to how the material in each moment should be shaped. As this was a constraint system, which is highly conceivable in terms of algorithmic construction, I decided to programme a system that would conduct a 'walk' through the topological space, as opposed to defining the linear flow from node to node by hand. If I were to have chosen the order of the behaviours myself, then I would have introduced a natural bias through my own intuitive preferences at every choice, and potentially undermined the very constrains that I had constructed. Thanks to the algorithm I devised to navigate the topological space, it was efficient for me to be able to generate a great many hypothetical walks whilst almost minimising my momentary compositional biases. I later choose a walk which I found to be most musically interesting, that reflected both the structure and nature of the topological space. This is an explicit example of how the formal problem, that is, the topological space/constraint system, defined and directed the resulting musical material.

The second part of Lewinski's statement that I would like to consider is the following: 'Let it be made clear at once that this 'communication' has nothing to do with the 'content' of music as

generally misunderstood. Music — or rather music that is good, demonstrably good — has no content.' This is a much more challenging aspect to address, due to the ambiguity of Lewinski's statement, and also the crude dismissal of any works which do not satisfy his aesthetic system, but I will describe the parallels between this statement and the work I have produced. If we read 'content' as being an extra-musical narrative, such as observed in music for occasions, or programmatic works, as I have, then we can see how this relates to the aesthetic considerations in my work. The programme note to *uncompromisingness with which dogma* is held alludes to my general attitude towards how I view the narratives in my work, and itself attempts to embody the same interpretive strategies as the piece, in which no one mode of interpretation is suggested or enforced, but many possible interpretations are encouraged. By situating the narrative of my works in the musical material, and in the performance of the material, rather than any extra-musical ideas, I invite listeners to draw their own conclusions from the ways in which I transform and direct the components of the compositions. If I were to attempt to depict specific non-abstract narratives in my work, I would find myself directing the material in ways in which I fear could result in more limited modes of interpretation. This account of musical narrative does have one caveat: I make both implicit and explicit references to other 'historical' works in my portfolio.

My concept of the 'musical fourth wall', the idea of explicitly stating my own compositional material against historical materials, may at first seem to undermine the abstract, or non-programmatic, space in which I aim to make my music inhabit. It is in fact used to intensify the abstract qualities of my own work. By setting my material in conflict against historical materials, which can and often do have programmatic or extra-musical associations, I hope to highlight the abstract qualities of my own work by illustrating the historical and performative distance between older musical materials, and my own. This is most clearly seen in *Juncture II*, which very clearly states quoted material from J. S. Bach and Gregorio Allegri, in opposition to, and eventual

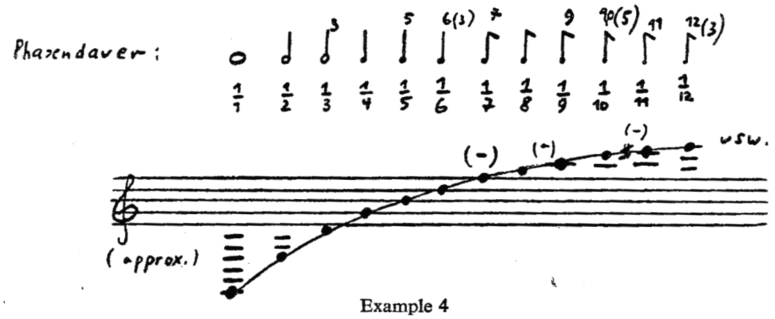
integration with, my own materials. The details for how I approached this process lead us into the second section of this document.

2. Parameterisation

The ways in which *die Reihe* discusses musical parameterisation is also a key aspect of the journal, and its relationship to the portfolio. While I do not use any specific process from *die Reihe* exactly, some examples in particular have informed processes that I have made use of.

Stockhausen, in his article '…how time passes…', described a process by which rhythmic values are derived from a series of proportions that closely resembles the harmonic series:

What is such a series of proportions, 1/1, 1/2, 1/3, . . . 1/12 . . . , when applied to time-phases? Let us once again take a helpful example from the sphere of micro-phases, because here the musician has much more conscious experience. If the fundamental phase is ○ = $\frac{1}{100}''$, then the half-phase is 𝅗𝅥 = $\frac{1}{200}''$, a third of a phase as ♩³ = $\frac{1}{300}''$, and a twelfth of a phase is ♩¹² = $\frac{1}{1200}''$ etc. But that is nothing more nor less than a *harmonic or overtone series:*



Example 4

[2]

The kind of approach that Stockhausen illustrated is a similar approach that I have used in my own work. For example, in *Juncture II*, starting at bar 344, I used a Fibonacci-like series to determine the points at which the quoted and transformed material of Bach's would cut into the other material I presented:

[2] Stockhausen, Karlheinz. "…how time passes…" *Die Reihe : A Periodical Devoted to Developments in Contemporary Music.* 3 (1959): 10-40. 16.

344, 346, 347, 349, 353, 361, 371, 385, 405, 434, 477, 542.[3]

Similarly, in *Come, from nothing*, I have used a geometric series to define the duration of the various sections in the work. In the preplanning phase, I conceived of the work in eight lines, each of which would last for sixty seconds. I further determined that I would be using two distinct types of material: breath material in combination with oral cavity filters and valves, and more conventionally played material, which I labelled α and β, respectively. I then decided that the work would be in two halves, in which the proportion of material α to β would be reversed, but proportionally consistent. From this point, I was able to start the process of creating a skeleton of proportions within which I could compose. The first line would comprise entirely of one type of material, so that it would set a thorough context for the contrasting materials that would follow, and would also highlight the structural flip that occurs in the second-half of the work. Each line took the basic form of a geometric series to conceptually divide the lines, going by base 2:

2 4 8 16 30

As each line was to total sixty seconds, it was necessary to truncate or elongate the last value in order to retain the shape of each line. I was able to conceptualise this structure as a grid of values:

1:	2	4	8	16	30
2:	2	4	8	16	30
3:	2	4	8	16	30
4:	2	4	8	16	30

[3] The use of the sequence in this instance was not an end in itself, rather it was used to create an expanding series so that the entries would become further spaced apart as the section went along. I adjusted the exact entries manually as the series proper proved to be too inflexible for my needs. The actual Fibonacci numbers for this series are: 344, 345, 346, 347, 349, 352, 357, 365, 378, 399, 433, 488, 577.

At this point, I started introducing the β content, which itself took the form of the geometric series:

2 4 8 16 32

1:	2	4	8	16	30	
	α	α	α	α	α	
2:	2	**2**	4	8	**4**	40
	α	$\boldsymbol{\beta}$	α	α	$\boldsymbol{\beta}$	α
3:	2	**8**	4	8	**16**	22
	α	$\boldsymbol{\beta}$	α	α	$\boldsymbol{\beta}$	α
4:	2	**32**	4	8	**2**	12
	α	$\boldsymbol{\beta}$	α	α	$\boldsymbol{\beta}$	α

And as such, the remaining four lines of material are structure as follows:

5:	2	4	8	16	30	
	β	β	β	β	β	
6:	2	**2**	4	8	**4**	40
	β	α	β	β	α	β
7:	2	**8**	4	8	**16**	22
	β	α	β	β	α	β
8:	2	**32**	4	8	**2**	12
	β	α	β	β	α	β

This process served its purpose in assisting me in defining a general framework in which the two kinds of material expand and contract proportionally. Similarly, the proportional systems I used in *Juncture II*, and elsewhere in my work, served as means and not ends in themselves. During the periods in which the performer of *Come, from nothing* and I collaborated, it was found to be necessary for musical and practical concerns to adjust the durations and specific proportions of individual sections, and the work as a whole.

It was for the reasons above that I chose to analyse the writings in *die Reihe*. The ideas and processes in the journal provided me with an opportunity to critically assess their compositional motivations and procedures, and in doing so, allowed me to refine my own thinking on these matters, both in a technical and musical way. While *die Reihe* is a valuable historical source for gaining understanding of the work of its authors, some of which are central figures in European art music in the latter-half of the twentieth century, it is also symptomatic of the specific political and cultural climate of their time, and as such does not map directly onto our understanding of music today. In spite of this, there is still much value in the journal for composers, theorists, and historians.

Portfolio overview

Technical considerations:

The principal research question in each of these works is one of musical structure, and specifically, in what ways do large-scale compositions differ to shorter-scale structures. The majority of the portfolio is comprised of two large-scale pieces, both of which approach the issue of large-scale structuring in quite different ways, and which I will describe later.

Aesthetic considerations:

A key influence in my artistic work is the work of many of the composers of the 'Darmstadt school', most notably Herbert Eimert and Karlheinz Stockhausen. The accompanying thesis is part of my compositional research. By gaining a better understanding of their aesthetic issues, I in turn gain a better understanding of several of my own aesthetic concerns. One key element in this research was to identify in part the purpose and role of the high level of abstraction common in their works during the late 1950s.

My own work does feature a high level of abstraction, but also uses quotations for specific reasons. While I have sought to avoid writing conventionally emotive music (which I will refer to as *emotive tropes*), they are not absent in my work. Rather, I rely on the quoted materials to bring emotive tropes to the fore in my composition. I do this not to emote, but rather to introduce a musical 'fourth wall'. Michael Finnissy, who is my main point of reference for musical quotation, achieves a similar result, but while Finnissy uses tropes as an apparatus for social and political commentary,

I use such techniques as a means of making the linear trajectory of music immediate and audible. By invoking the musical fourth wall, I seek to draw attention to the actual process of composition and compositional history.

Much of the quoted music is personally significant to me. While it would be short-sighted to see my compositional practice as being unbiographical, the subjects under scrutiny are external to my typical domestic life. To paraphrase George E. Lewis speaking of his project *Voyager*, ultimately, the subject of my music is not quotation or histories at all, but musicality itself.[4]

[4] Lewis, George E. "Interacting with Latter-day Musical Automata." *Contemporary Music Review* 18.3 (1999): 99-112. Web.

uncompromisingness with which dogma is held

uncompromisingness with which dogma is held is the product of a collaboration between myself and oboist Christopher Redgate, which is scored for his microtonal Redgate-Howarth oboe.

uncompromisingness with which dogma is held is a continuation of earlier work that investigates some primary research questions:

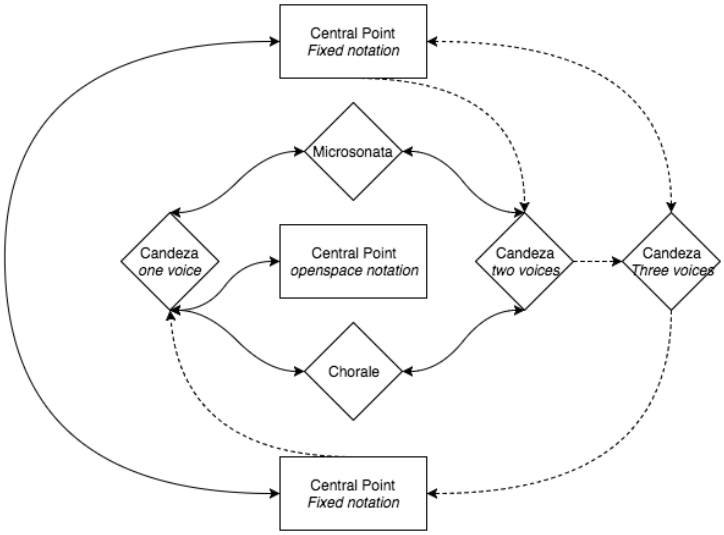
1. What strategies are available and practical in the articulation of highly abstract or novel melodic and harmonic materials;
2. To what extent can material function as a conduit for re-hierarchising the composer-performer dynamic; and
3. How the psychology of notation can both serve as a means of defining material, as well as being a compositional force in itself.

1. What strategies are available and practical in the articulation of highly abstract or novel melodic and harmonic materials?

This work, as is characteristic of my other outputs, situates itself as an antagonistic 'other' against various kinds of mainstream concert works. This has been achieved previously by situating highly semantically loaded materials from the canon, and particularly JS Bach – the emblematic shorthand for the musical sublime - against my own material, which in turn is, somewhat unfortunately, itself hopelessly referential of another canon. In doing so, the two forces in opposition create a narrative of known and unknown, where the historical content's context is subverted by its reframing in the context of a modernist narrative, and the original content is

delineated and demarked by the presence of the canon. In this example, the perception of structure is achieved by contrasting material that is familiar and thus remarkable, with material that is unfamiliar, chaotic, and thusly takes on the guise of 'anonymous'.

However, in *uncompromisingness with which dogma is held* a radically different approach is taken. This work establishes a network of behaviours (to call them sections is overly simplistic), which serve a dual purpose as a compositional aide, and also as a means of defining how the piece itself functions.



In this example, the network is both a model of sequential movement, but also a kind of topological space, in which movement from one kind of behaviour to another is constrained, demonstrated in the network by a solid line being traversable in both directions, and a dashed line being traversable in one direction. So it is therefore possible to go to a one voice cadenza from 'Central Point [fixed notation]', but not in reverse. Each of the nodes are proportional in terms of their length. The Central Point node, and its variants are the single most expansive forms, with each of these sections lasting c. 2minutes. The shortest of these behaviours are the cadenzas, lasting 15-30 seconds each. The microsonatas are micro, in so far as they are short, but are sonatas in the later Cageian sense of functioning like 'a piece', as opposed to a historical form. As this network is

naturally weighted by its construction, it was possible, and ultimately most natural, to allow the form to be generated automatically. In doing so, the natural proportions and the topology of the network can be allowed to emerge by unbiased means.

By viewing each node as a kind of behaviour, as opposed to a distinct material itself, it allows for the emphasis to be removed from the material and to be placed on what each node does. As one might expect, cadenzas are short florid passages, in one, two, or three voices; microsonatas have highly individualistic characteristics, and so on. This form is designed to aid in the perception of how the material behaves as a means of understanding the structure, without relying on more traditional or historical modes of interpretation to perceive the content.

2. To what extent can material function as a conduit for re-hierarchising the composer-performer dynamic?

This work is the fruit of an intense period of collaboration with a specific individual. As such, the notation is a response to the abilities and creativity of the performer for whom it is written. Much of the material is characterised by existing to invite the performer into the creative process – acting not as a stand-in composer, but as a co-arbiter of how the material is projected. Consequently, much of the work's tension arises from the palpable dialectic of control between the performer and the composer. This is achieved in two ways:

1. As in the openspace portions of the work, the tempo and pacing are chosen and defined by the performer.
2. In the sections where multiple layers of activity are colliding with each other, or even simultaneously, the performer is required to exercise creative control as to how those technical and musical challenges are to be resolved.

3. How the psychology of notation can both serve as a means of defining material, as well as being a compositional force in itself?

It is widely understood in practice today that the notation and presentation of material can itself be an active force in interpretation, and thus the resulting musical performance is defined and coloured by these characteristics. This work seeks to capitalise on this practice by making use of multiple kinds of notation as a means of altering the timbre of the performance itself. This is demonstrated most clearly in the 'Central Point [fixed notation]' portion of the work, which seeks to emulate the expansiveness implied by the notation of the other Central Point sections through strict and detailed metric notation. The ensuing performance of such moments will be both audibly and musically distinct.

Come, from nothing

For microtonal tuba – commissioned by Jack Adler-Mckean for the Darmstadt Festival.

Come, from nothing is the most abstract of the works in this portfolio. It makes no explicit references to other works and instead focuses on the the idea of the tuba as a historical object with its own performance practice. The structure was settled first, taking rough proportions from a geometric series (a + ar + ar2 + ar3 + …). The material relations in the piece are primarily binary, with two kinds of content: ingressive and egressive air material, and pitched material that was derived from various harmonic series. The proportions between the air material and the pitched material are in a proportion of 1:2, where the durations of the pitched material are twice as long as the air material, which can be seen in the diagram below:

α refers to the air-sounds material;

β refers to the pitch-dominant material.

1	2	4	8	16	30			4	8	16	32	60		5
	α	α	α	α	α			β	β	β	β	β		
2	2	4	4	8	8	40		4	2	8	16	4	80	6
	α	β	α	α	β	α		β	α	β	β	α	β	
3	2	16	4	8	32	22		4	8	16	16		44	7
	α	β	α	α	β	α		β	α	β	α		β	
4	2	64	4	8	4	12		4	32	8	16	2	24	8
	α	β	α	α	β	α		β	α	β	β	α	β	

Juncture II

For solo piano – commissioned by Ian Pace.

Juncture II uses a cellular method to define and generate the musical material, where all of the content in the entire work, bar the quotations, was stated in the opening bars, and the remainder of the work was in effect an orchestration of the opening material. The structure was defined as 'blocks' of material that reflect the opening material in different ways. My desire for the work was to be harmonically homogenous, with the different structural sections to be defined by the ways in which the material was presented. Quotations and transcriptions were introduced in the piece in order to create a framing effect, whereby the previous material should be heard in the context of the quoted materials; in effect, the notion of zooming in and out of a certain kind of musical history. Later in the work the demarcation between historical content and original content is blurred by an accumulation processes in which the various cellular components of the quoted material and the original material are combined.

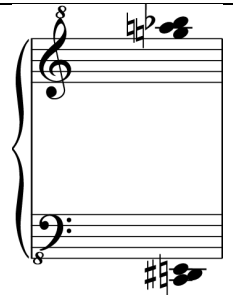
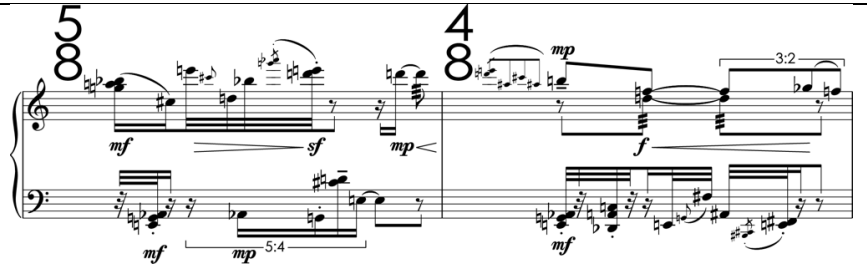
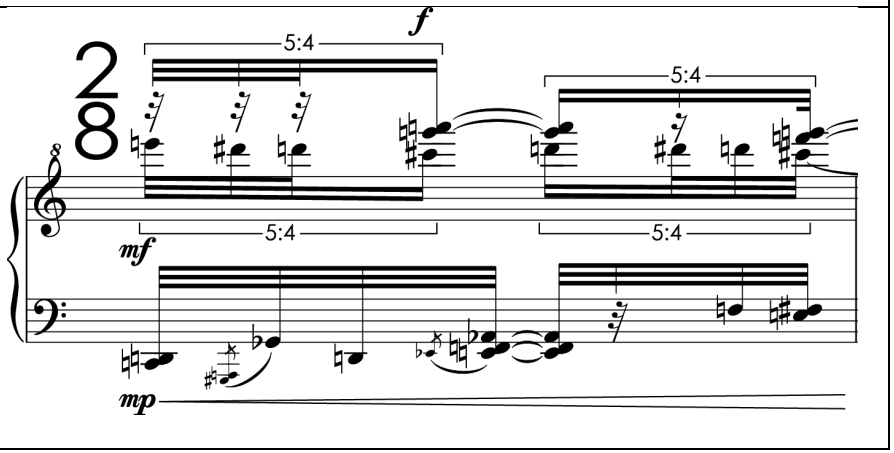
Juncture II structural outline

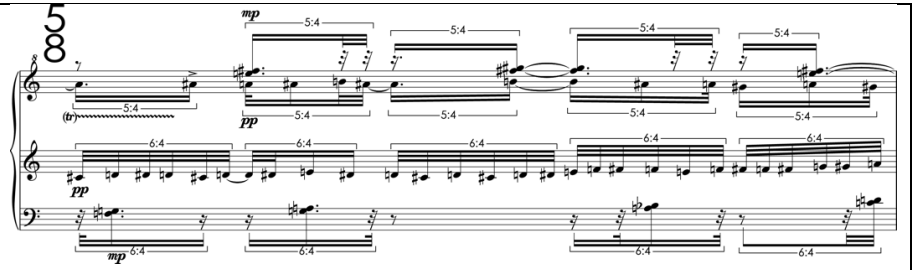
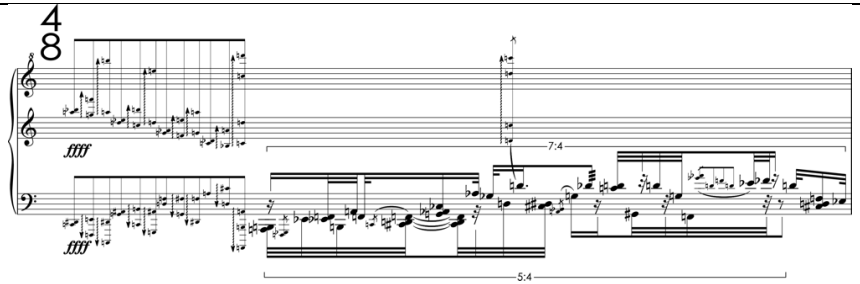
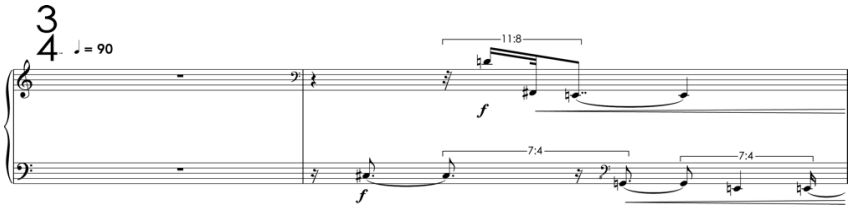
a	a^1	$a^1 + a^2$	$a^2 + a^3$	$a^1 + a^2$	$a^1 + a^4$	a^1	b^1	c^1	$c^1 + d^1$	b^2	$b^3 + d^1$	$c^2 + d^1$	b^4	$c^1 + d^1$	b^5	$a^2 + c^1 + d^1$
b. 1	7	15	27	60	72	73	199	204	206	216	221	222	248	252	276	281
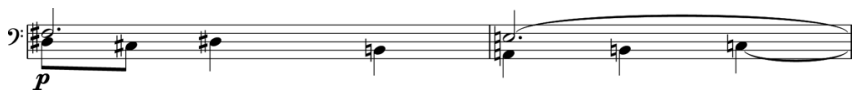
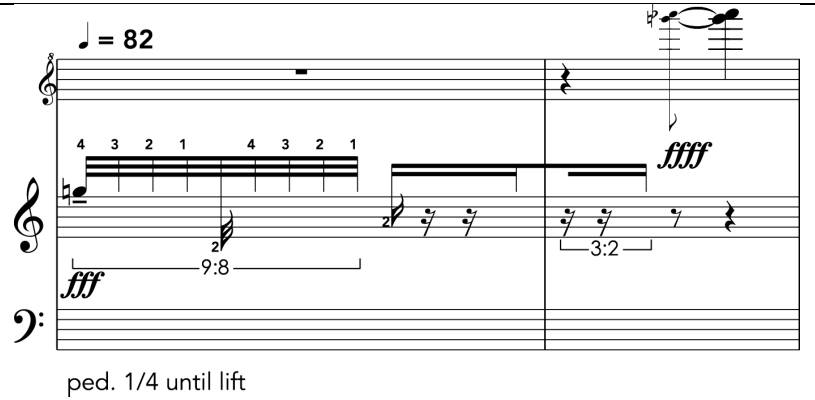
b^6	a^1	c^2	a^1	c^2	a^1	c^2	a^1	c^2	a^1	c^2	a^1
b. 335	342	344	345	346	348	349	352	353	357	361	366
a^1	c^2	a^1	c^2	a^1	c^2	a^1	c^2	a^1	c^2	a^1	
377	385	392	405	413	434	443	477	487	542	553	

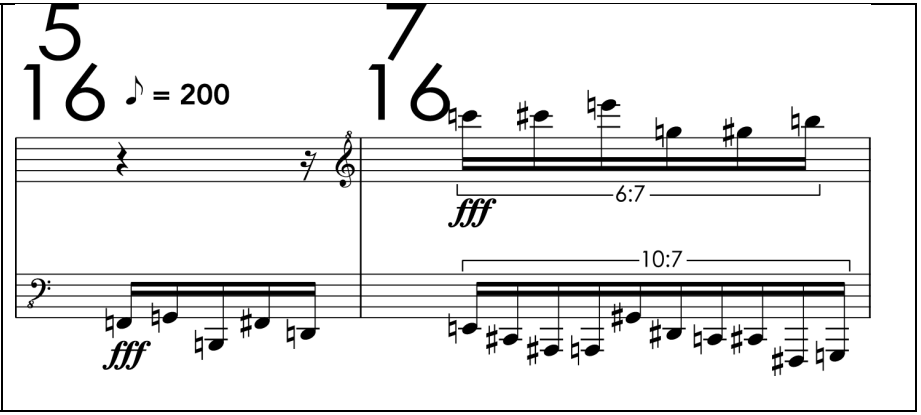
e	e^2	a	f	a^1	e^3	$a^2 + c^1 + d^1$	f^2	a^3
b. 572	674	716	723	874	961	971	1041	1215

The following table details the previous tables indicating the structure of *Juncture II*. Each letter refers to a different type of material, and the superscript numbers attached to letters indicate the nature by which the material has been treated.

a	A pitch complex in the treble that features its own inversion on Eb in the bass. This functions as the harmonic reservoir for the majority of the piece.	
a^1	A figuration on the pitch-complex a.	
a^2	A linear walk is introduced that is harmonised with elements from pitch complex a. Here it is accompanied by figurations typical of a^1.	

a^3	As a^2. Linear walks occur in both treble and bass registers, and the bass register has its own harmonisation based on the bass complex from a.	
a^4	A compressed statement of the material seen in a^1.	
b^1	An expanded and registrally discontinuous presentation of the linear walk in a^2. Always occurs in the lower register of the piano and serves to temporary interrupt the musical continuity at that point.	

c[1]	The first example of quoted material in this piece. All of the quotations are subject to transformations such as transposition, fragmentation, inversions, and the like. The first quotation is from the unfinished fugue of BWV 1080.	
d[1]	A highly transformed version of the material from Allegri's *Miserere*. It always appears set against the material from b or c.	
e	An articulated expansion using the minor 2nd interval from pitch-complex a.	

f	A linear presentation of a.	

Juncture II

Solo Piano

Nigel McBride

Specific notations

≧ - With the maximum force and loudness.

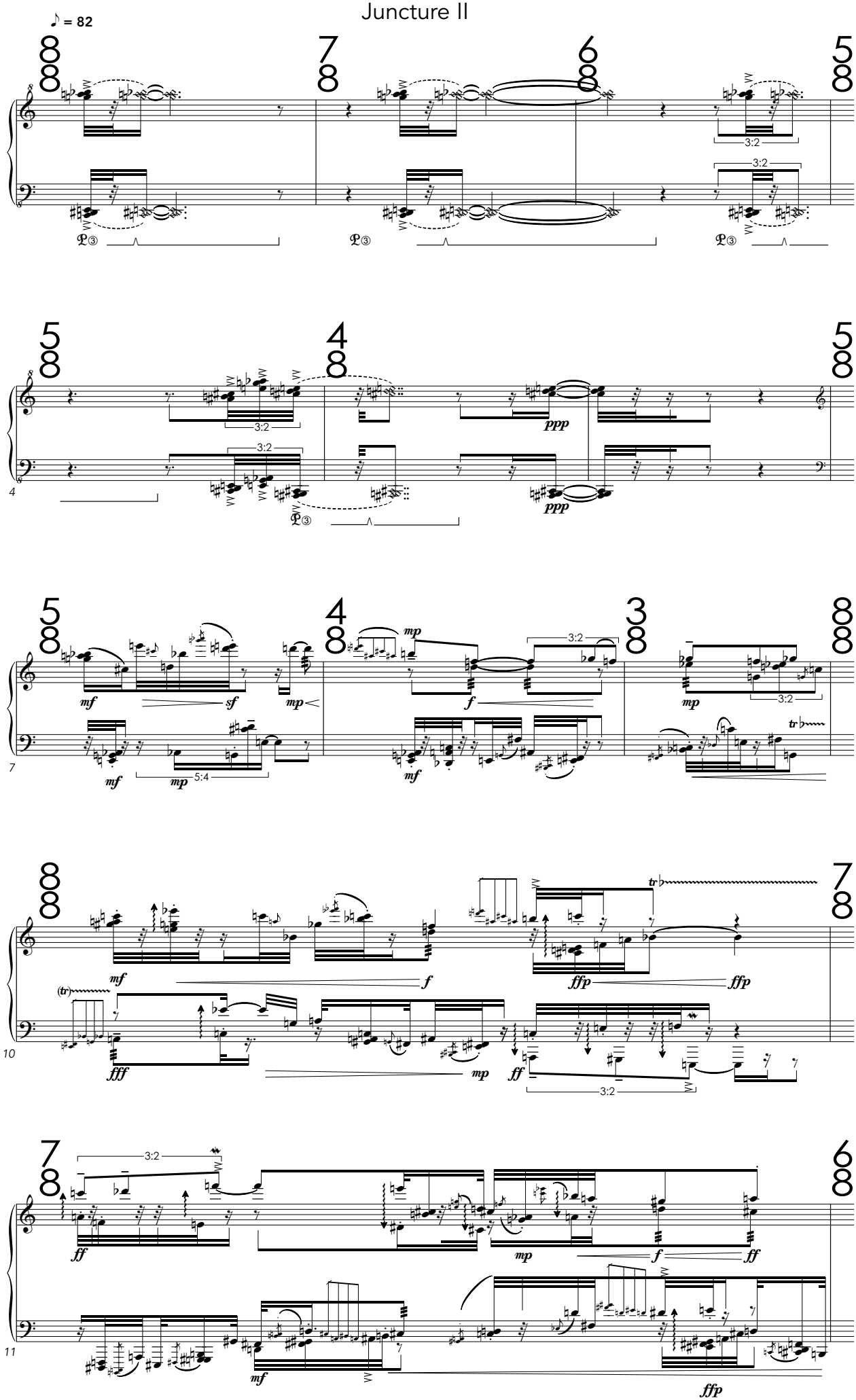
 - A cluster of approximate range.

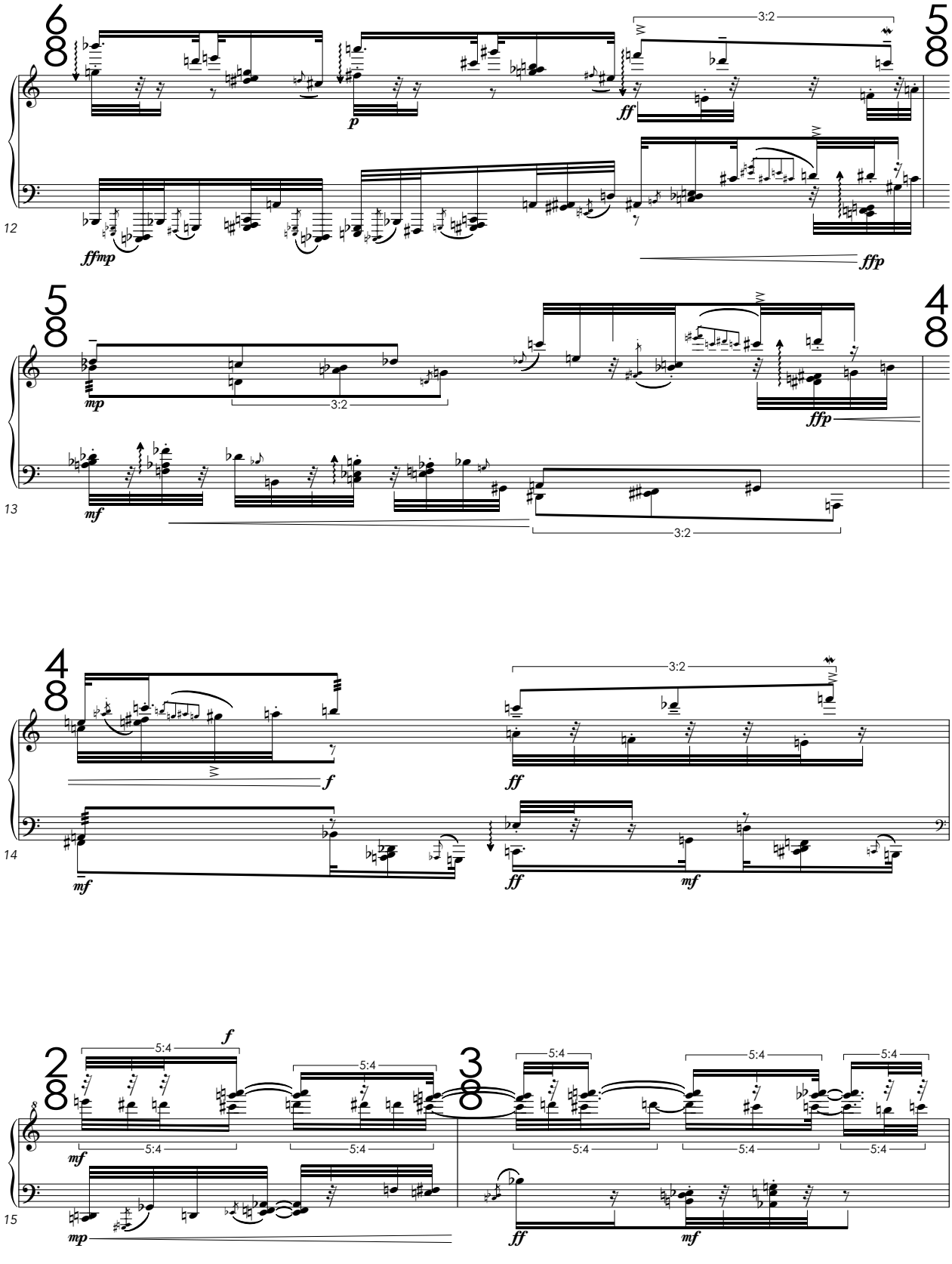
Duration

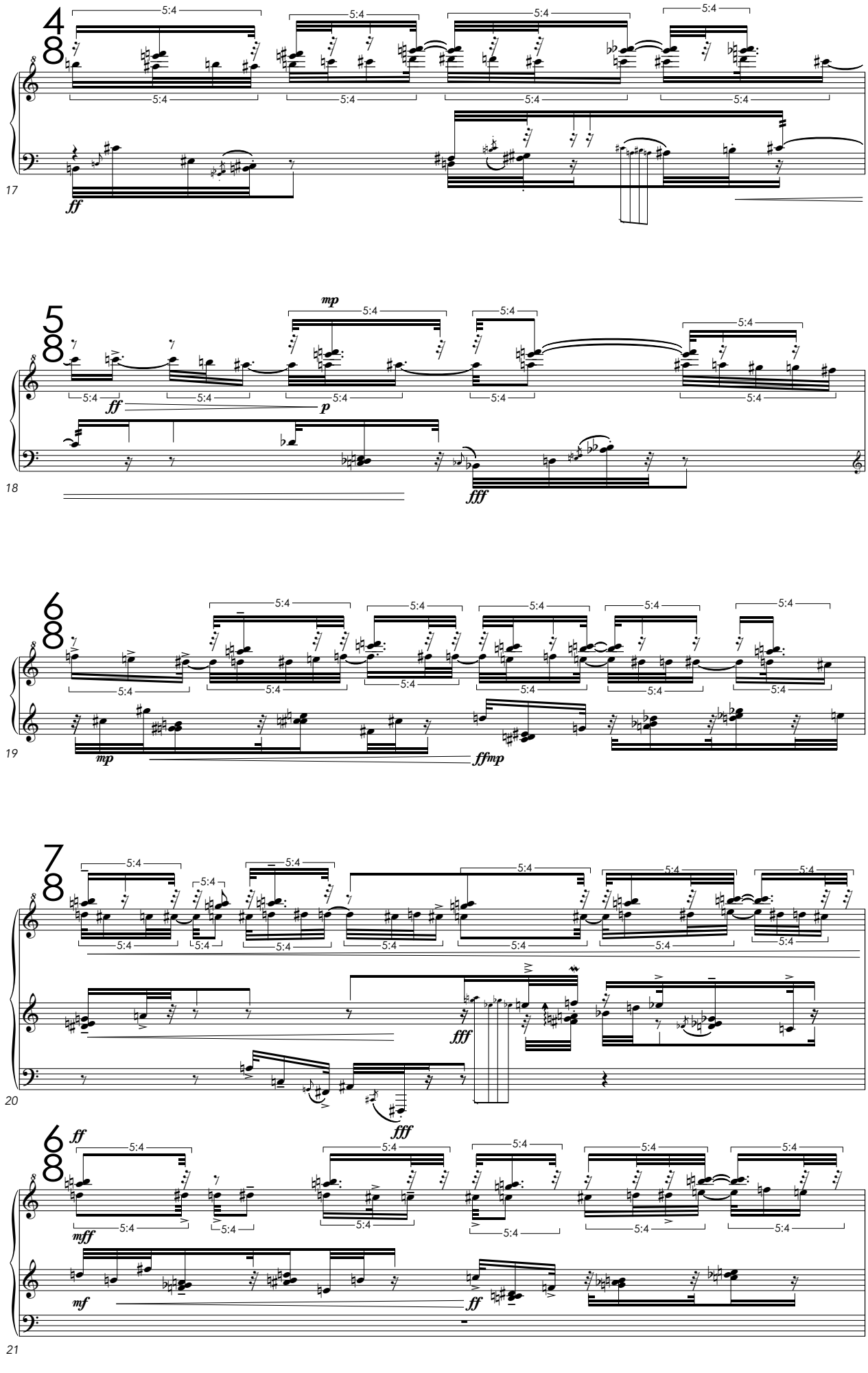
Approx. 45 minutes long.

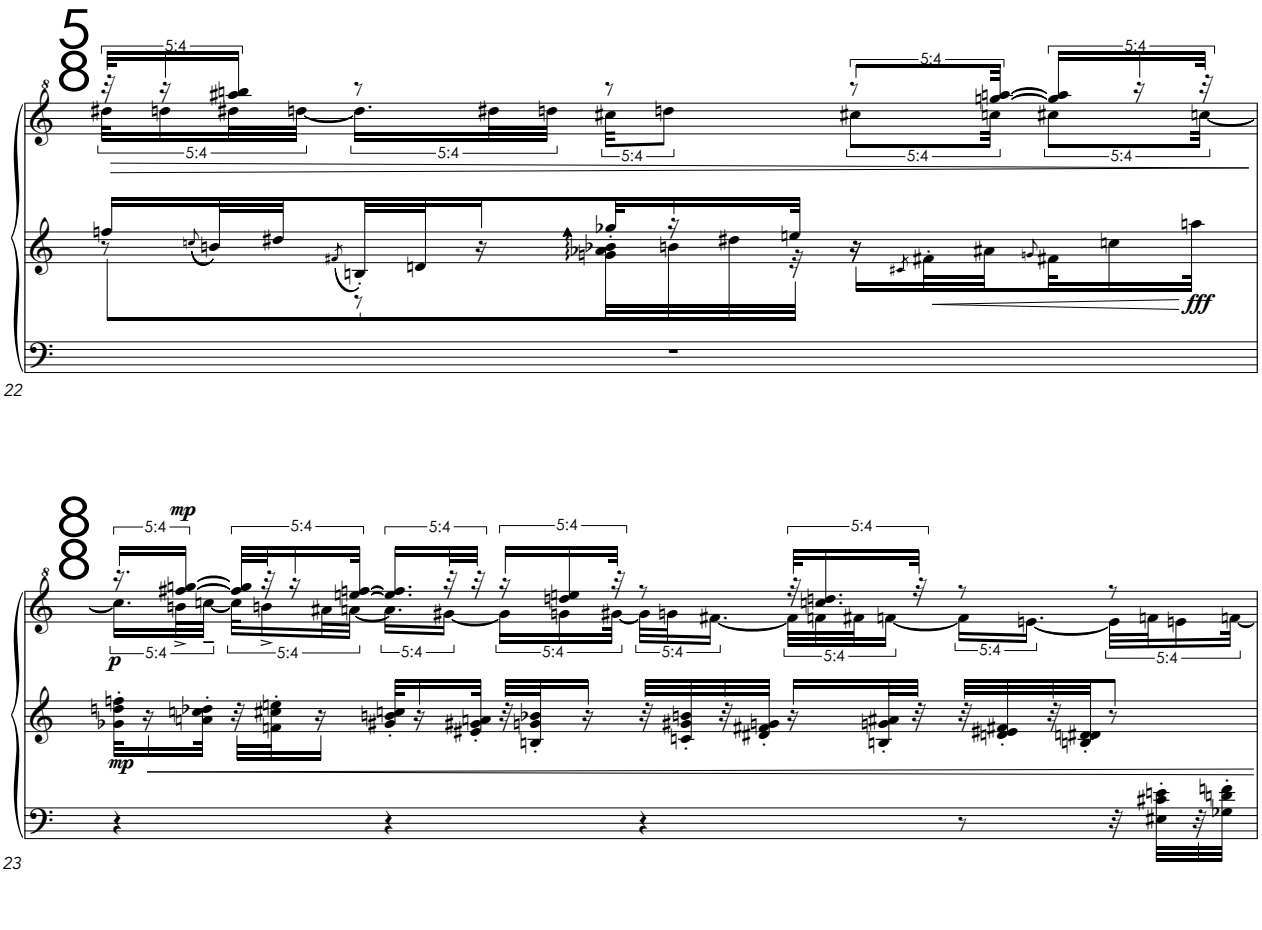
In dedication to Michael Finnissy on his 70th year.
For Ian Pace.

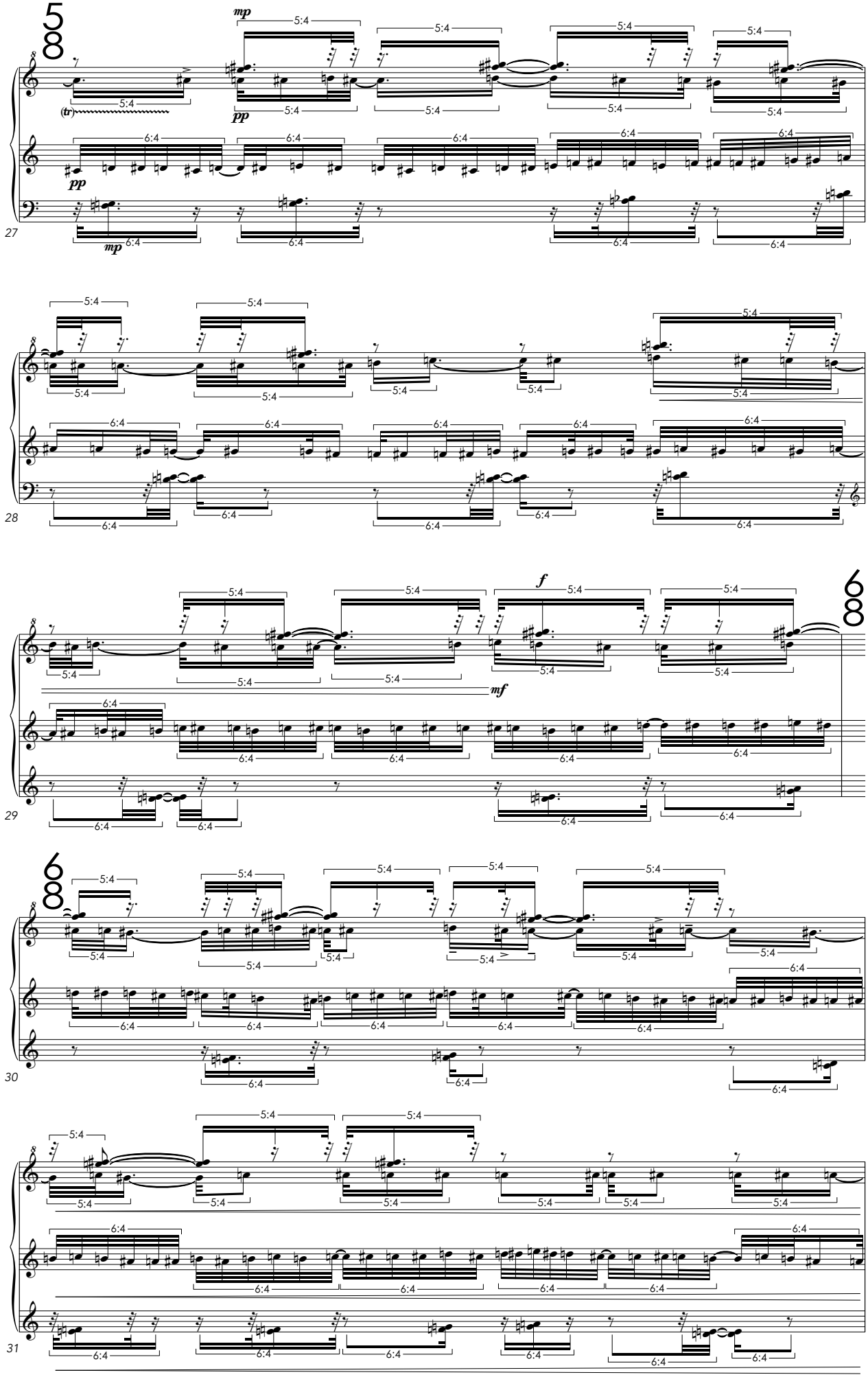
Juncture II

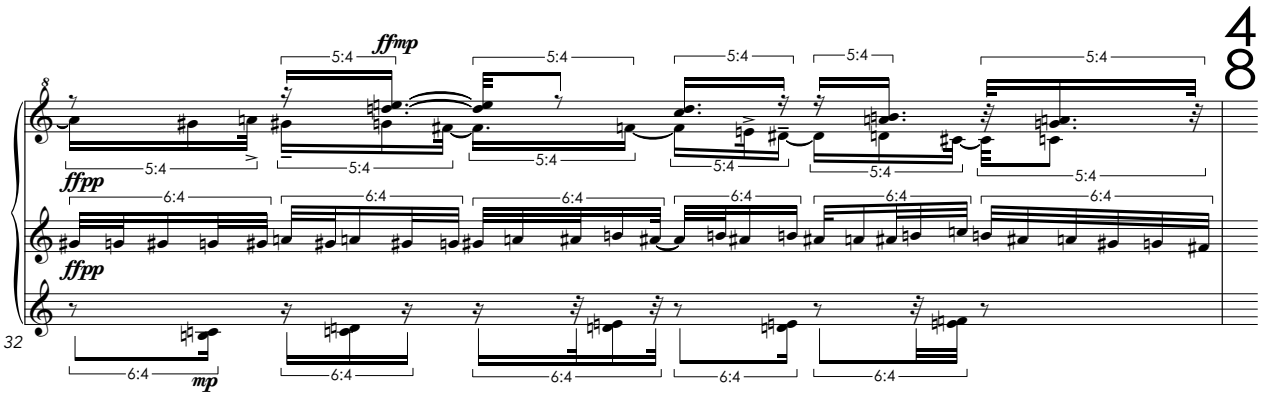

♪ = 82
3:2
3:2
3:2
3:2
ppp
ppp
4
mf
sf
mp
mf
mp
5:4
mp
f
mf
3:2
mp
tr
7
(tr)
mf
fff
f
mp
ffp
ffp
tr
ff
3:2
10
ff
mf
mp
f
ff
ffp
11

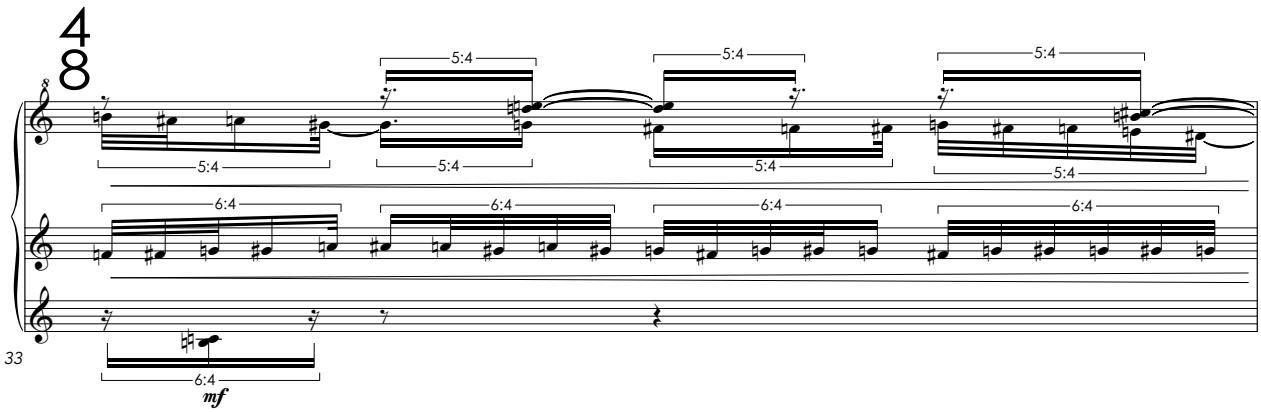

12
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14
15
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5:4
ffmp
ffp
mp
mf
ff
f
p

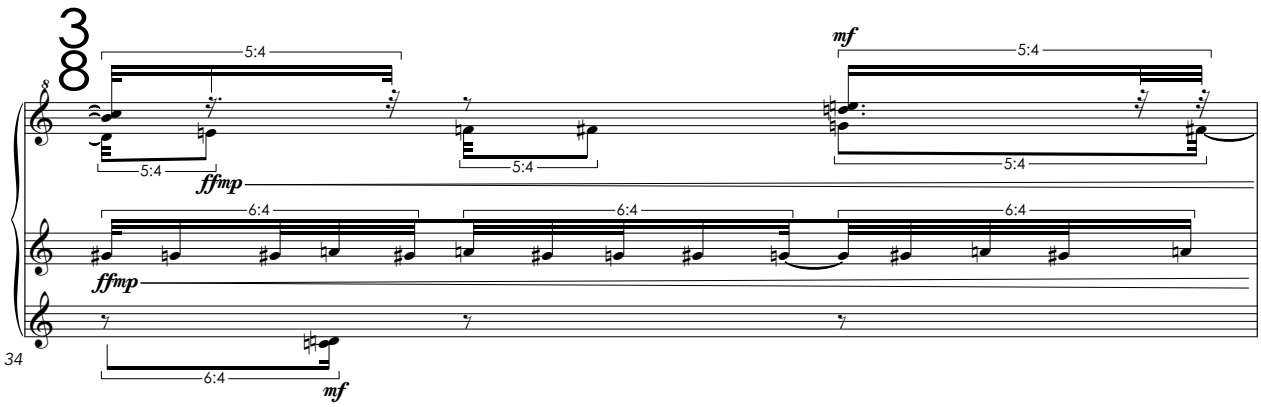

4/8
5:4
17
ff
5/8
mp
p
fff
18
6/8
mp
ffmp
19
7/8
fff
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6/8
ff
mff
mf
21

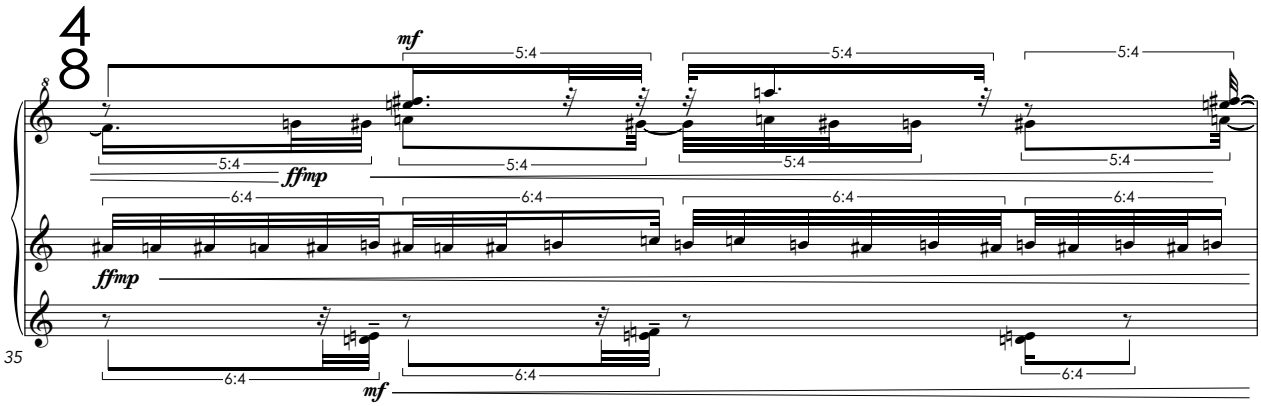

22
5/8
5:4
fff
23
8/8
mp
p
mp
5:4
24
7/8
ff
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8/8
fff
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smp
3:2
mp
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26
9/8
mff
tr
ffff
8va

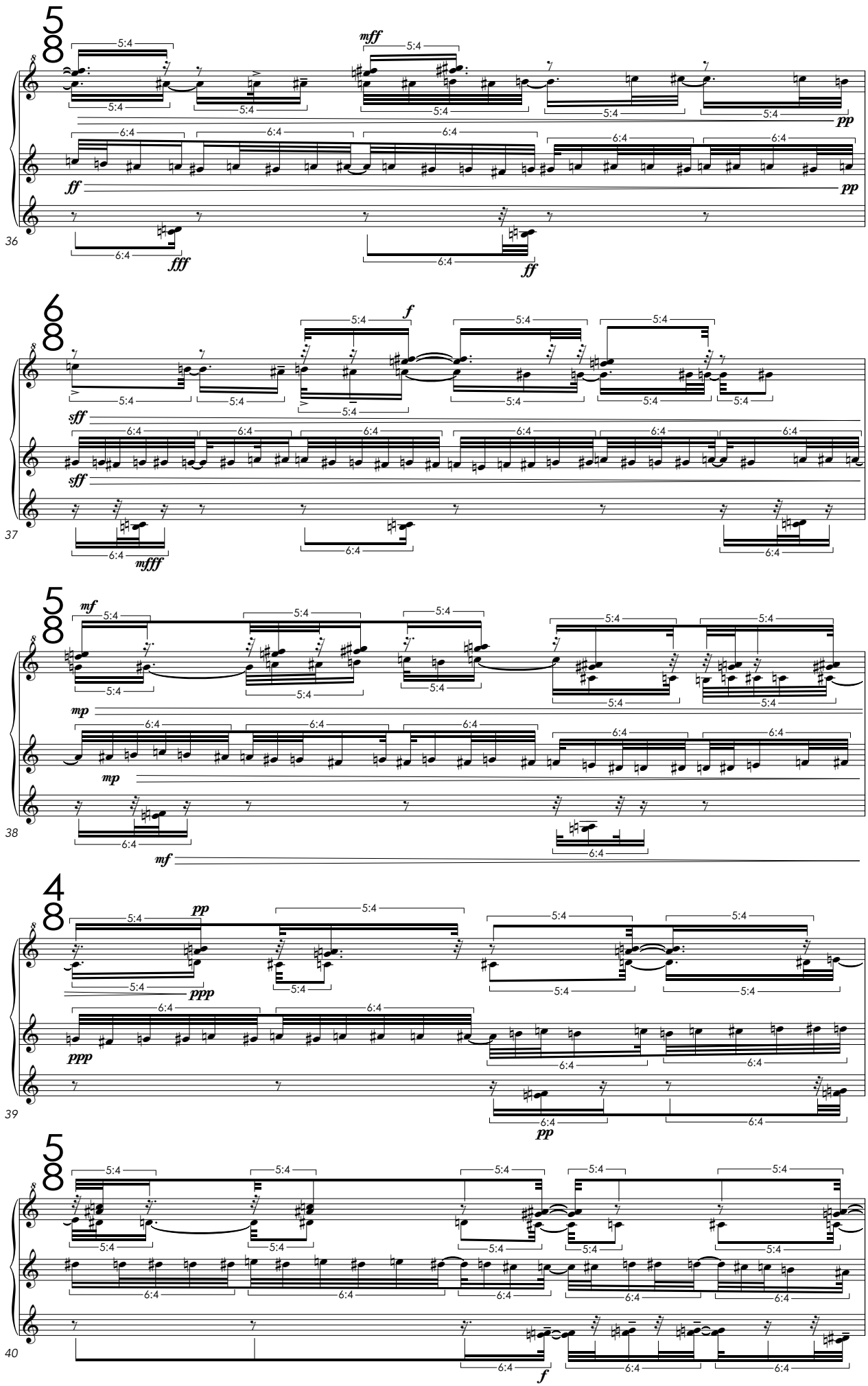

5
8
mp
pp
(tr)
5:4
6:4
27
28
f
mf
6
8
29
30
31

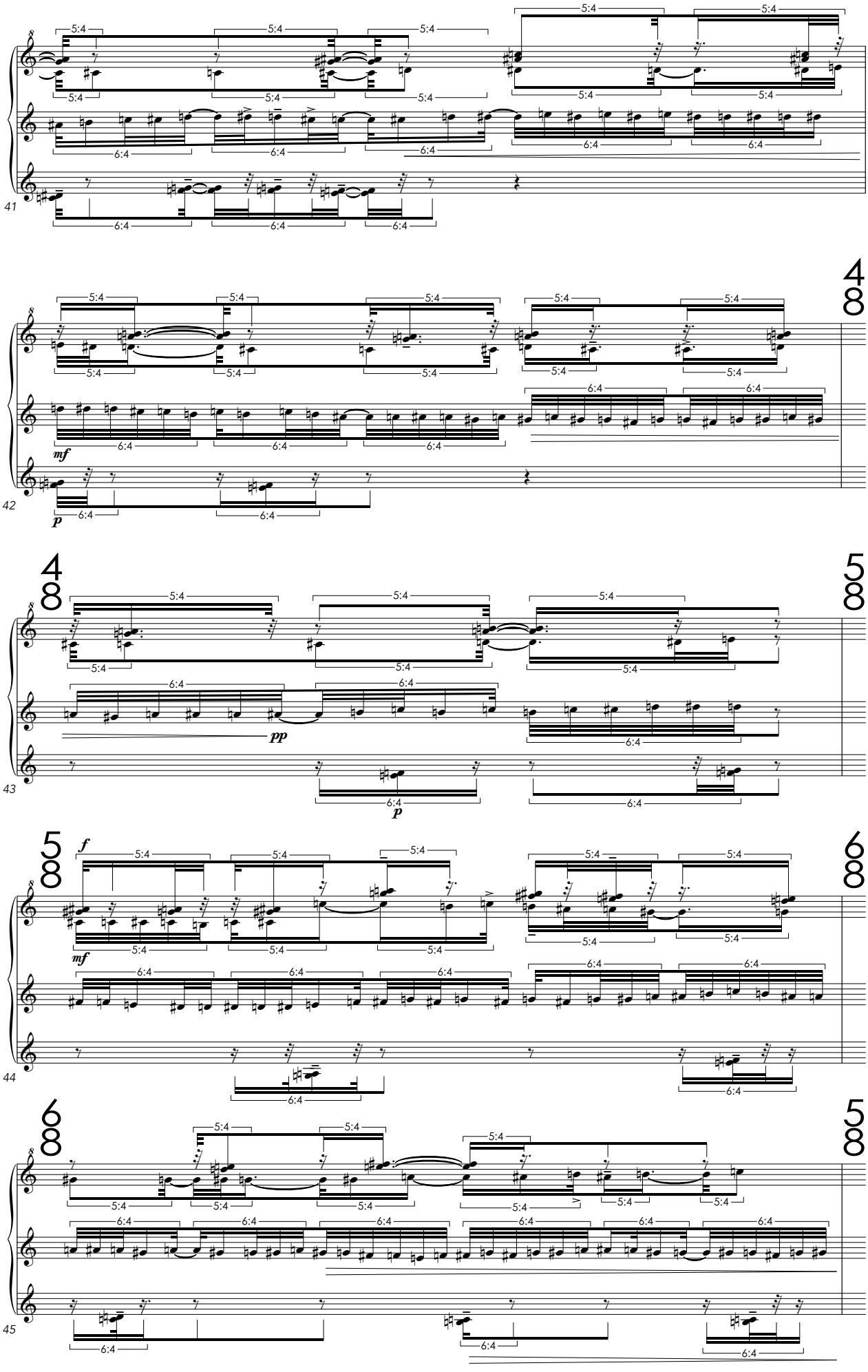

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ffmp
ffpp
ffpp
mp
5:4
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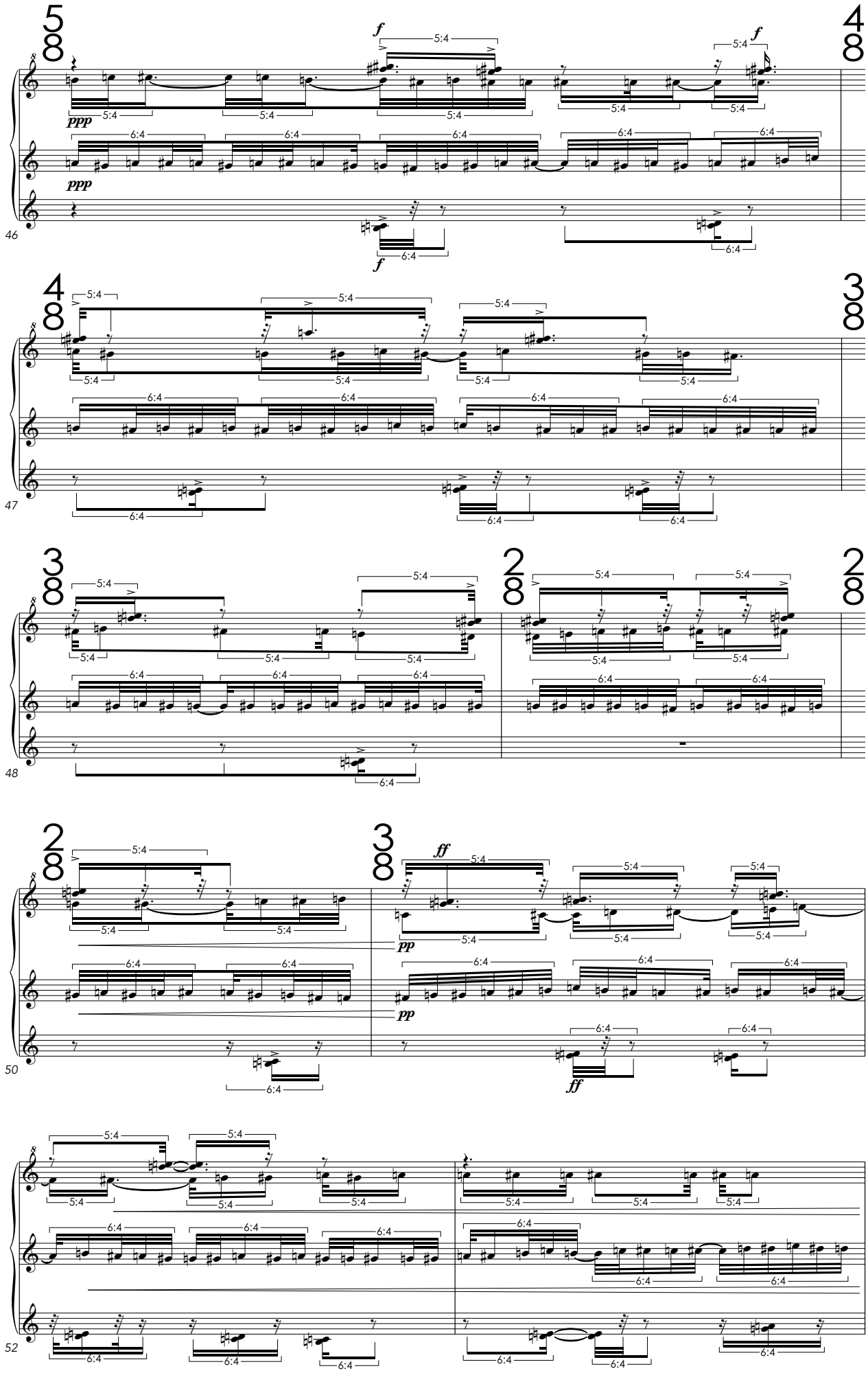

33
mf
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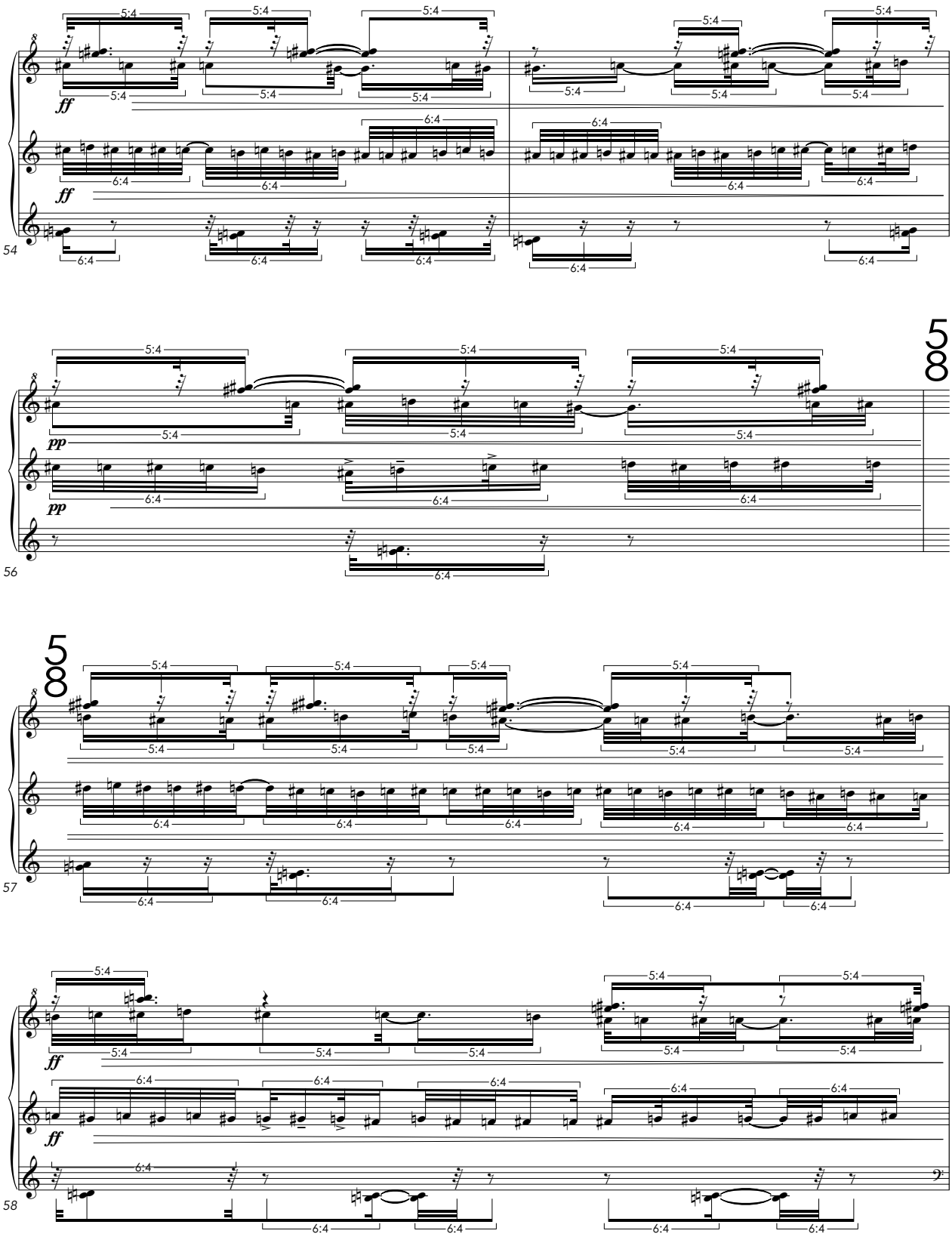

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mf
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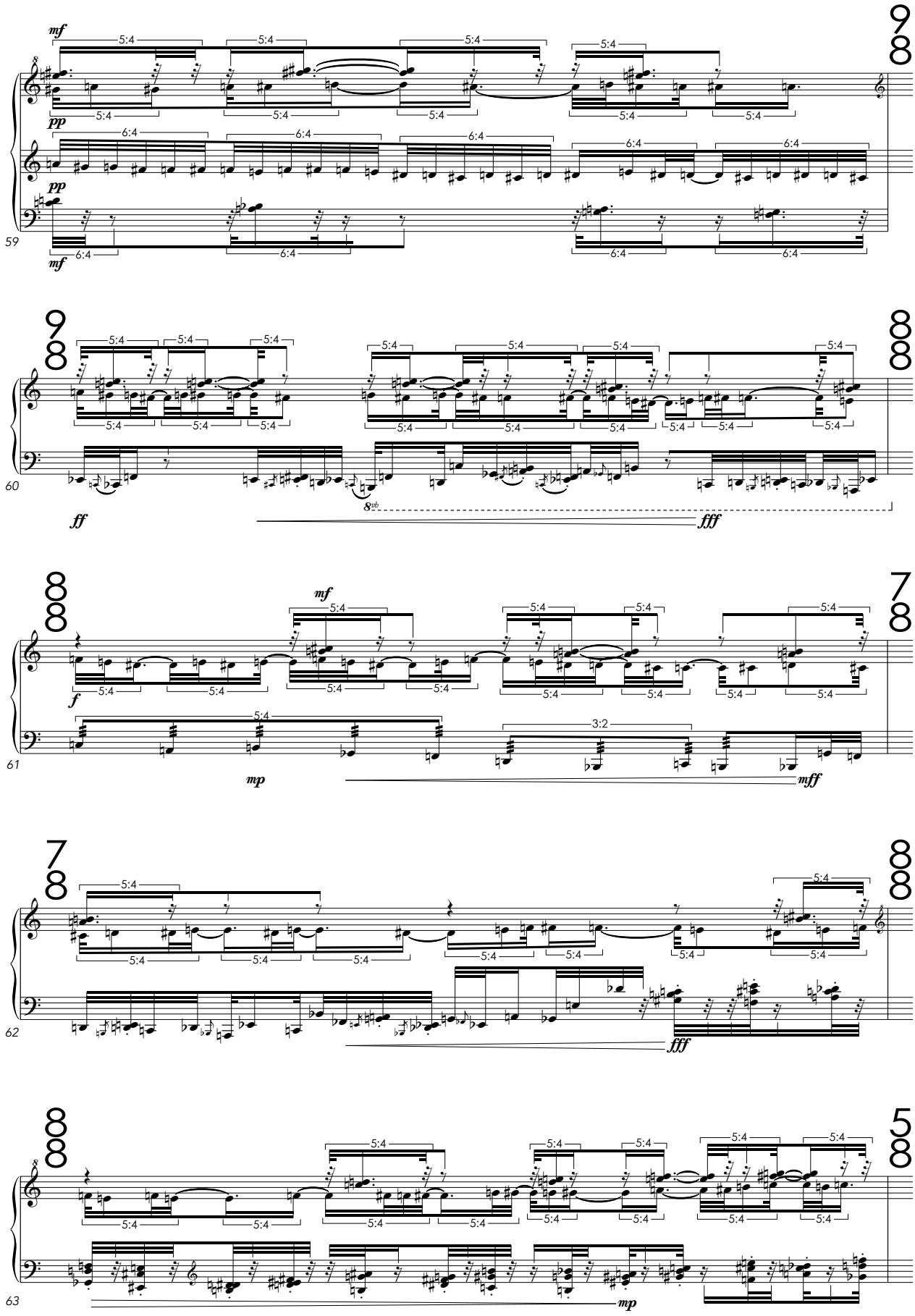

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mf
ffmp
ffmp
mf
5:4
6:4

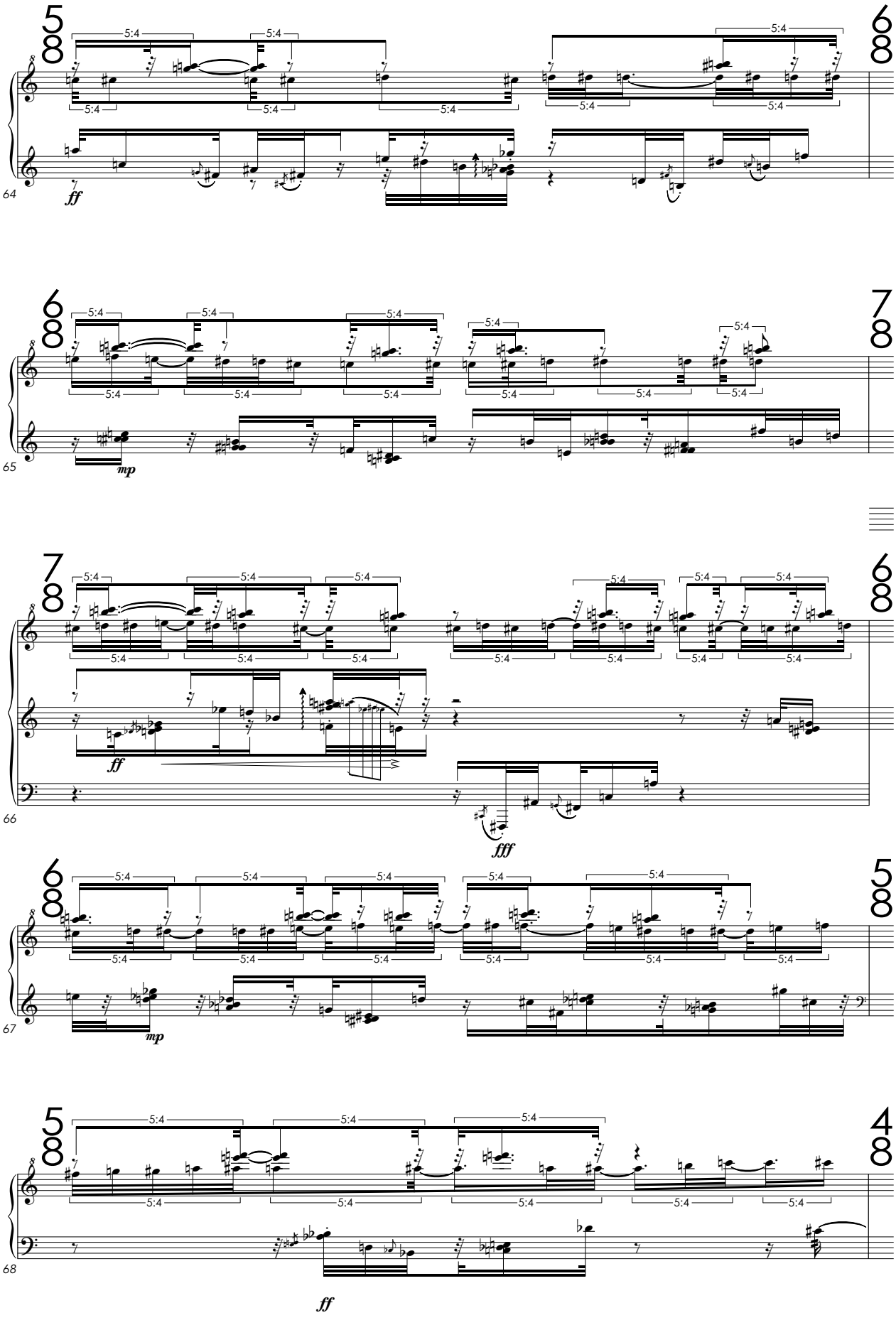

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37
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39
40
5:4
6:4
mff
pp
ff
fff
f
sff
mfff
mf
mp
ppp

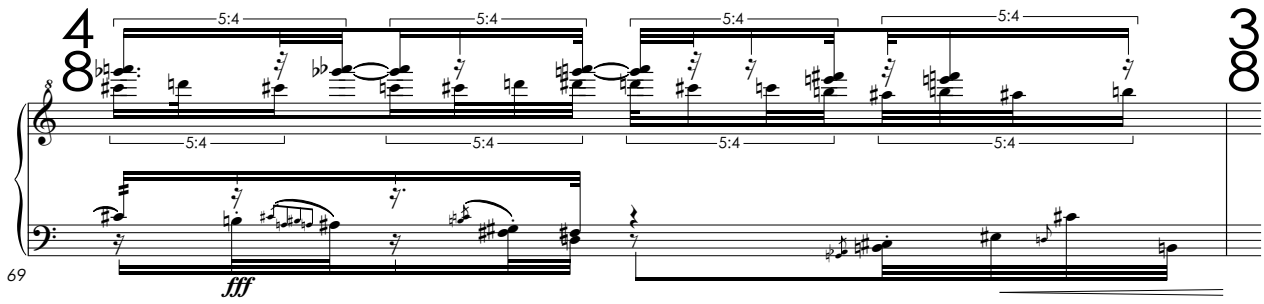

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42
43
44
45
5:4
6:4
mf
p
pp
f

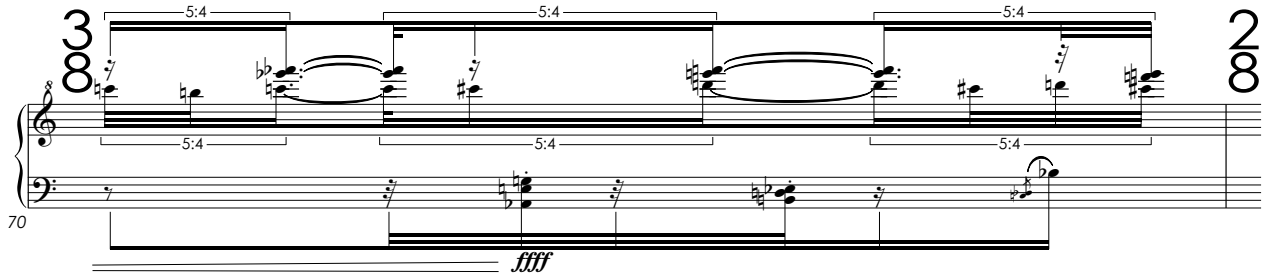

5/8
4/8
4/8
3/8
3/8
2/8
2/8
2/8
3/8
46
47
48
50
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ff
pp
5:4
6:4

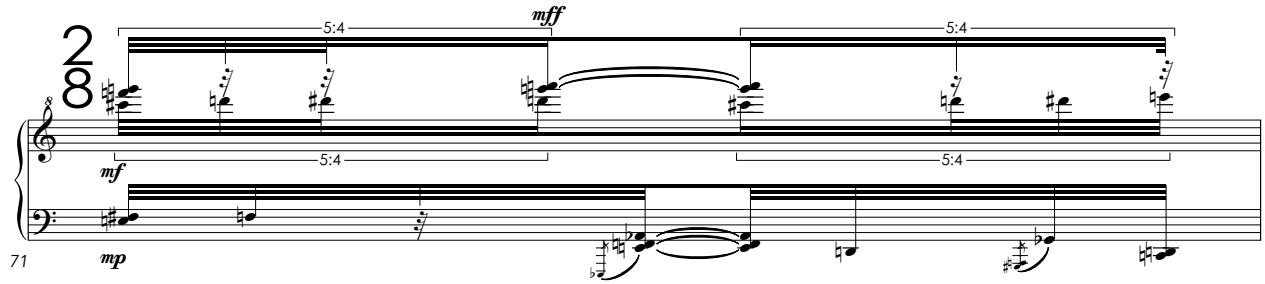

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6:4
ff
pp
5
8

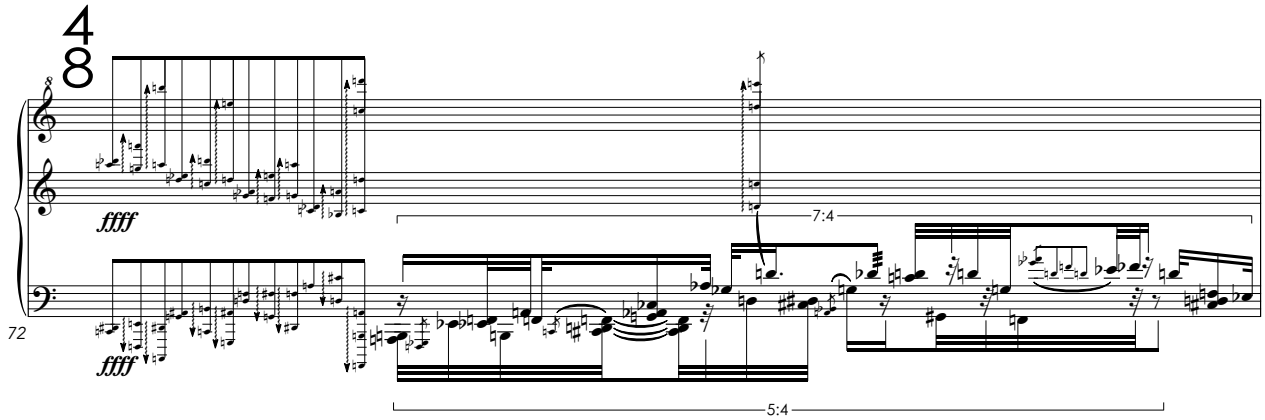

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62
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6:4
3:2
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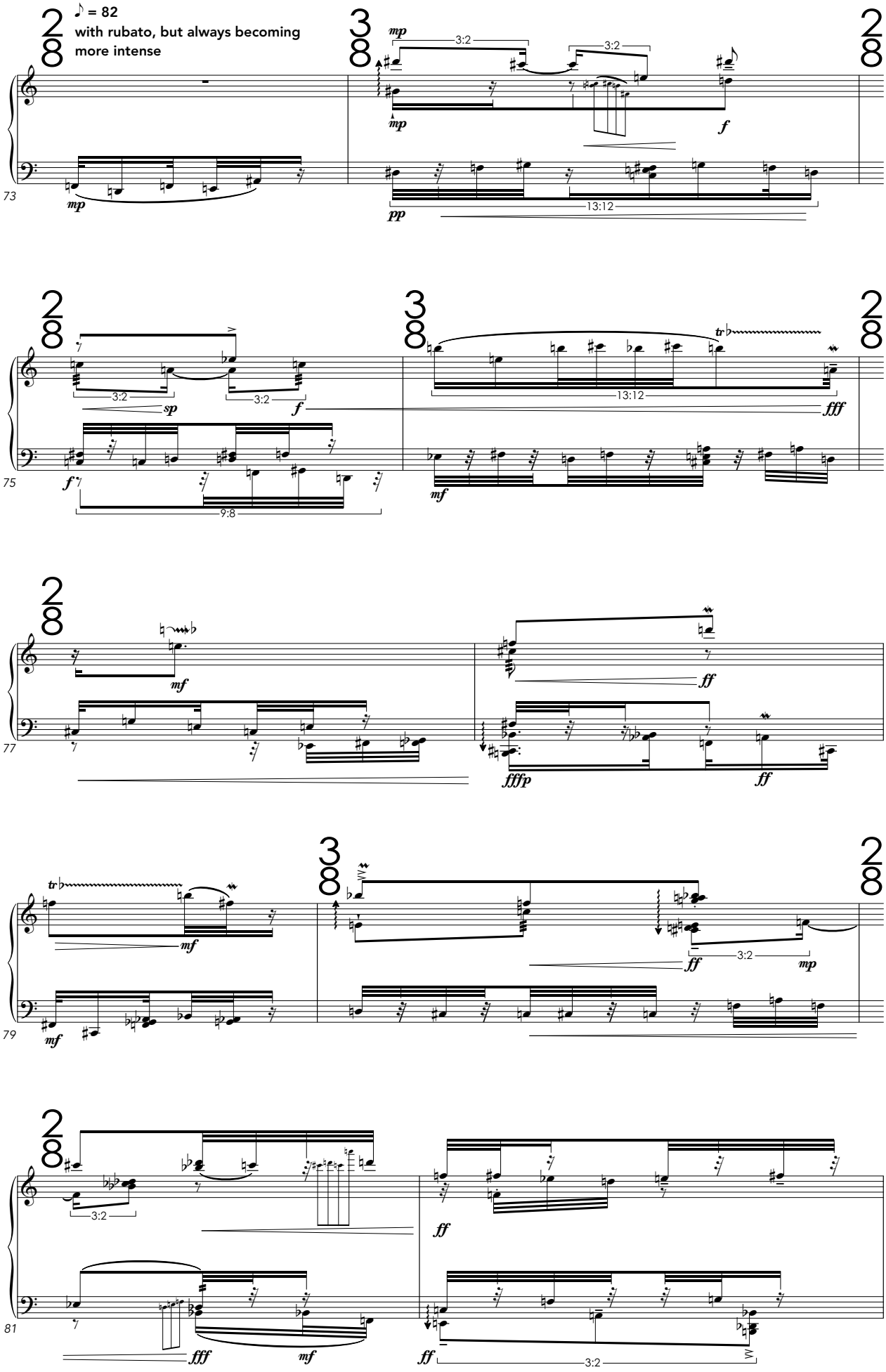

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ff
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fff
67
mp
68
ff

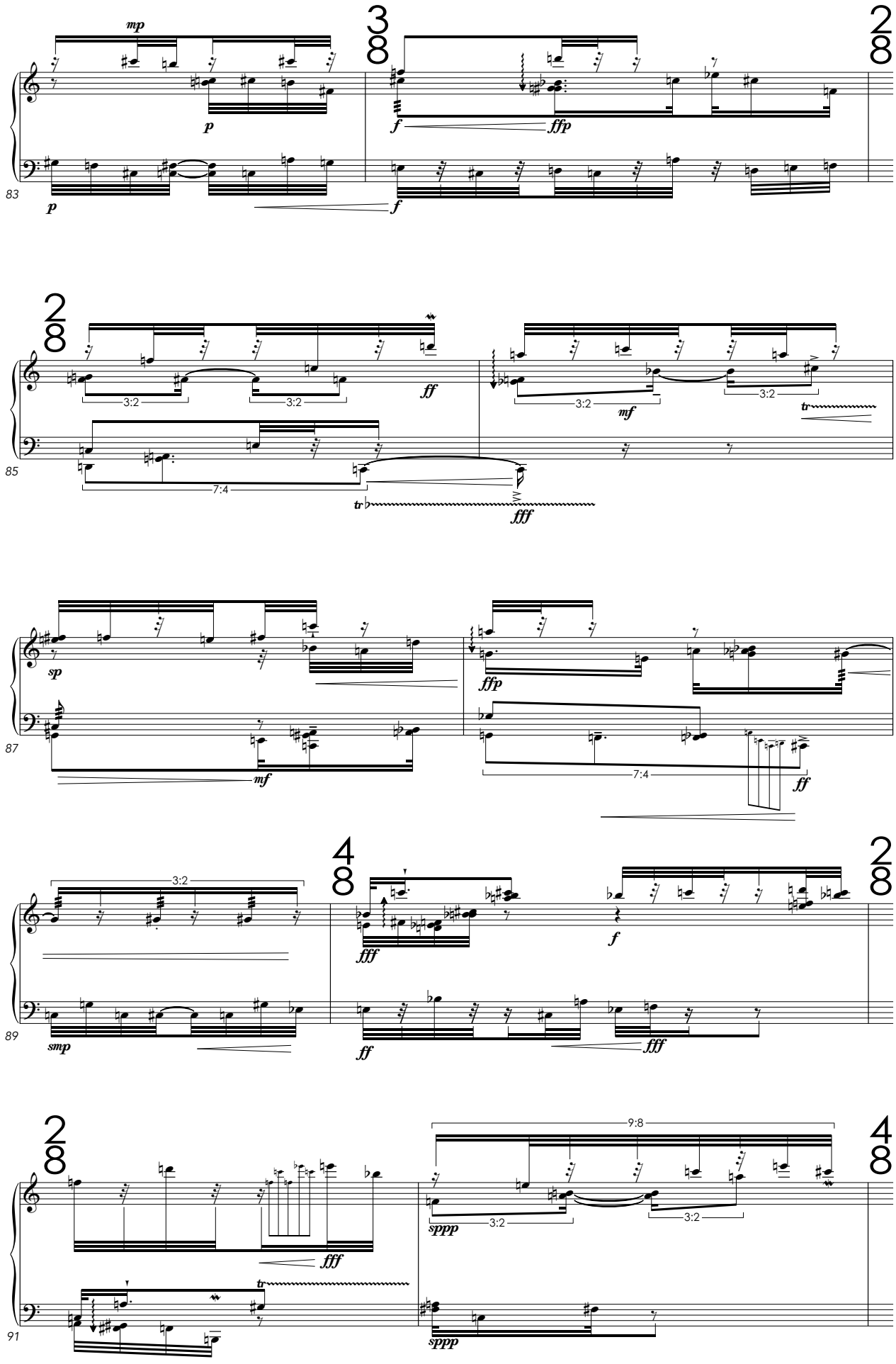

4
8
5:4
5:4
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5:4
5:4
5:4
5:4
5:4
3
8
69
fff

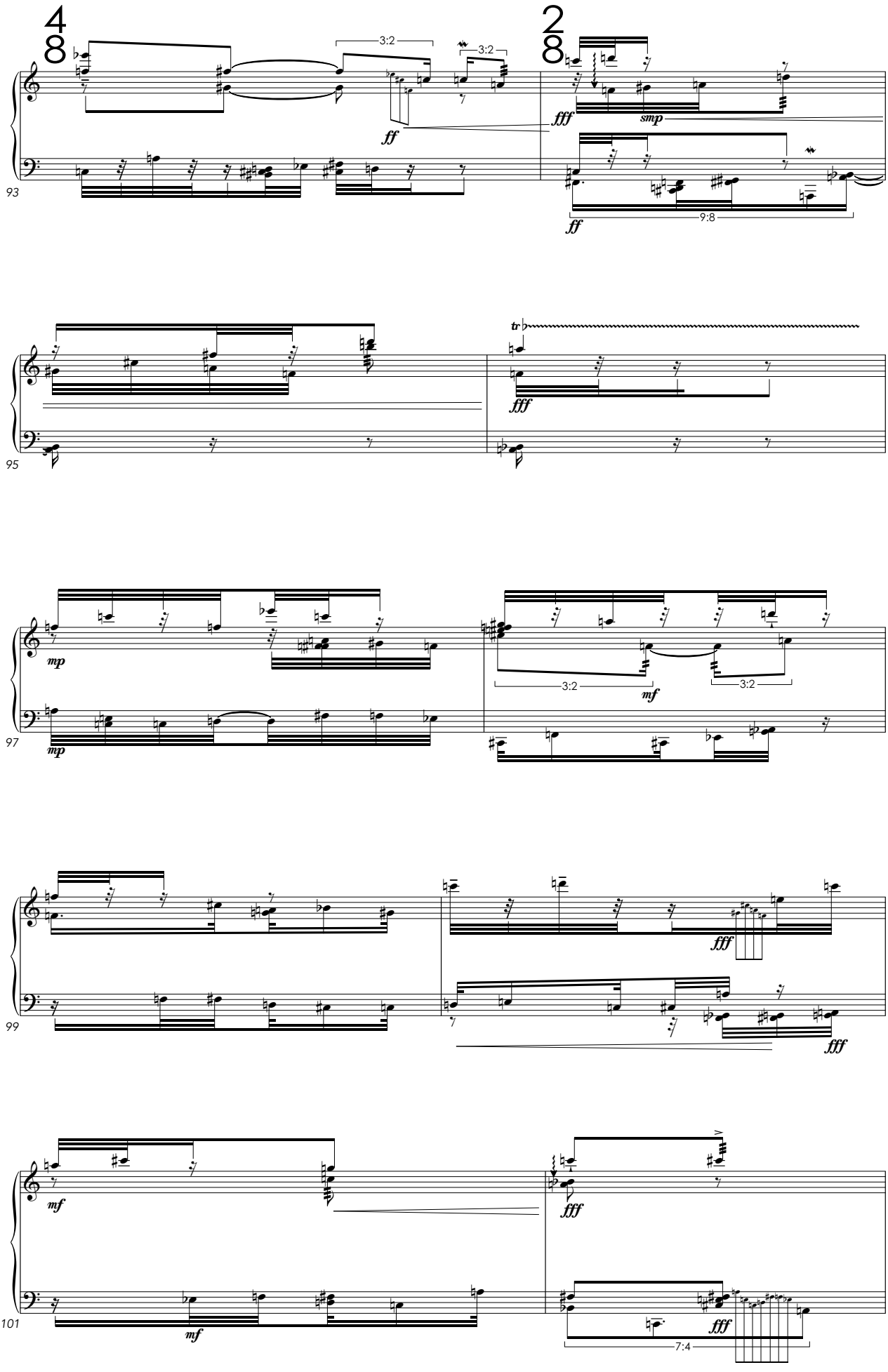

3
8
5:4
5:4
5:4
5:4
5:4
5:4
2
8
70
ffff

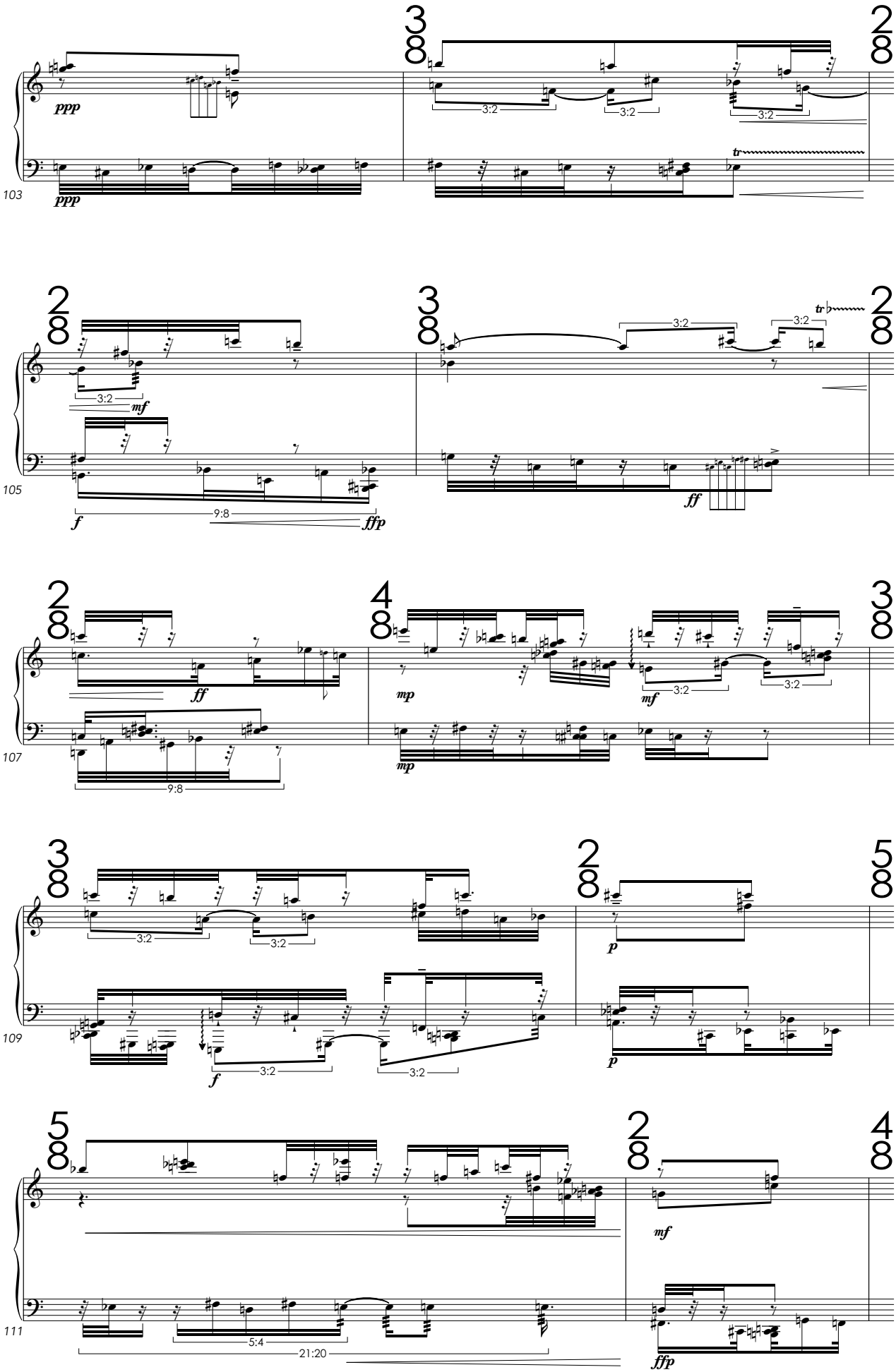

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mff
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5:4
mf
5:4
5:4
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mp

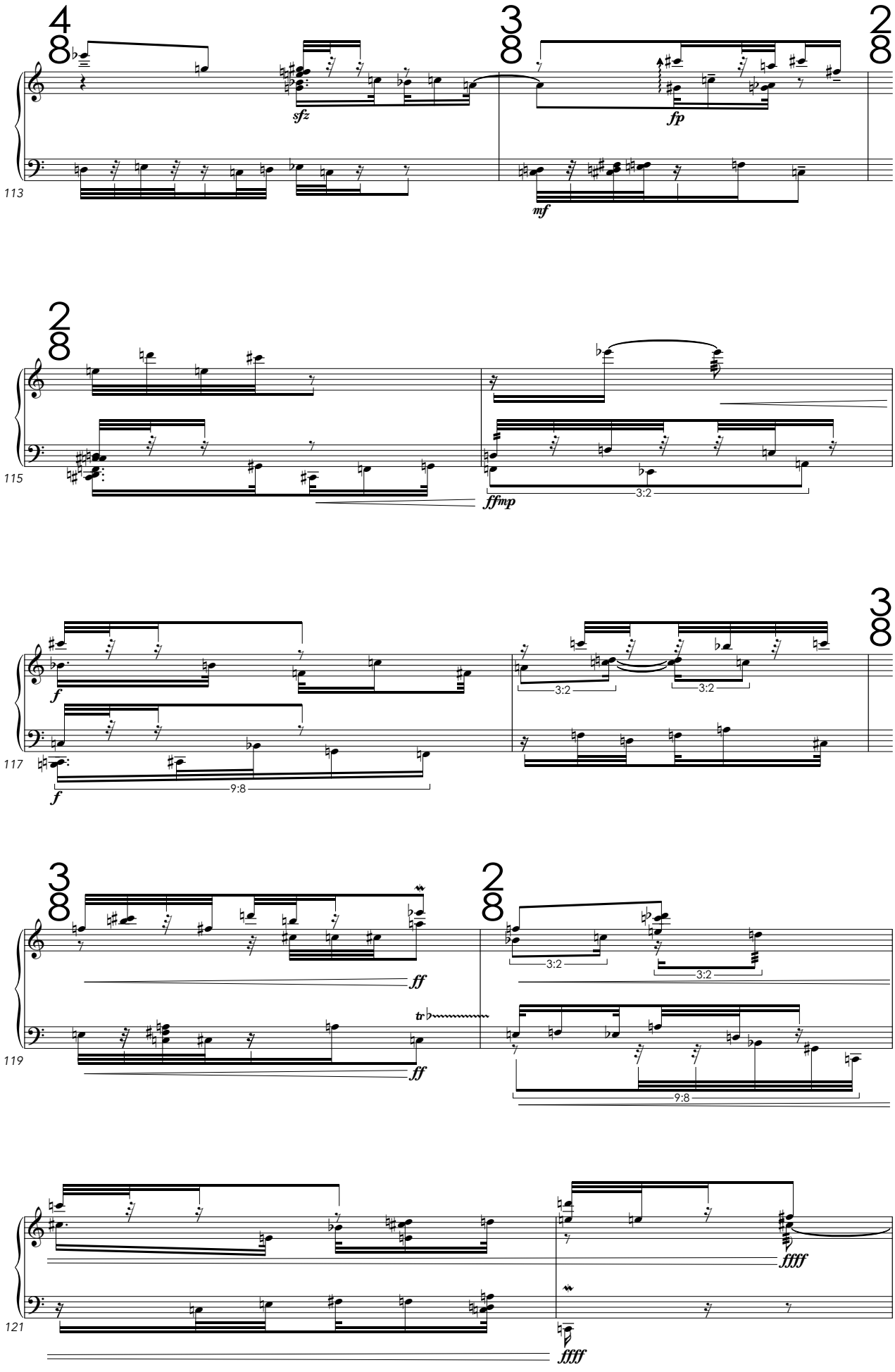

4
8
ffff
7:4
72
ffff
5:4

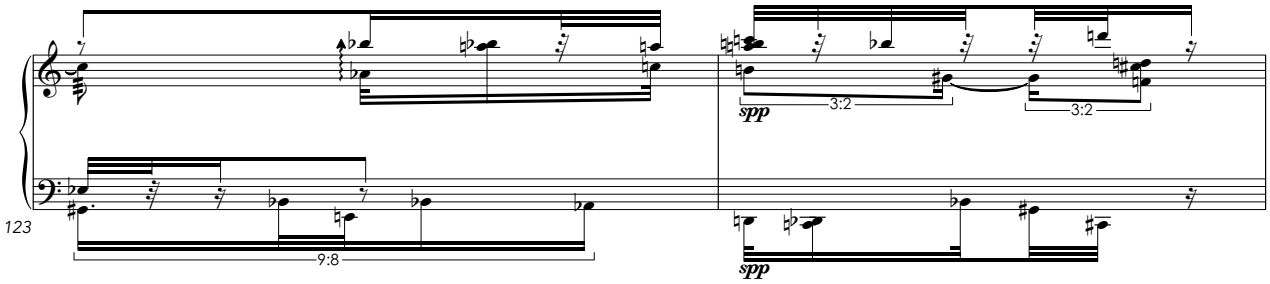

♪ = 82
with rubato, but always becoming more intense
73
75
77
79
81
3:2
13:12
9:8
mp
pp
f
sp
fff
mf
ff
fffp

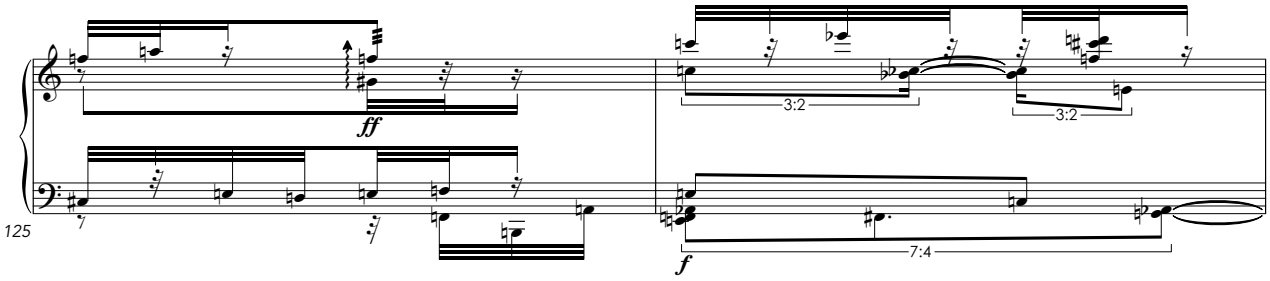

83
mp
p
3/8
f
ffp
2/8
p
f
2/8
85
3:2
3:2
ff
7:4
tr
fff
3:2
mf
tr
87
sp
mf
ffp
7:4
ff
3:2
4/8
fff
2/8
f
89
smp
ff
fff
2/8
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fff
tr
9:8
sppp
3:2
3:2
4/8
sppp

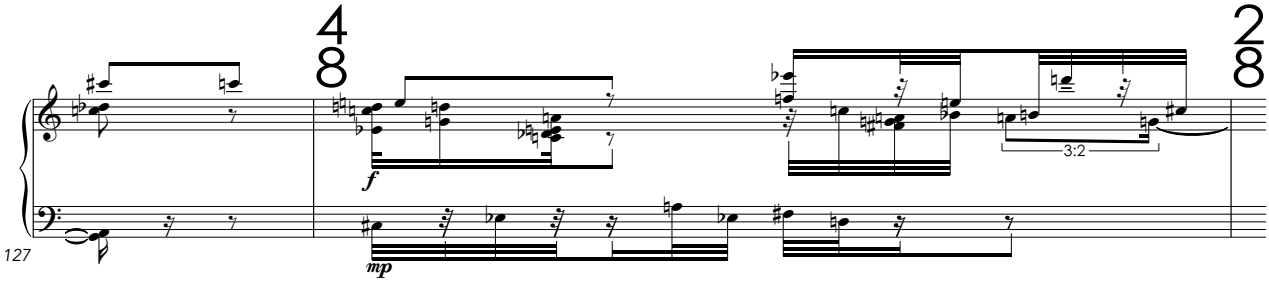

93
3:2
3:2
ff
fff
smp
ff
9:8
95
tr
fff
97
mp
mp
3:2
mf
3:2
99
fff
fff
101
mf
mf
fff
fff
7:4

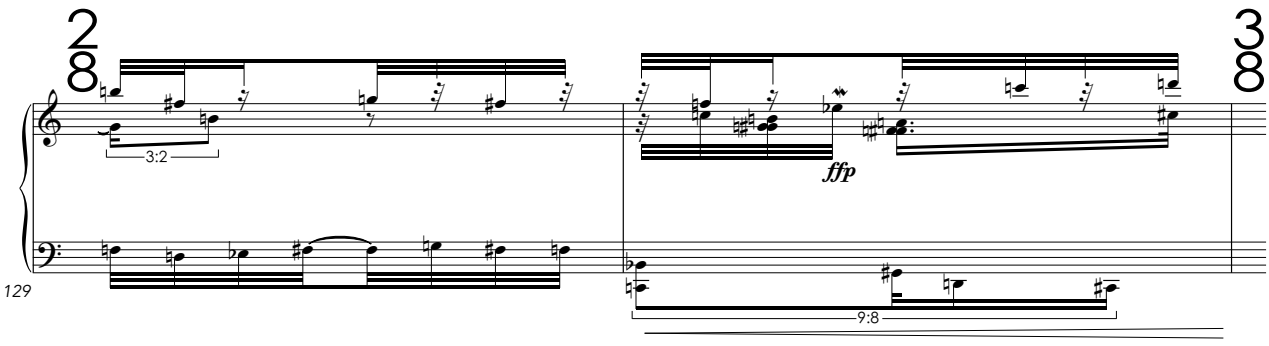

103
ppp
3:2
3:2
3:2
tr
105
mf
f
9:8
ffp
3:2
3:2
tr
ff
107
ff
mp
mp
mf
3:2
3:2
9:8
109
3:2
3:2
f
3:2
3:2
p
p
111
mf
5:4
21:20
ffp

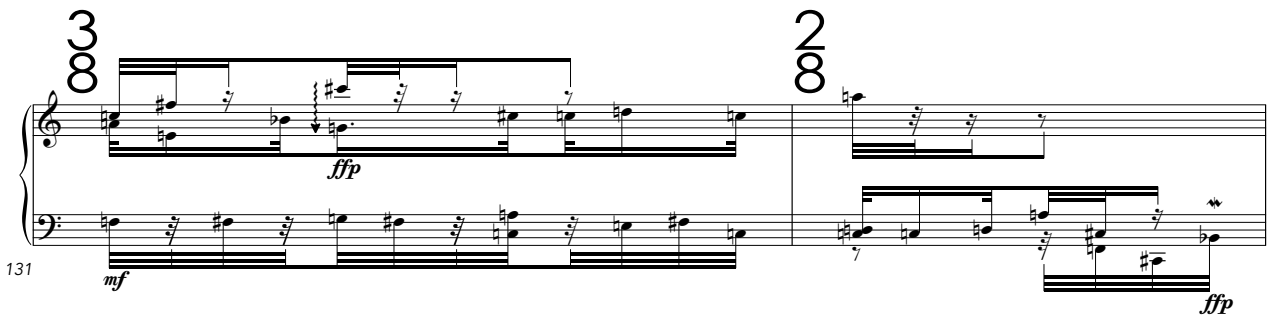

113
sfz
fp
mf
115
ffmp
3:2
117
f
9:8
119
ff
tr
3:2
121
ffff

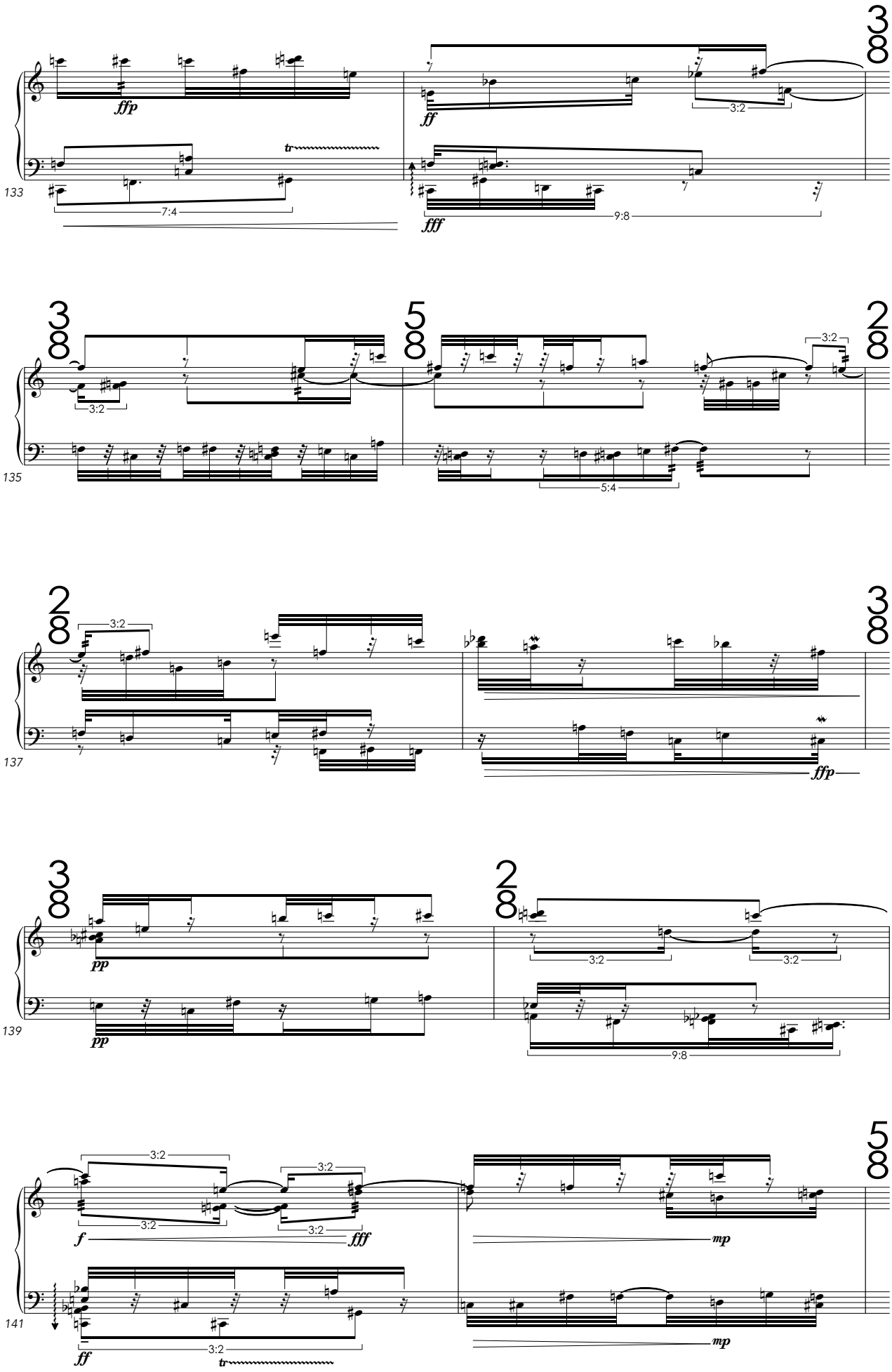

123
spp
3:2
3:2
9:8
spp

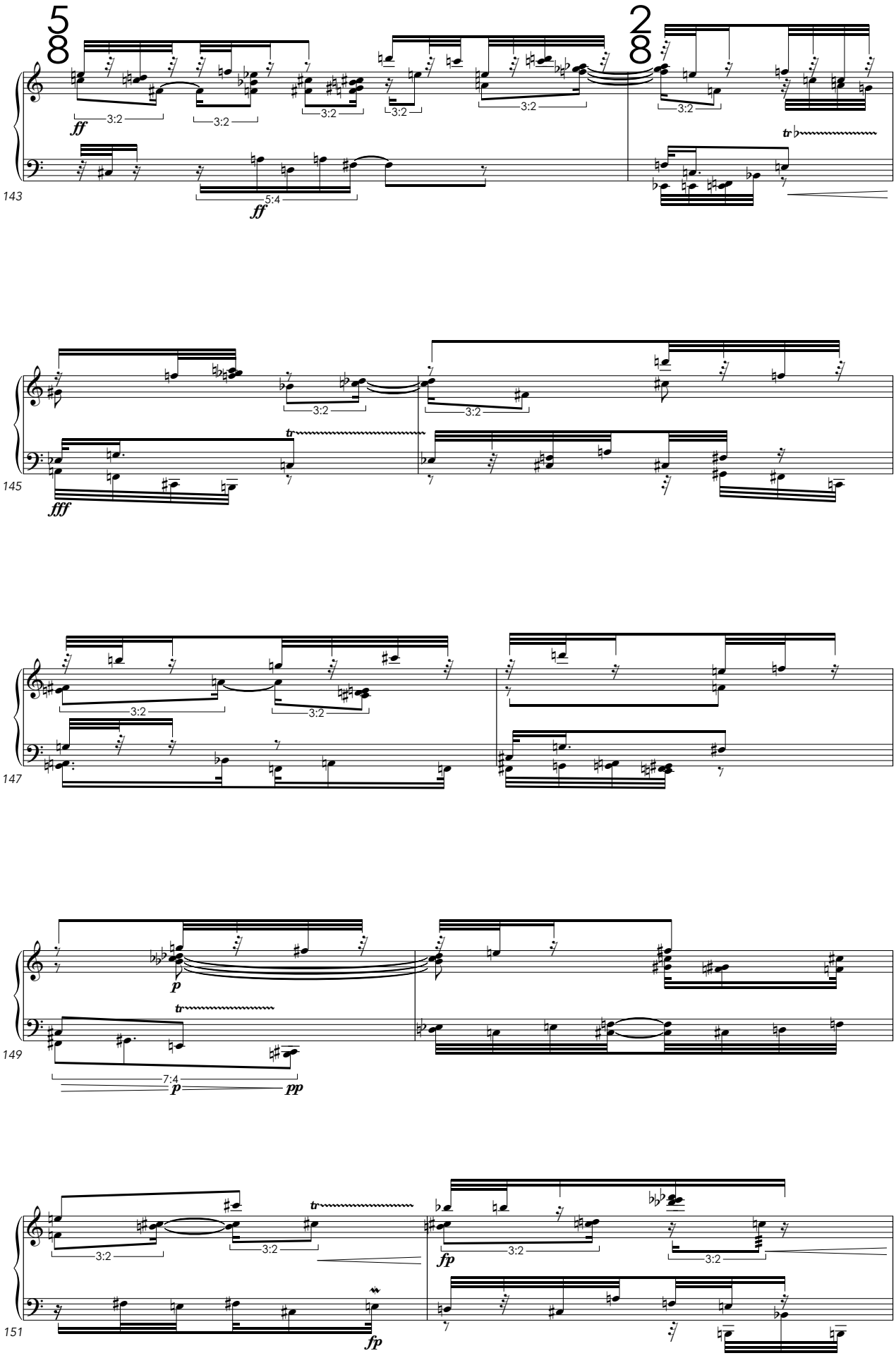

125
ff
3:2
3:2
f
7:4

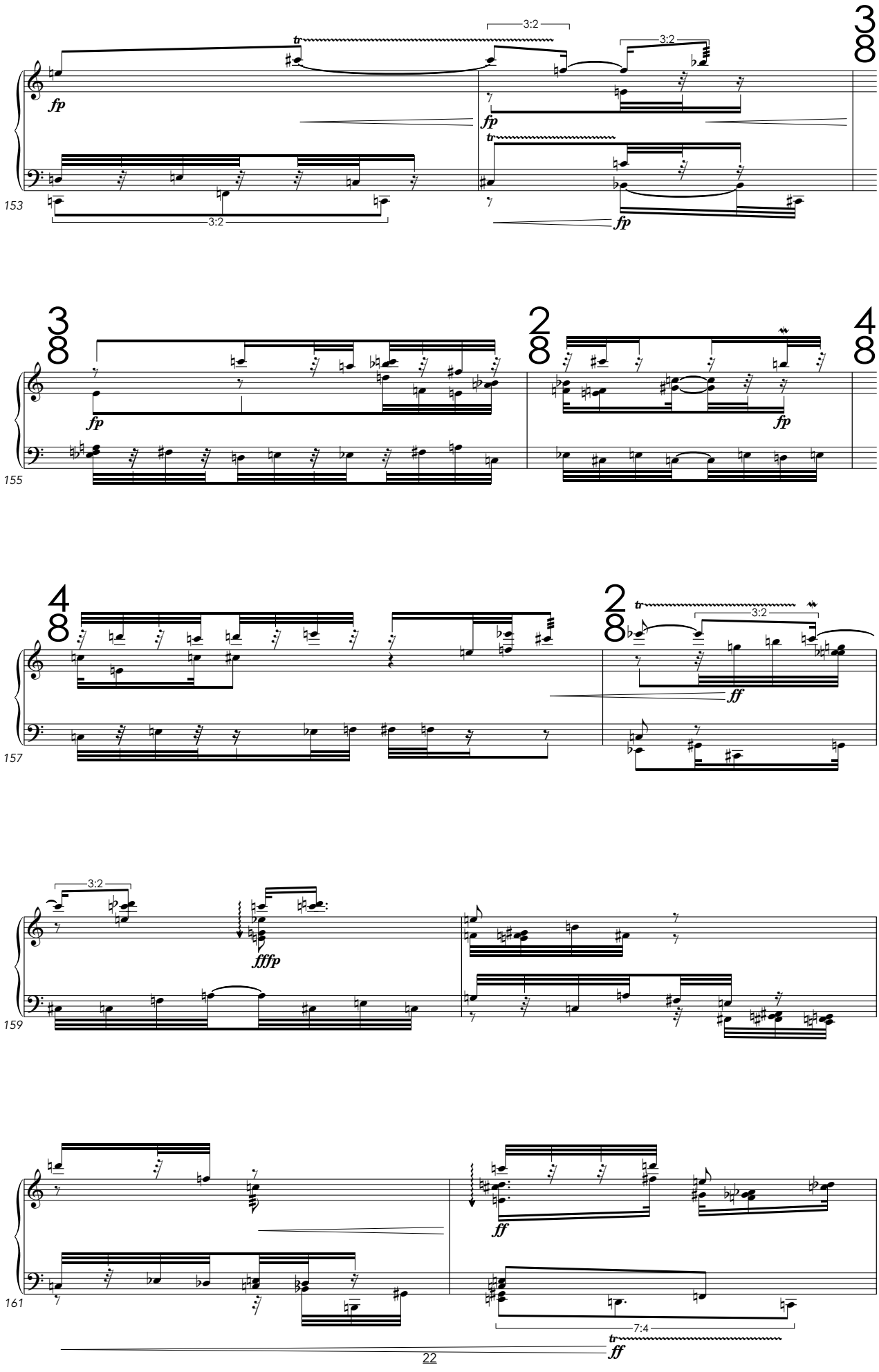

127
4
8
f
mp
3:2
2
8

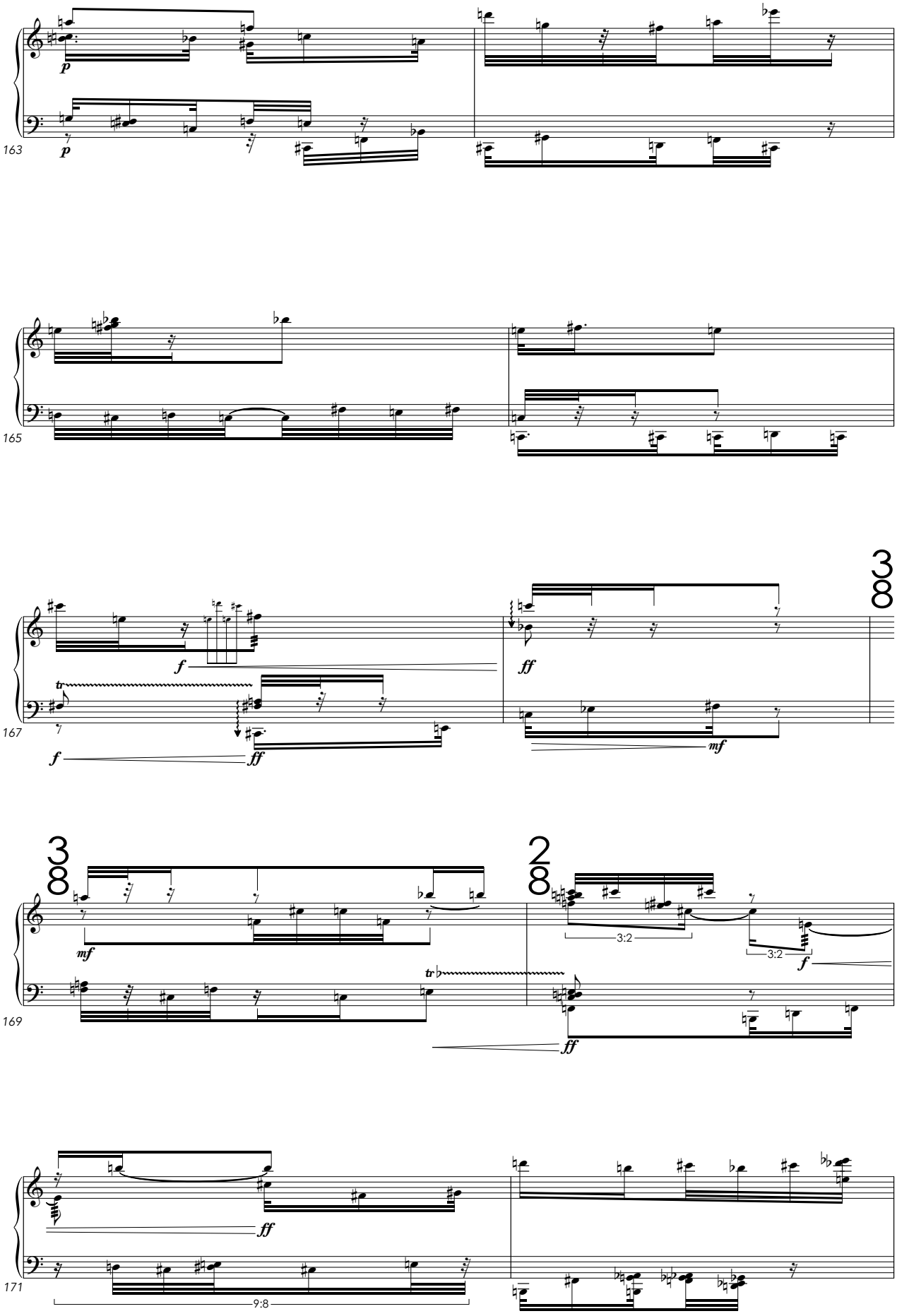

129
2
8
3:2
ffp
3
8
9:8

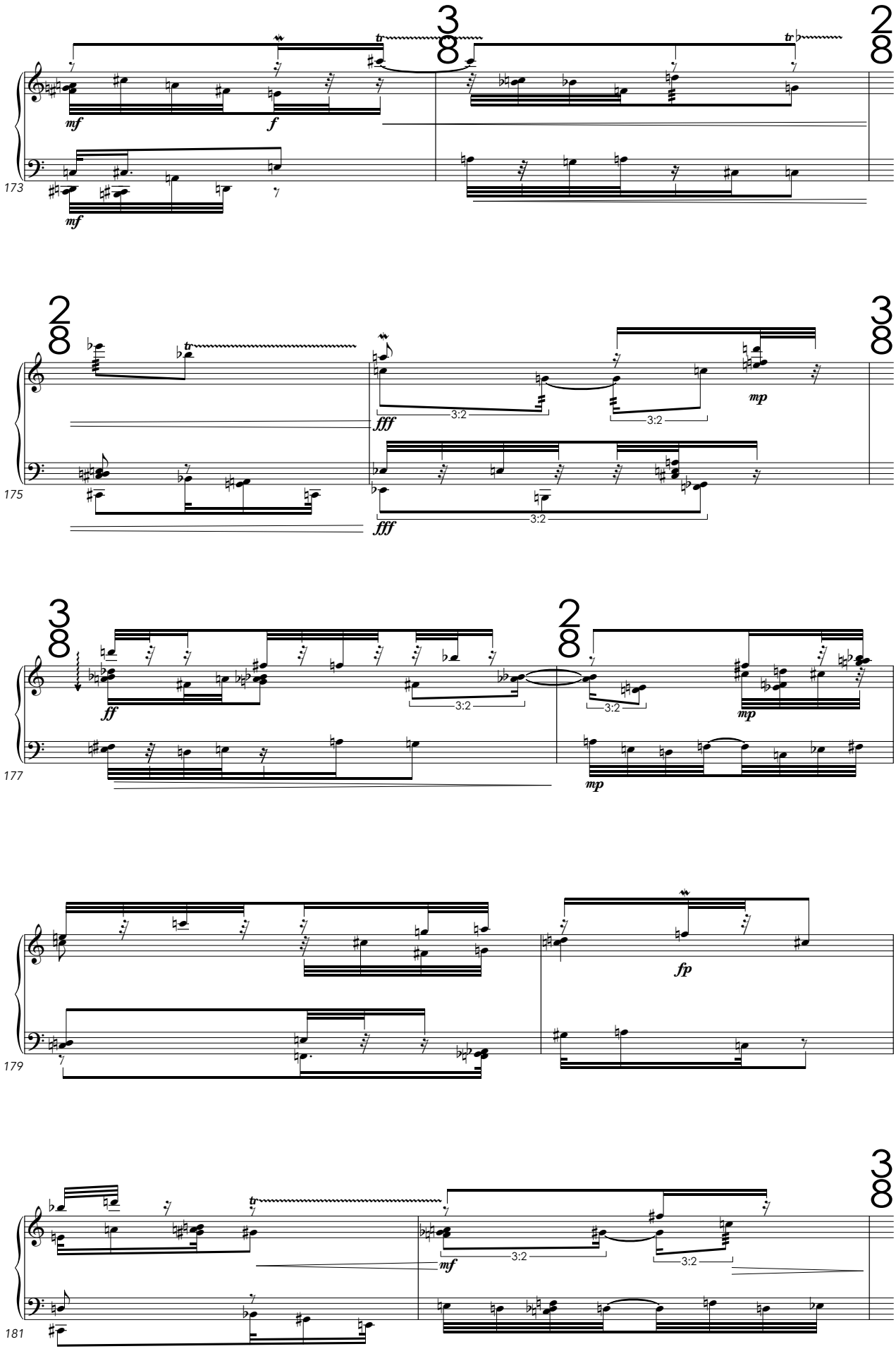

131
3
8
ffp
mf
2
8
ffp

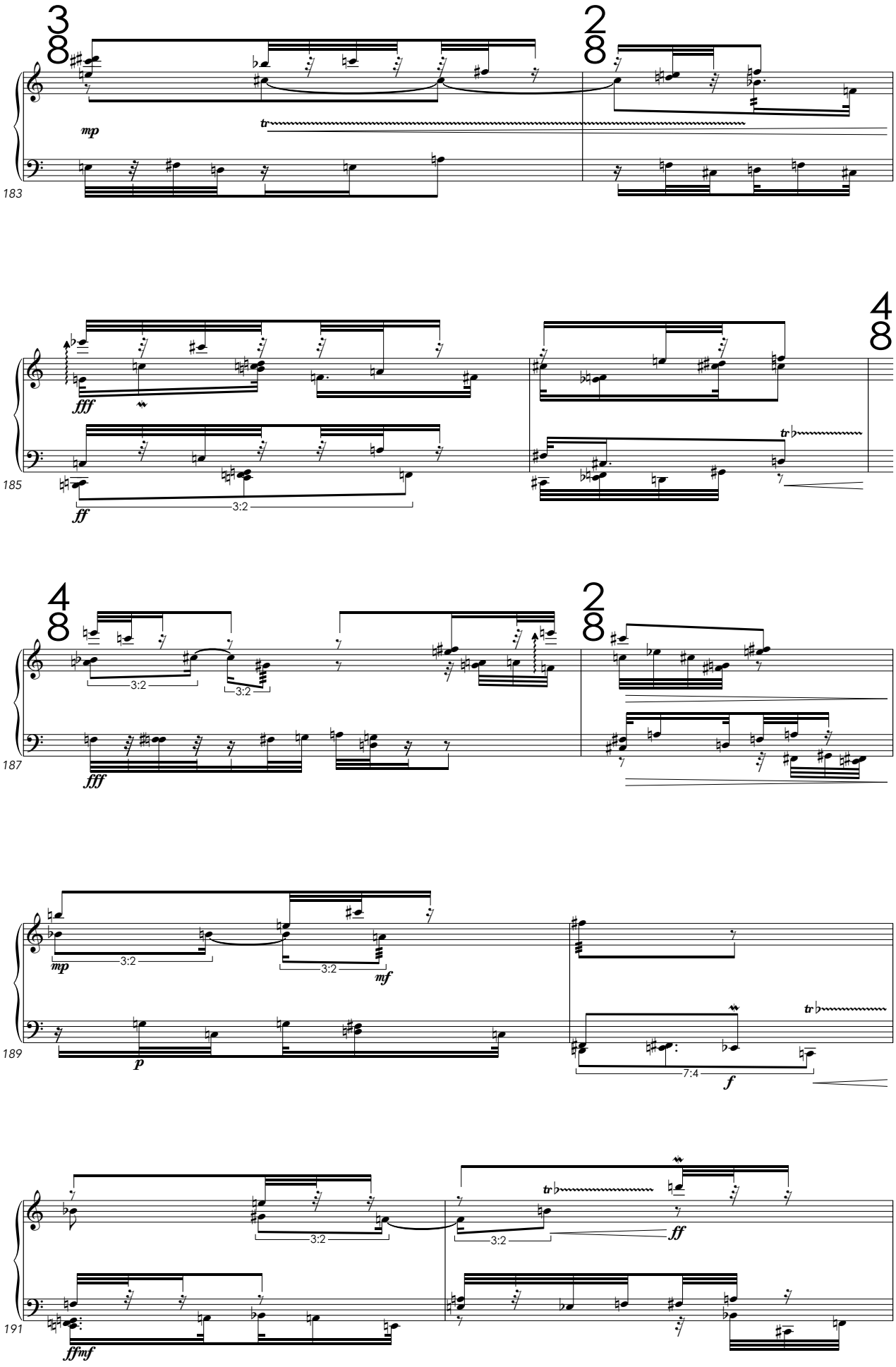

133
ffp
ff
fff
tr
3:2
7:4
9:8
135
5:4
137
ffp
139
pp
141
f
mp
3:2
9:8

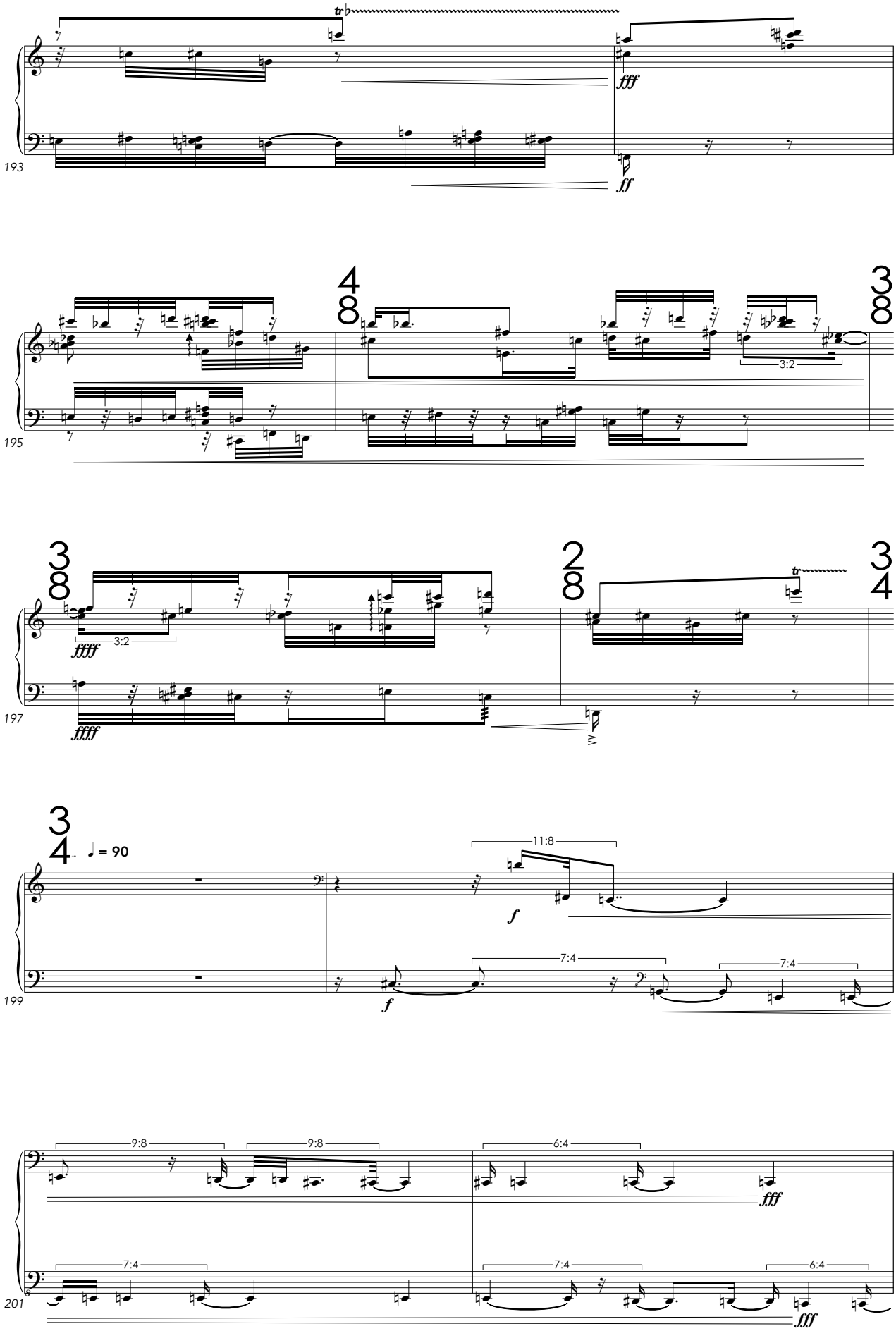

143
ff
3:2
3:2
3:2
3:2
3:2
3:2
tr
ff
5:4
145
fff
3:2
3:2
tr
147
3:2
3:2
149
p
tr
7:4
p
pp
151
3:2
3:2
tr
fp
3:2
3:2
fp

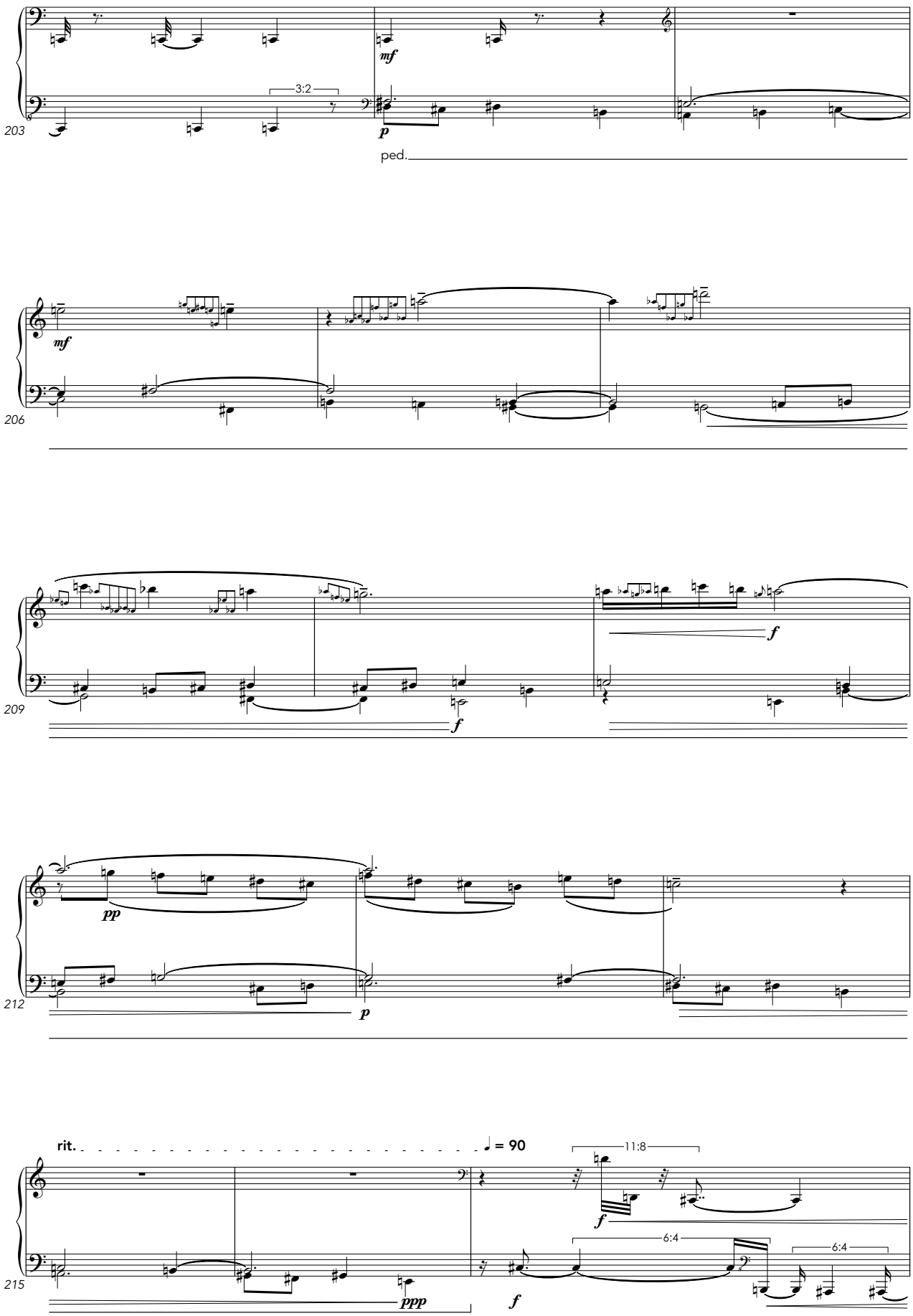

153
3:2
3:2
3:2
fp
fp
fp
155
fp
fp
157
3:2
ff
159
3:2
ffffp
161
ff
7:4
ff

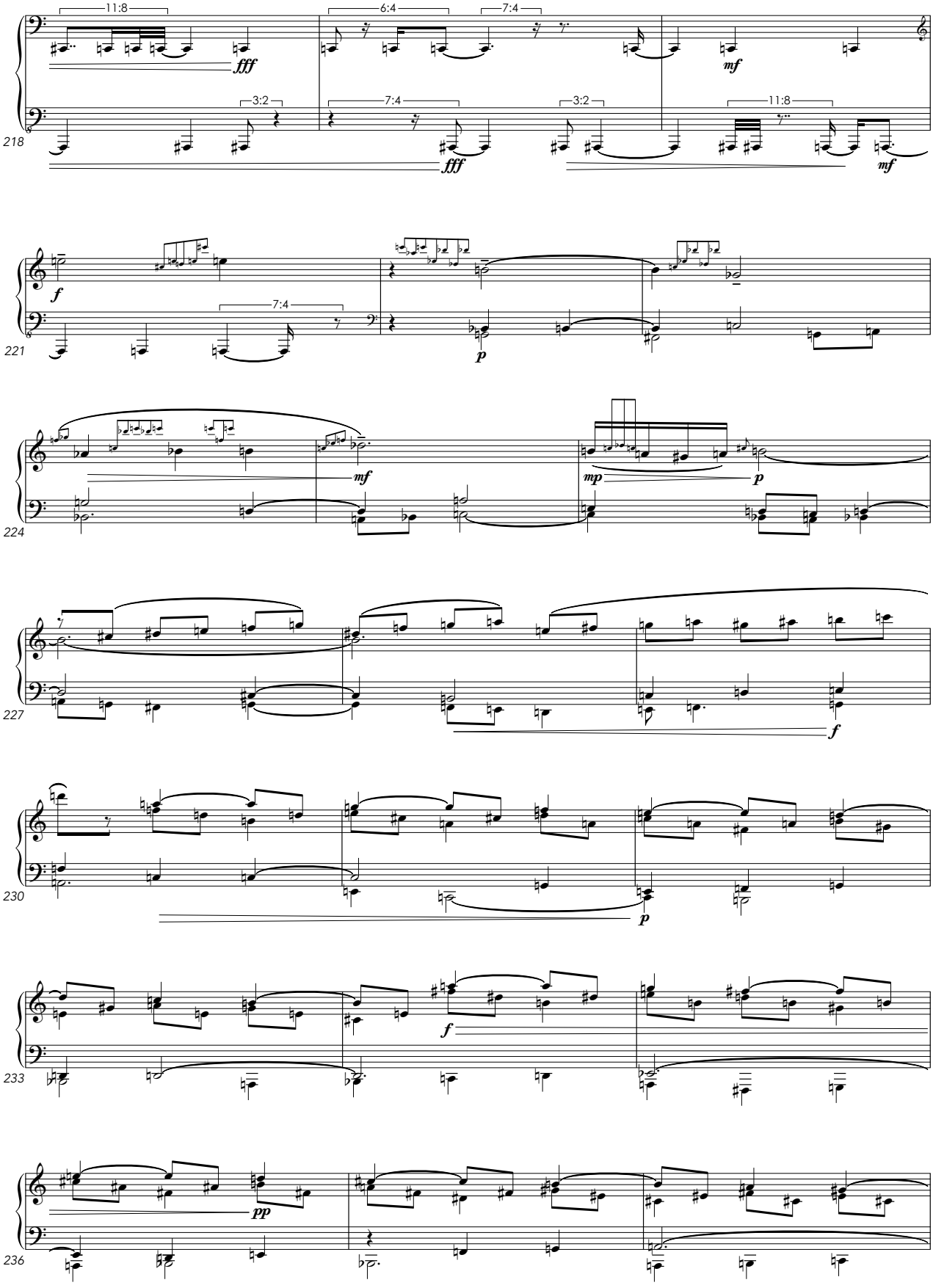

163
p
p
165
167
f
tr
f
ff
ff
mf
3
8
169
mf
tr
ff
3:2
3:2
f
2
8
171
ff
9:8

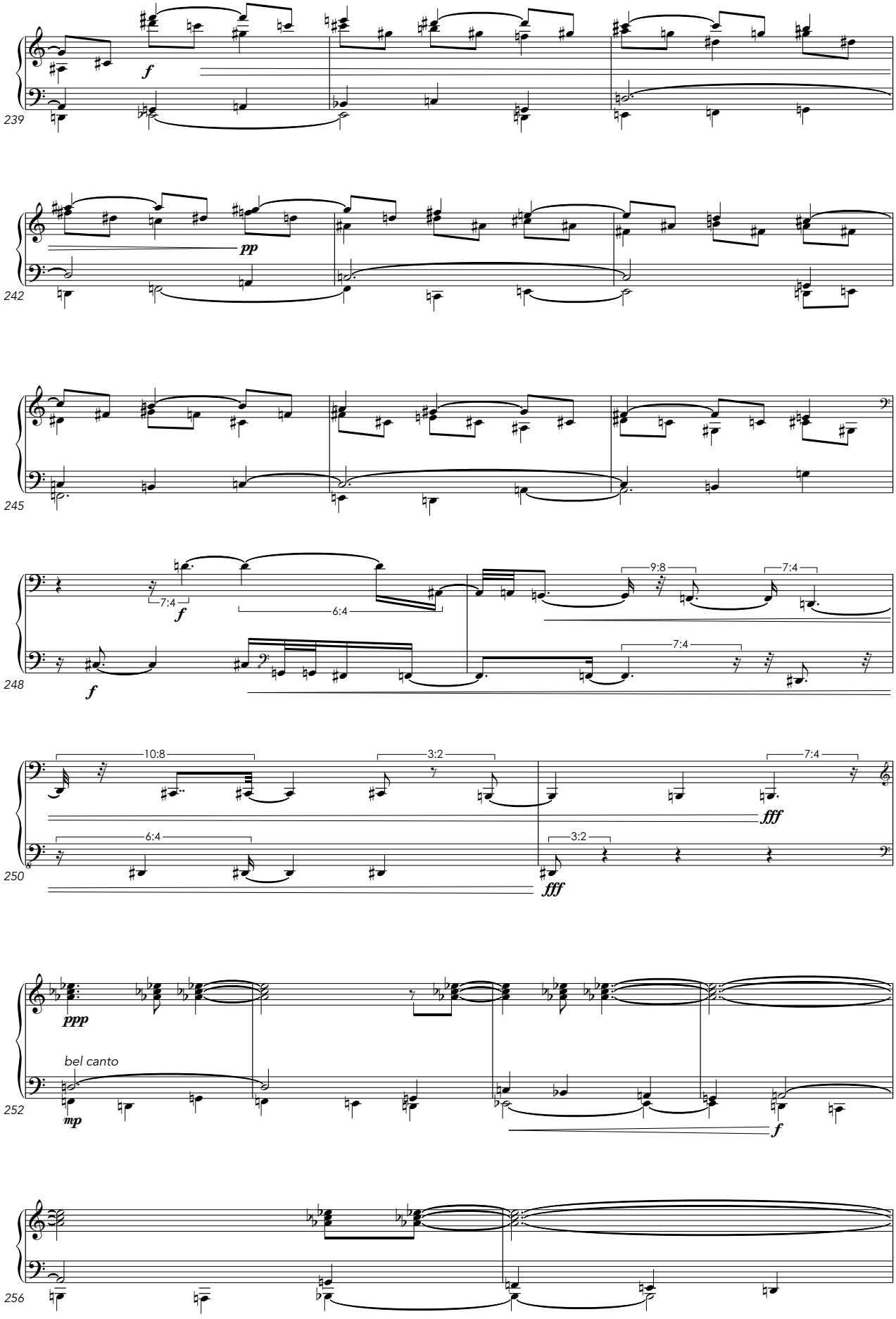

173
mf
f
mf
175
fff
3:2
3:2
mp
fff
3:2
177
ff
3:2
3:2
mp
mp
179
fp
181
mf
3:2
3:2

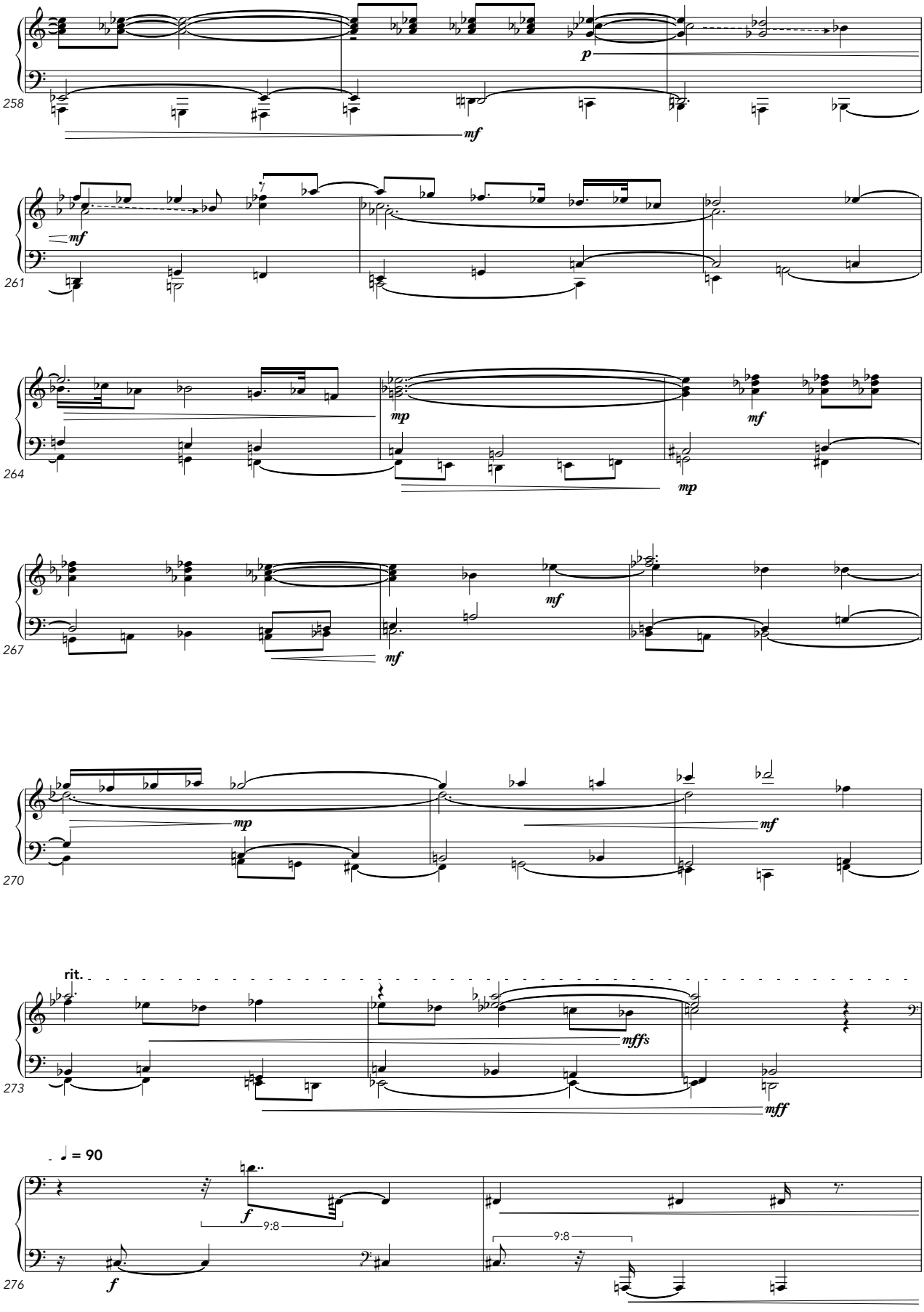

183
mp
tr
185
fff
ff
3:2
187
fff
3:2
3:2
189
mp
p
mf
f
7:4
191
ffmf
ff
3:2
3:2

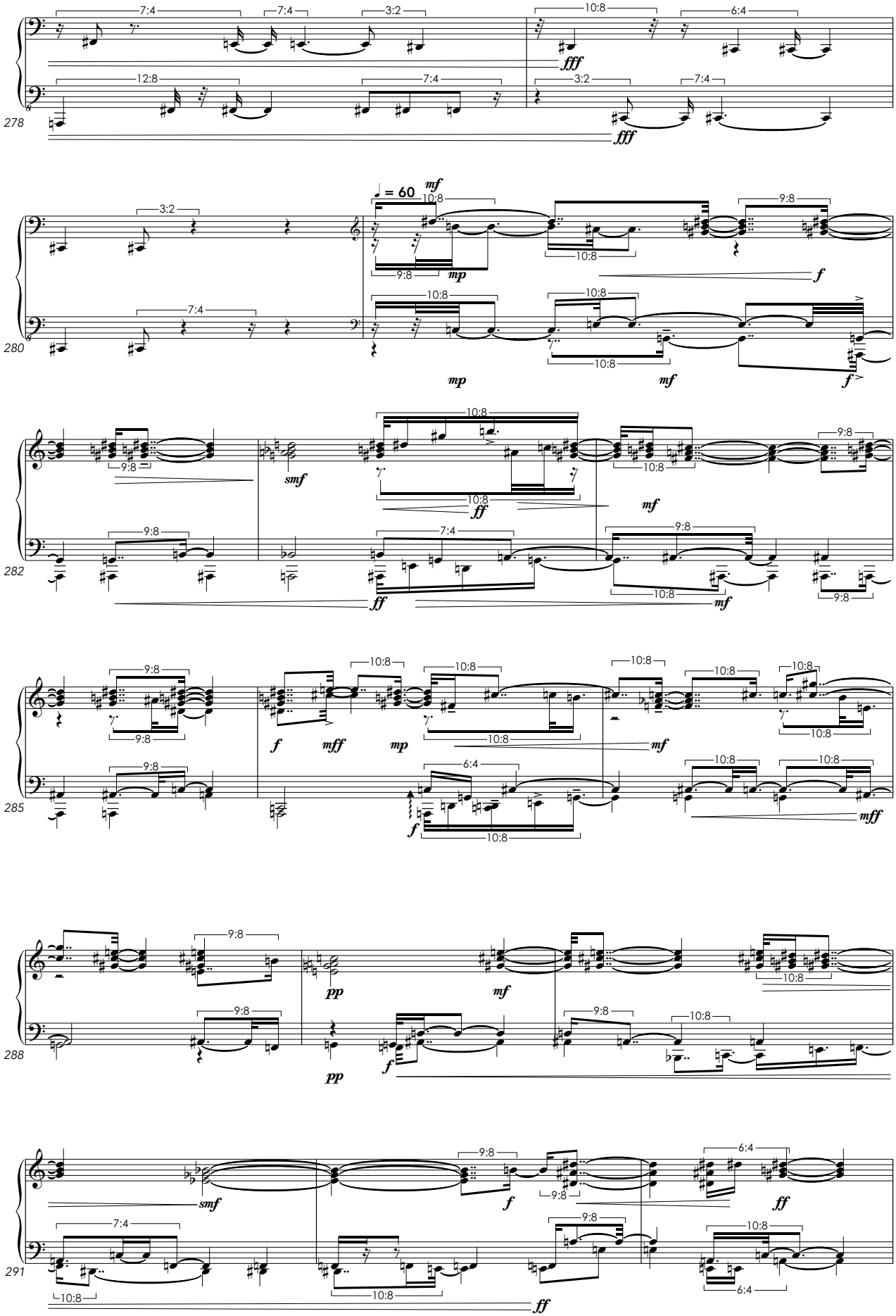

193
fff
ff
195
4/8
3/8
3:2
197
3/8
2/8
3/4
3:2
ffff
ffff
199
3/4
♩ = 90
11:8
f
7:4
7:4
f
201
9:8
9:8
6:4
fff
7:4
7:4
6:4
fff

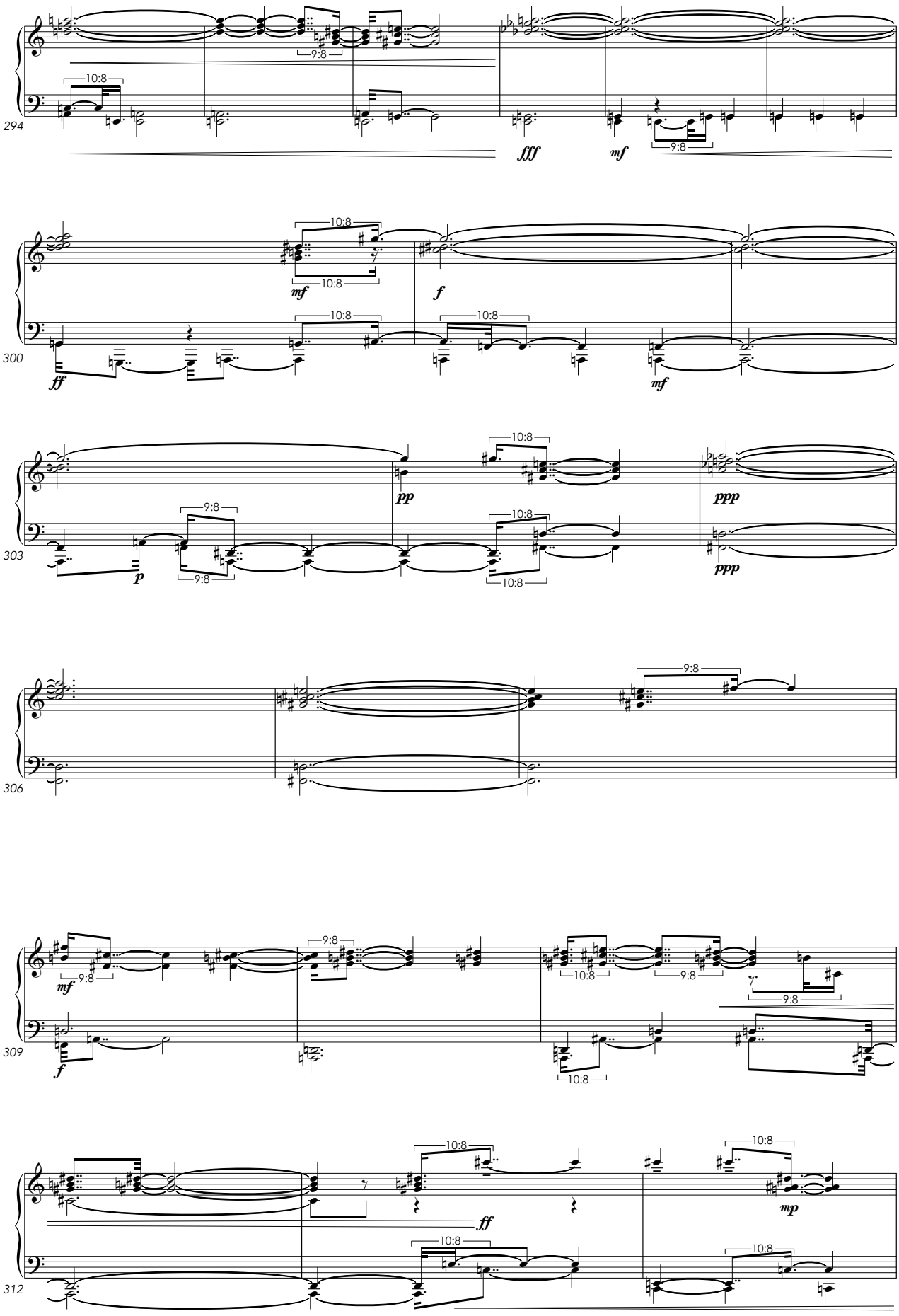

203
mf
3:2
p
ped.
206
mf
209
f
f
212
pp
p
rit.
♩ = 90
11:8
f
6:4
6:4
215
ppp
f

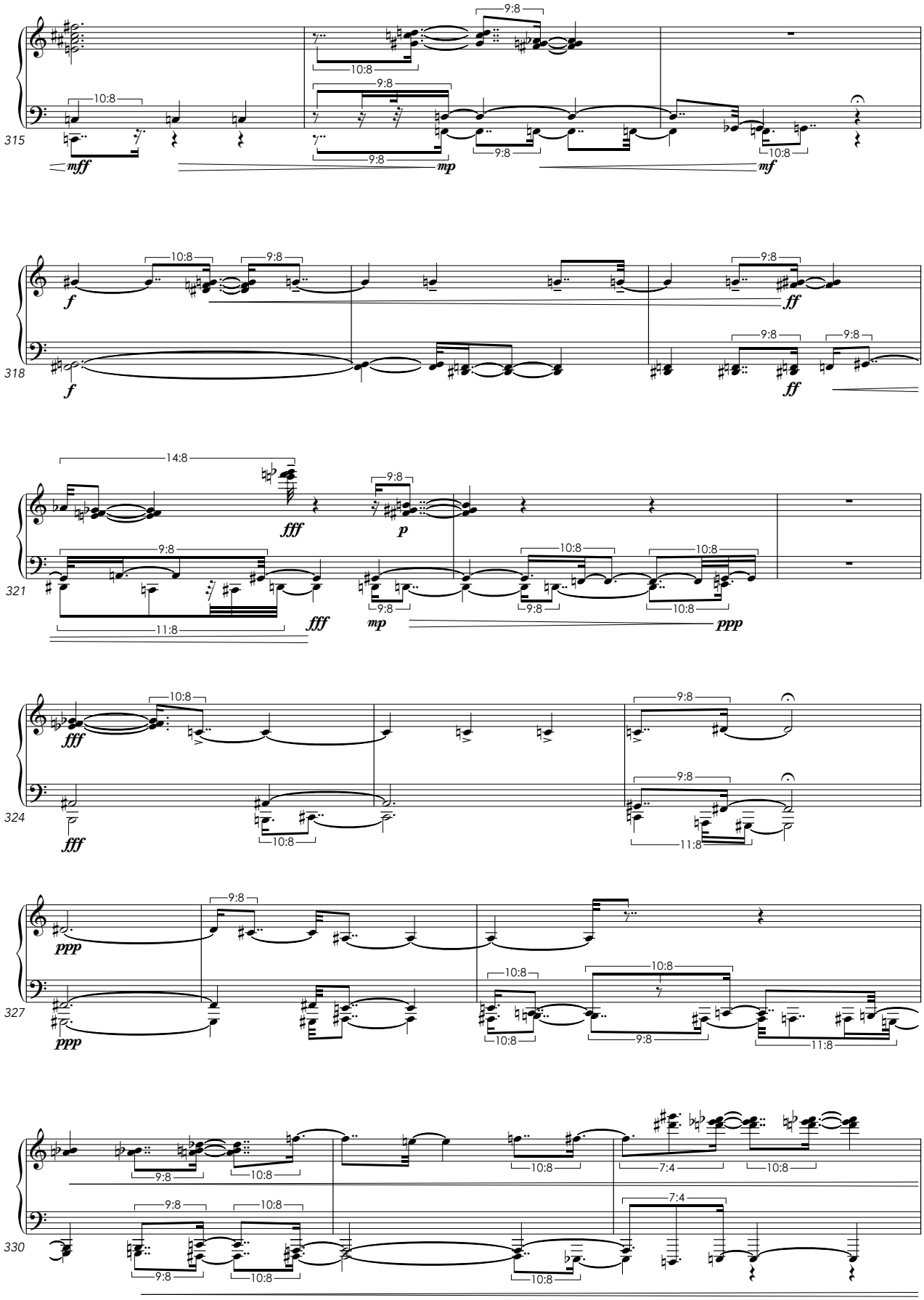

11:8
6:4
7:4
fff
mf
218
3:2
7:4
3:2
11:8
fff
mf
f
7:4
221
p
mf
mp
p
224
f
227
p
230
f
233
pp
236

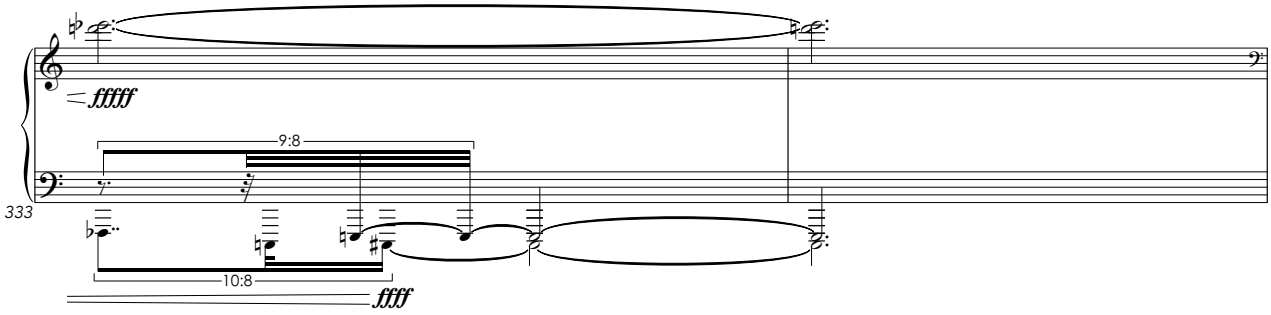

239
f
242
pp
245
248
7:4
f
6:4
9:8
7:4
f
7:4
250
10:8
3:2
7:4
fff
6:4
3:2
fff
252
ppp
bel canto
mp
f
256

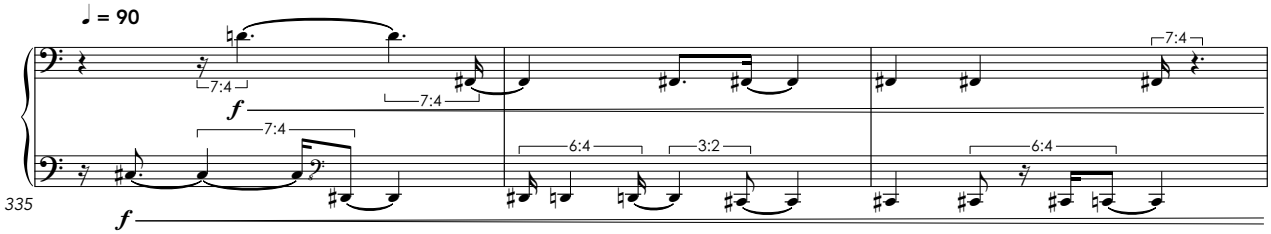

258
p
mf
261
mf
264
mp
mf
mp
267
mf
mf
270
mp
mf
rit.
273
mffs
mff
= 90
276
f
9:8
f
9:8

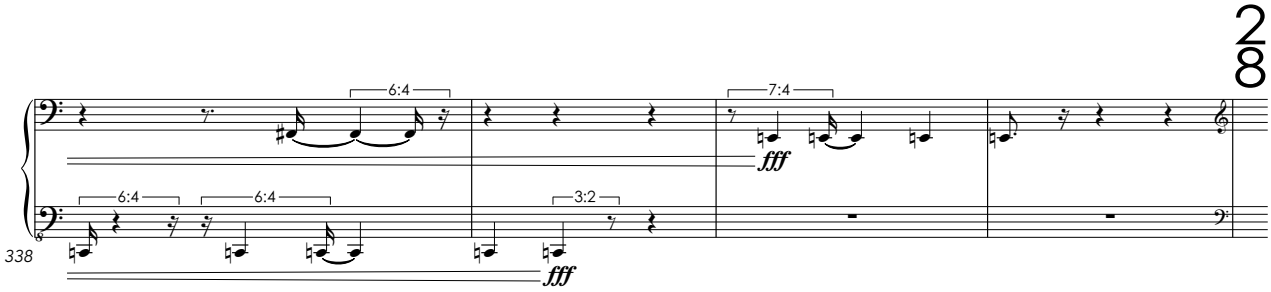

278
280
282
285
288
291
♩ = 60
fff
mf
mp
f
mf
smf
ff
mf
f
mff
mp
mf
pp
mf
pp
f
smf
f
ff
ff

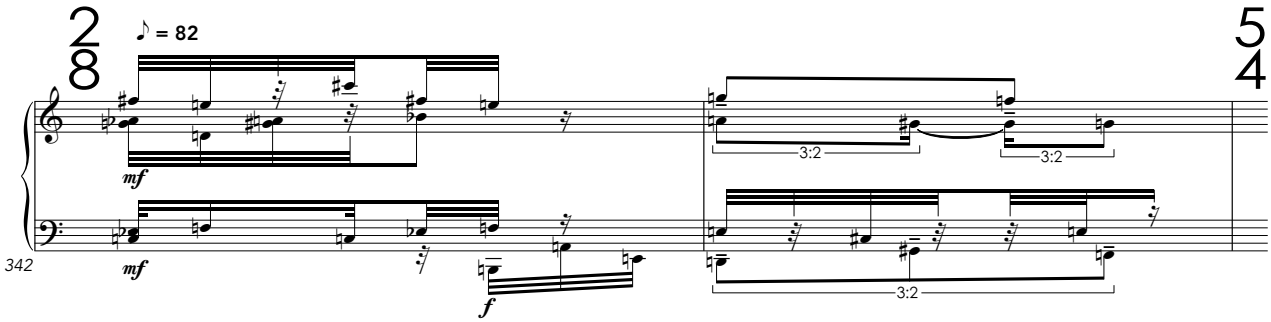

294
10:8
9:8
fff
mf
9:8
300
10:8
mf
10:8
f
10:8
10:8
ff
mf
303
10:8
pp
ppp
9:8
10:8
p
9:8
10:8
ppp
306
9:8
309
9:8
mf
9:8
10:8
9:8
9:8
f
10:8
312
10:8
ff
10:8
mp
10:8
10:8

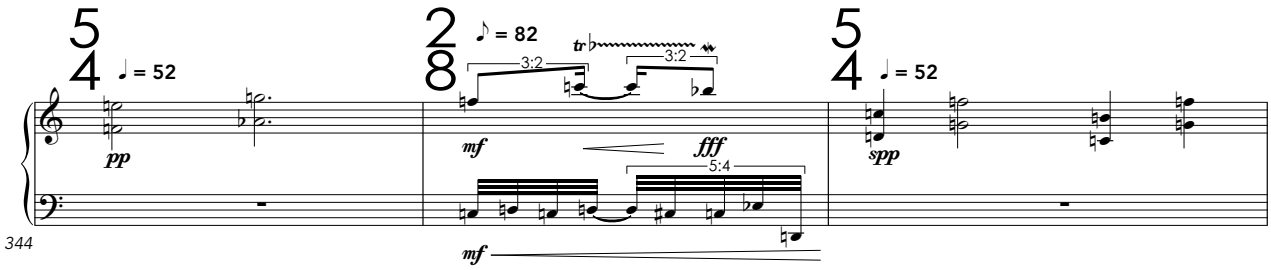

315
mff
mp
mf
318
f
ff
321
fff
p
ppp
324
327
330
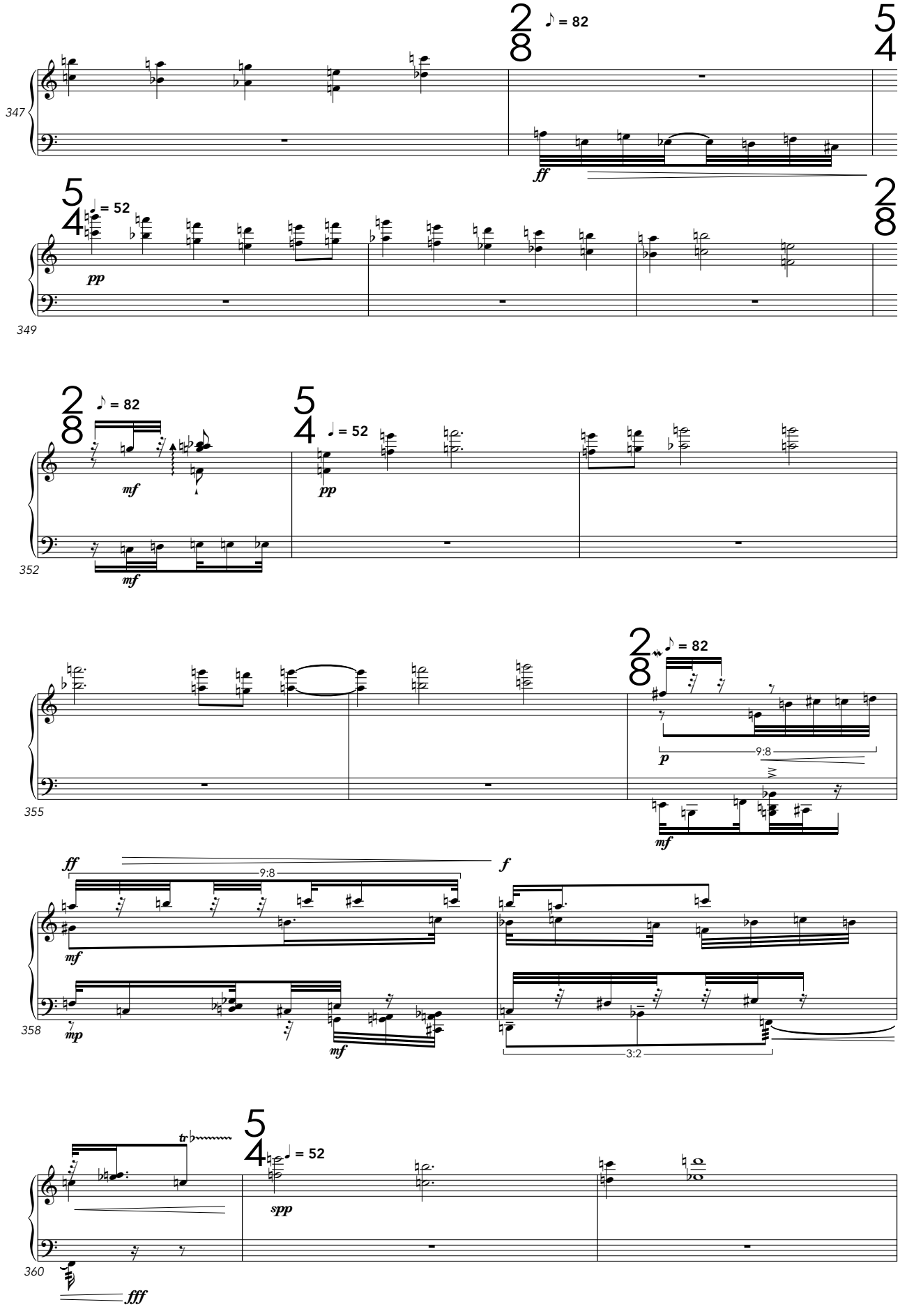

333
fffff
9:8
10:8
ffff

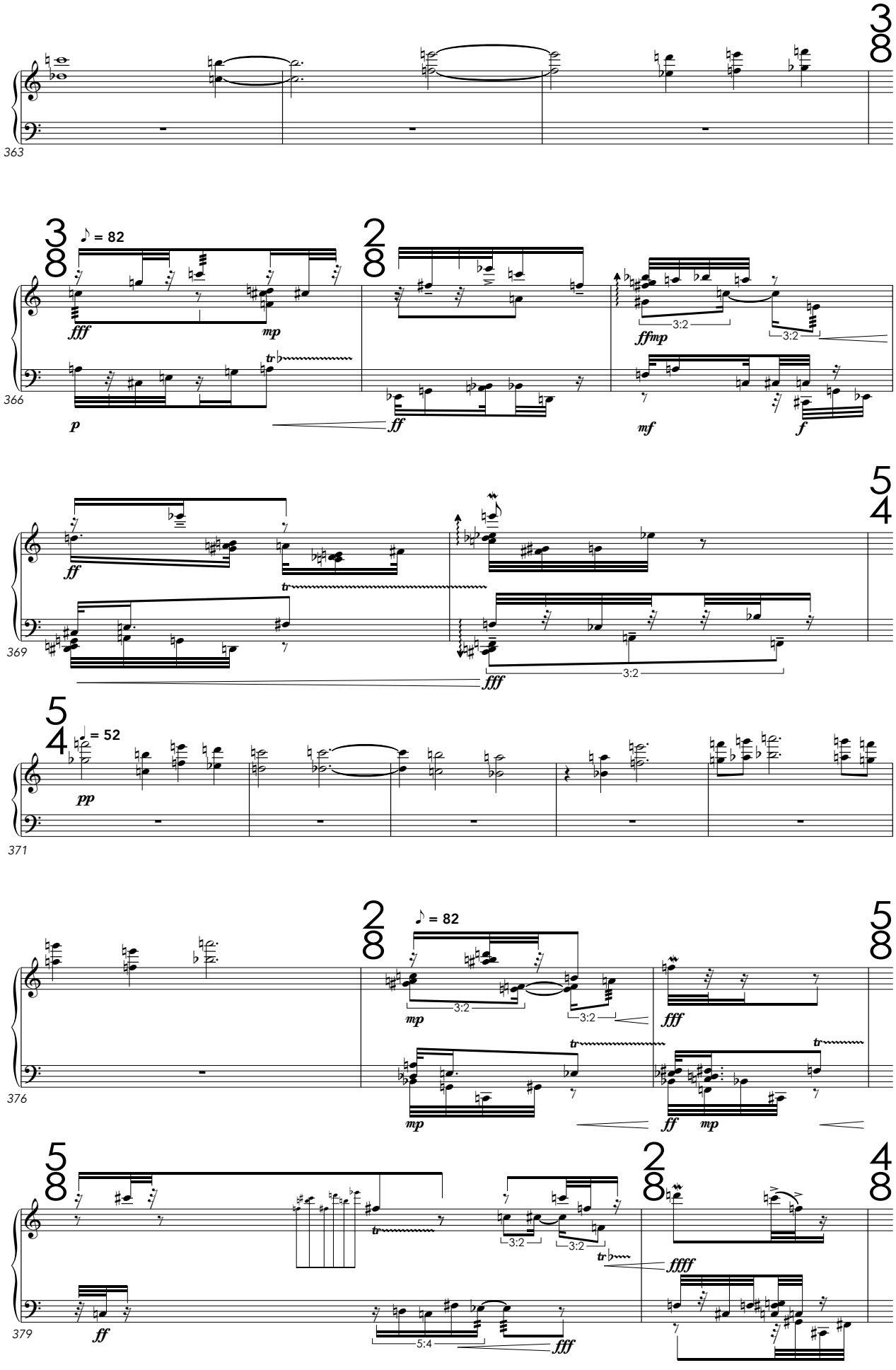

♩ = 90
335
f
7:4
6:4
3:2
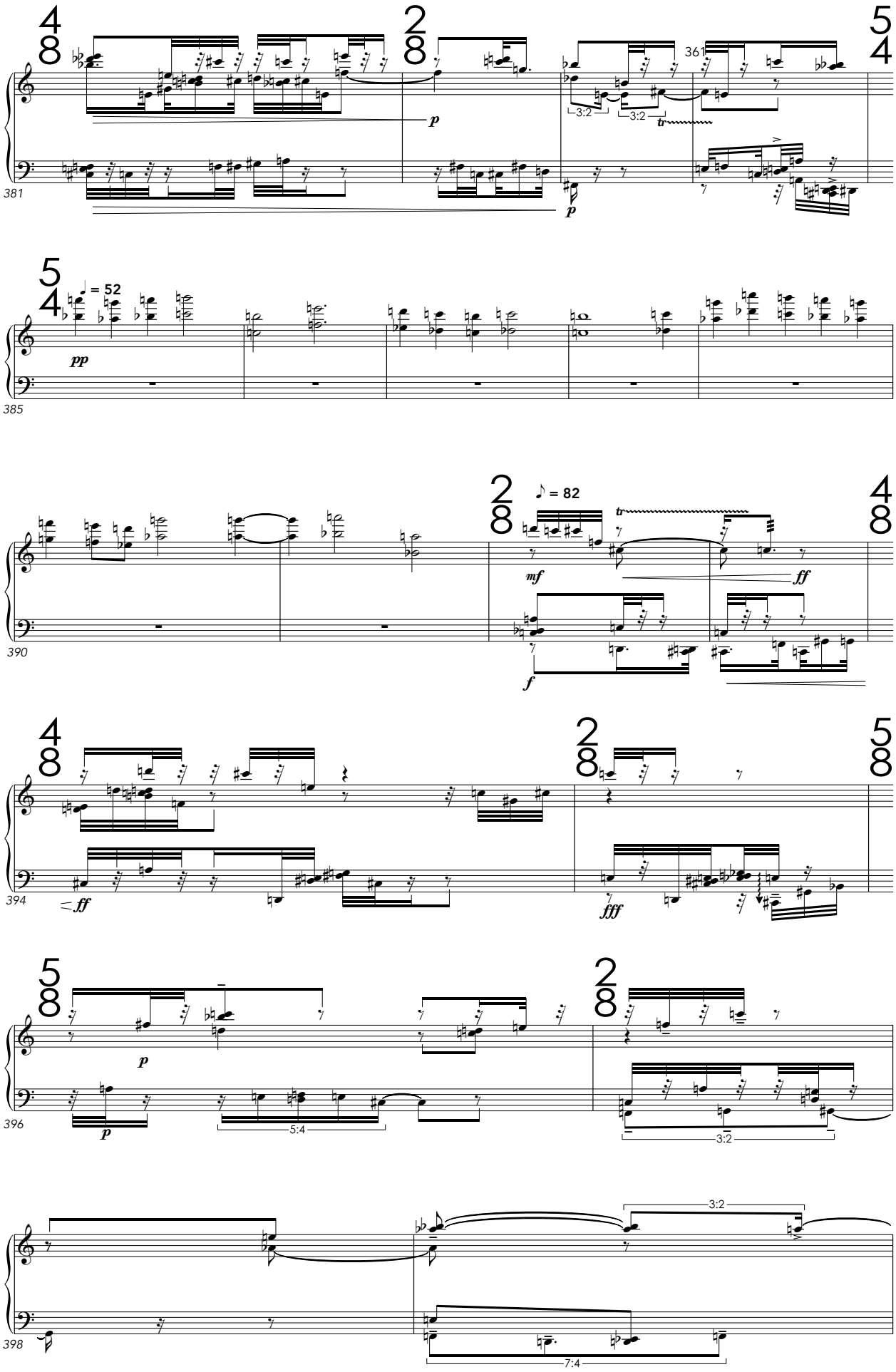

338
6:4
7:4
3:2
fff

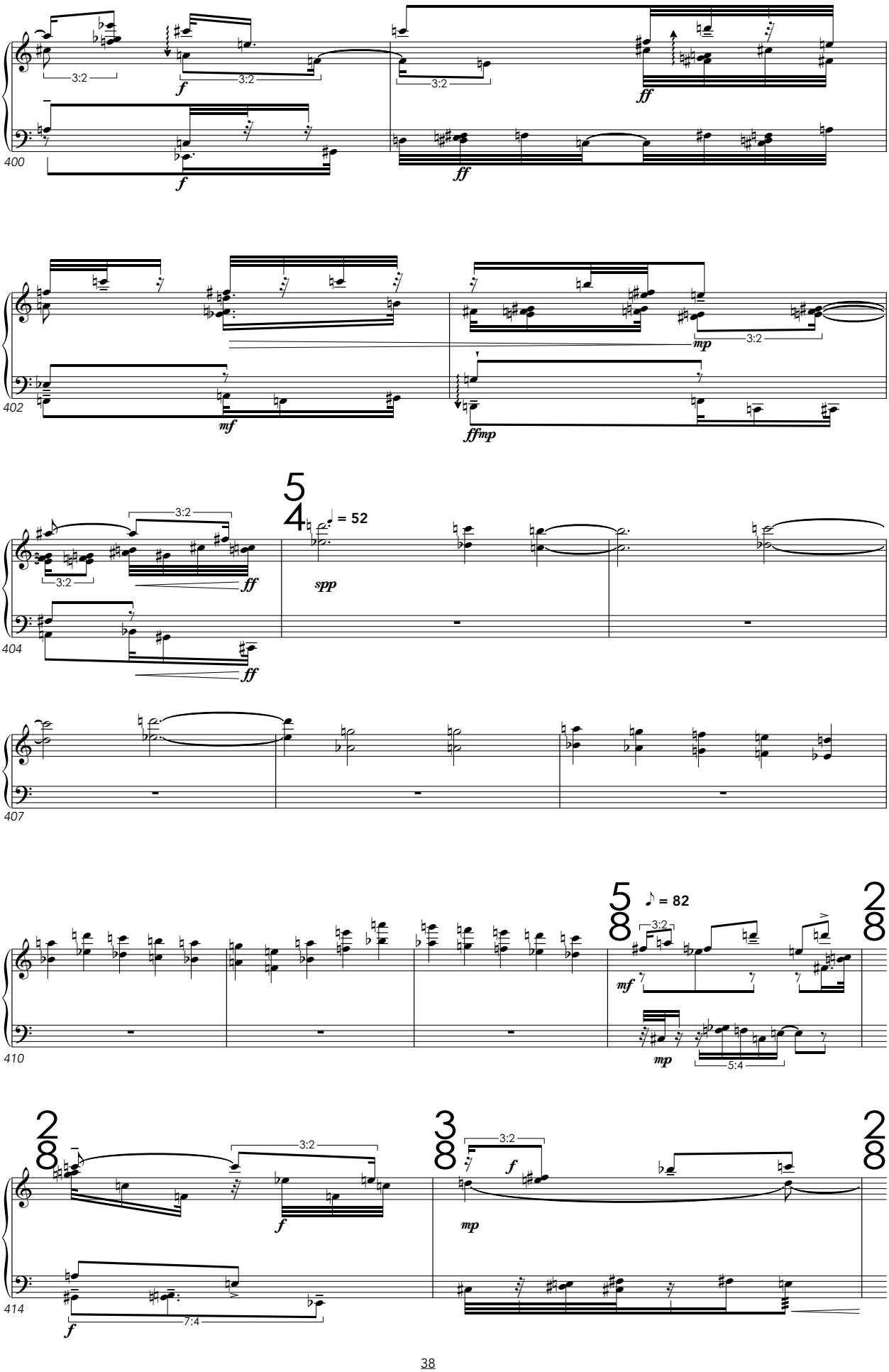

♪ = 82
342
mf
f
3:2

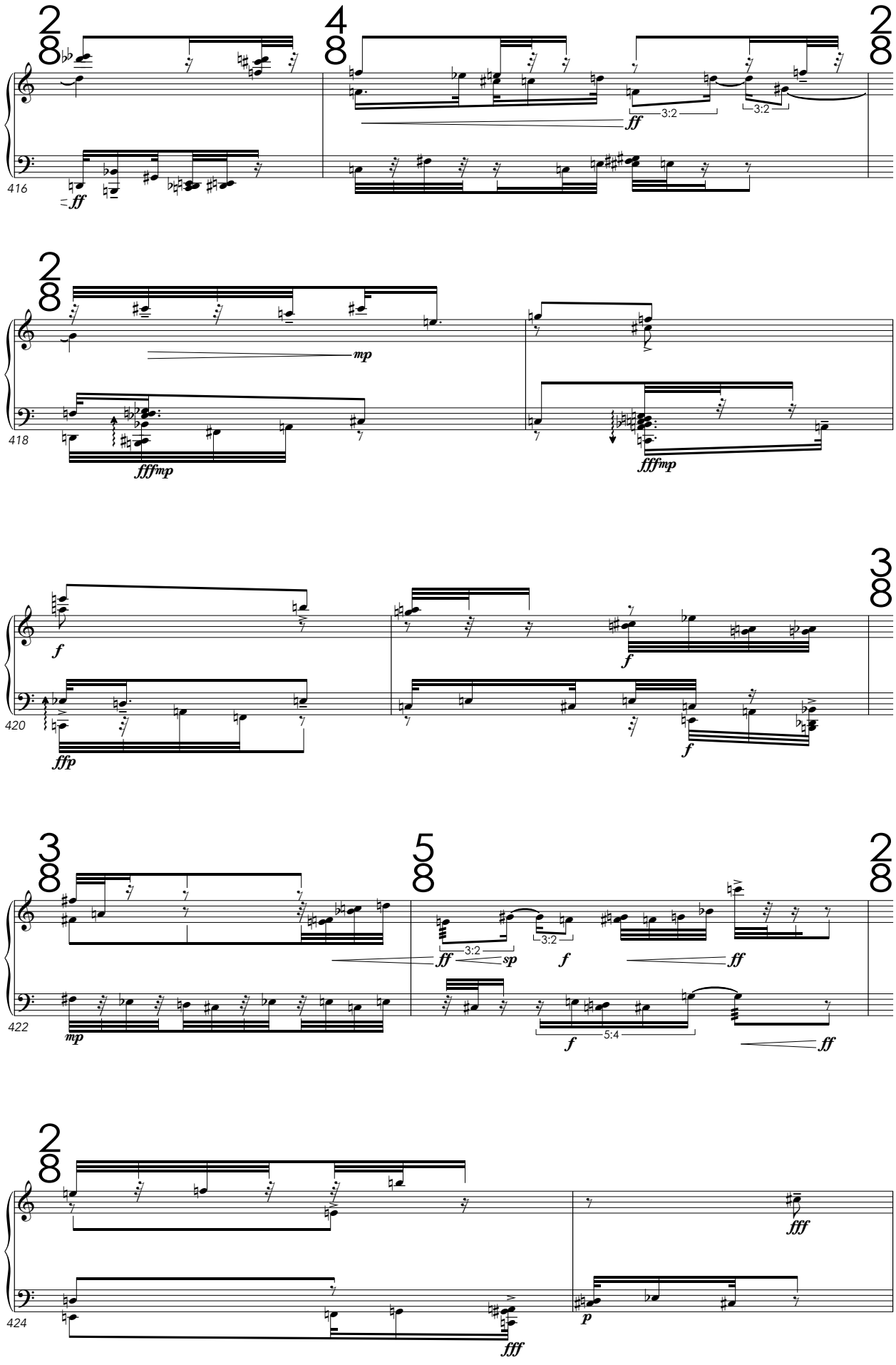

♩ = 52
344
pp
♪ = 82
3:2
tr
mf
fff
5:4
spp

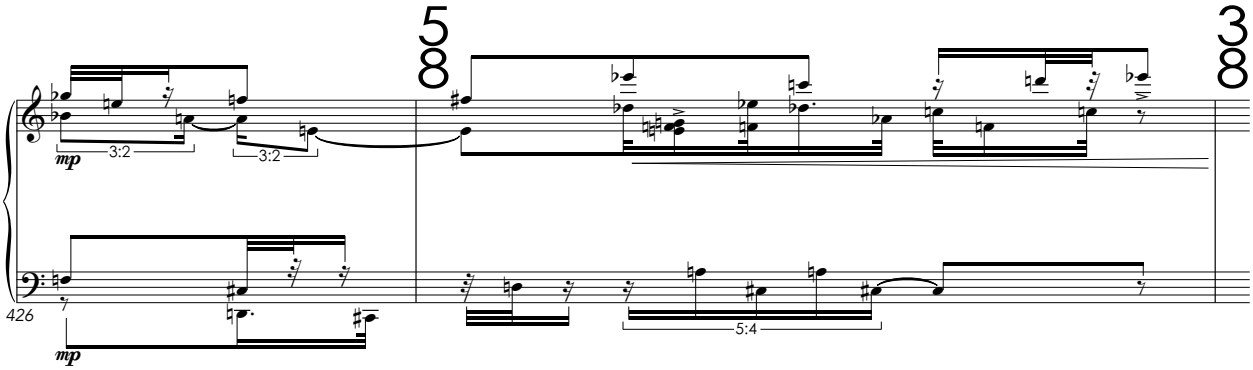

347
2/8 ♪ = 82
5/4
ff
5/4 ♩ = 52
pp
2/8
349
2/8 ♪ = 82
mf
5/4 ♩ = 52
pp
mf
352
2/8 ♪ = 82
p
9:8
mf
355
ff
9:8
mf
f
mp
mf
3:2
358
tr
5/4 ♩ = 52
spp
360
fff

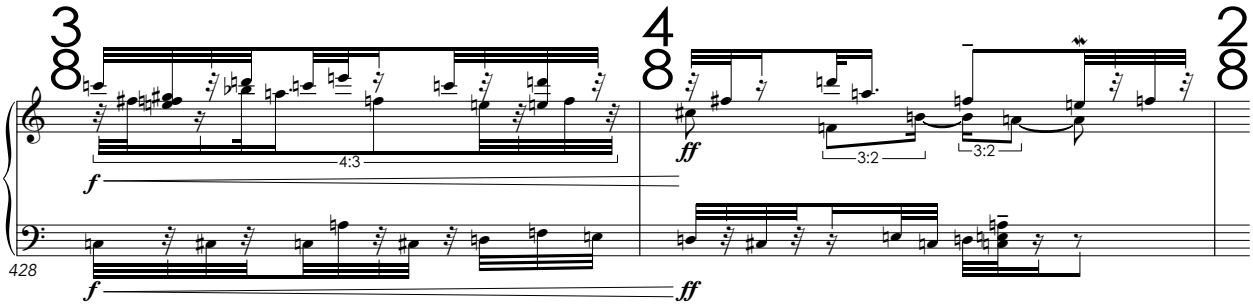

363
366
♪ = 82
fff
mp
p
ff
ffmp
mf
f
3:2
369
ff
fff
371
♩ = 52
pp
376
mp
ff
379
5:4
ffff

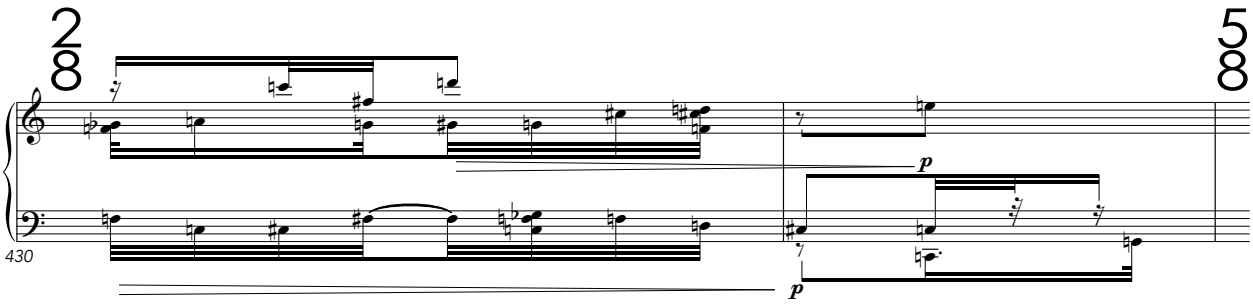

381
361
3:2
3:2
385
♩ = 52
390
♪ = 82
394
5:4
396
3:2
398
3:2
7:4

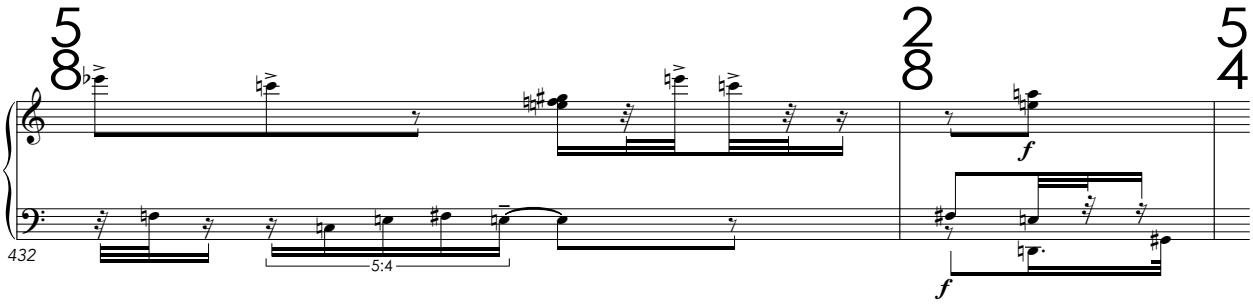

400
3:2
3:2
3:2
f
f
ff
ff
402
mf
ffmp
mp
3:2
404
3:2
3:2
ff
ff
5/4
♩ = 52
spp
407
410
5/8
♪ = 82
3:2
mf
mp
5:4
2/8
414
2/8
3:2
f
f
3/8
3:2
f
mp
2/8
7:4

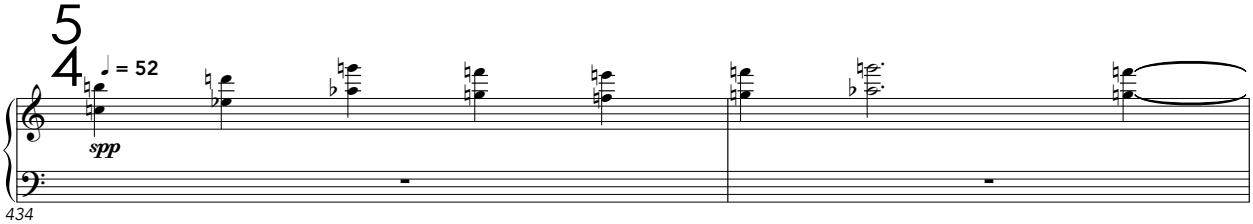

416
ff
3:2
3:2
418
mp
fffmp
fffmp
420
f
f
ffp
f
422
mp
ff
sp
3:2
f
ff
f
5:4
ff
424
fff
p
fff

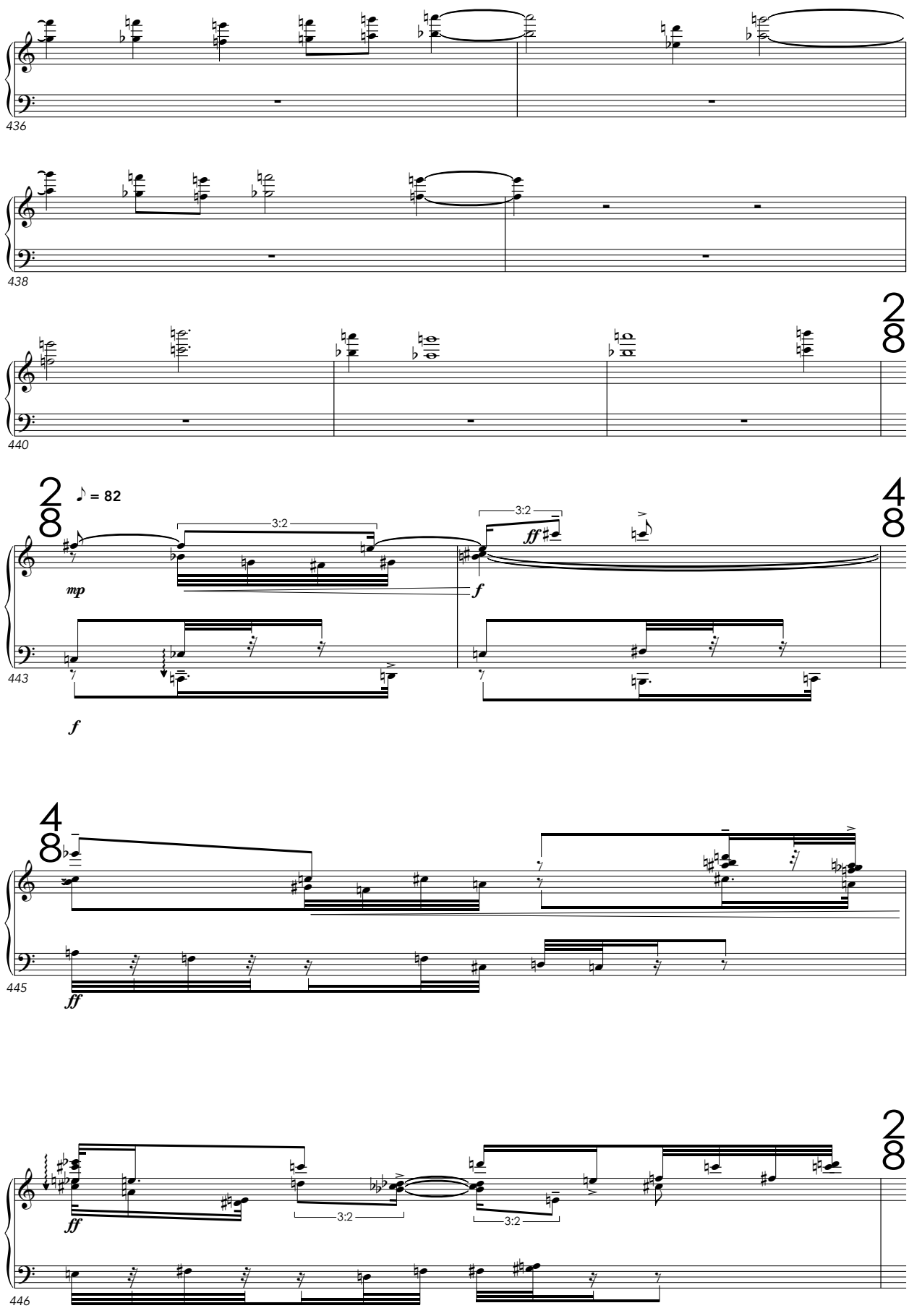

426
mp
3:2
3:2
mp
5:4

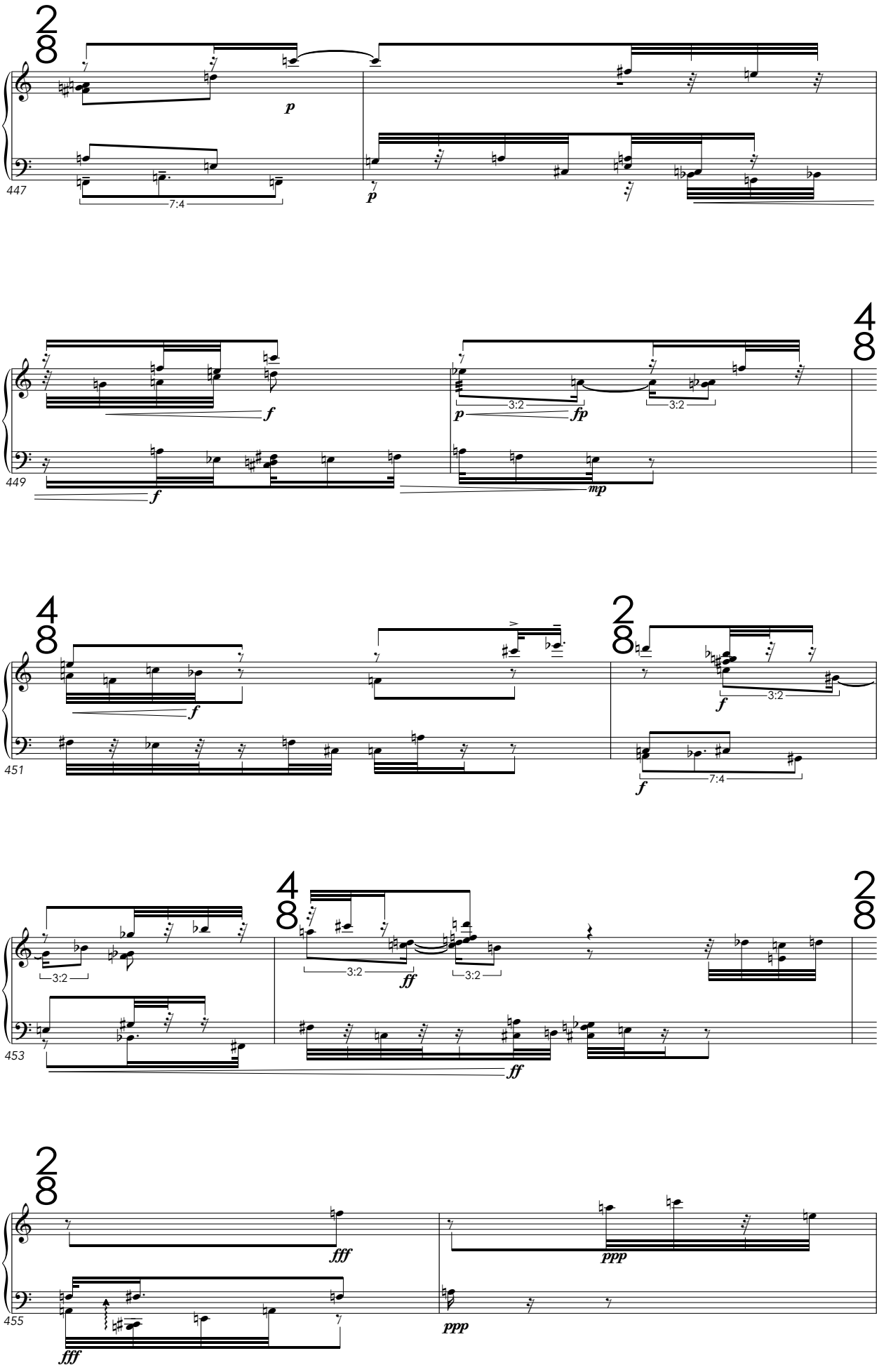

428
f
4:3
f
ff
ff
3:2
3:2

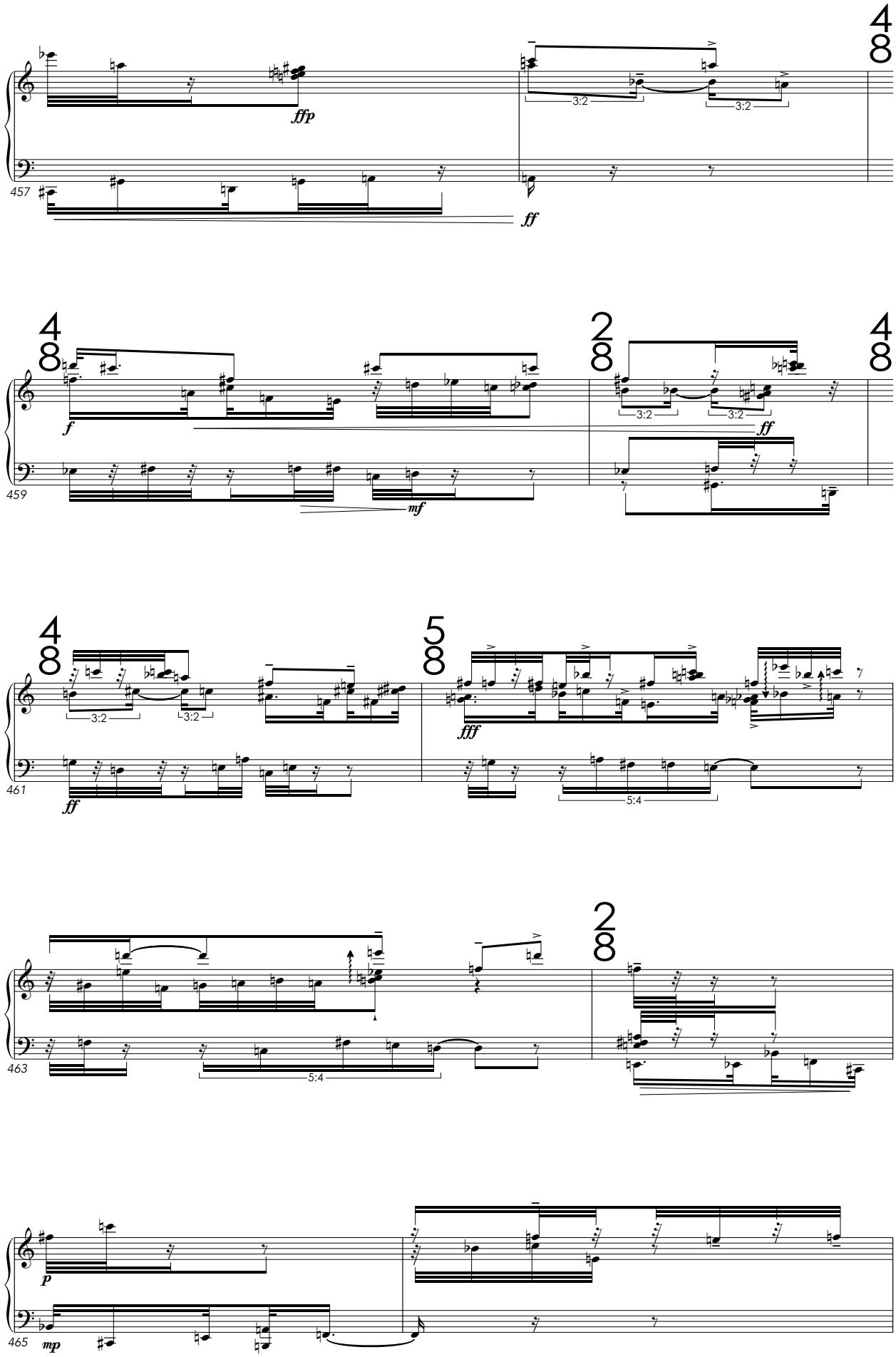

430
p
p

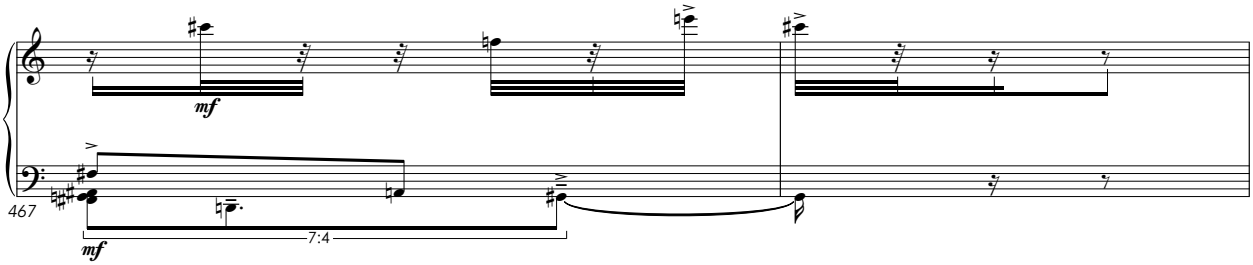

432
5:4
f
f

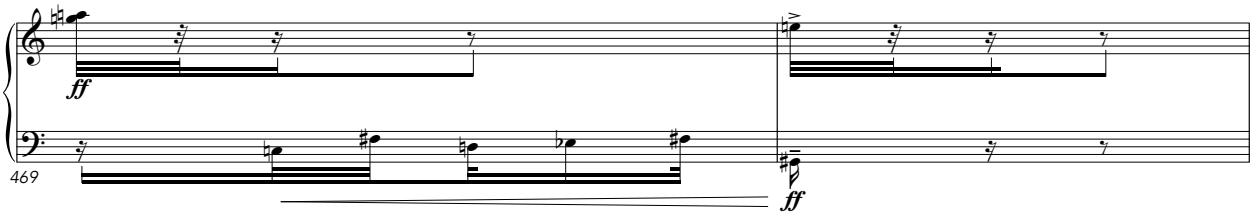

434
♩ = 52
spp

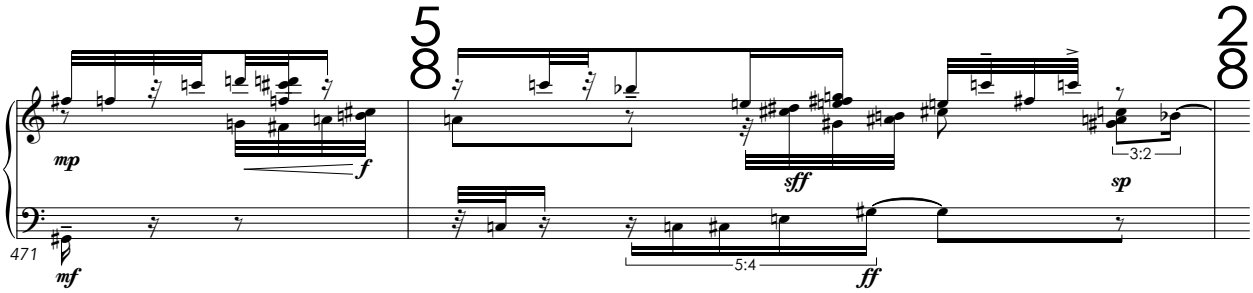

436
438
440
2
8
2
8
♪ = 82
3:2
3:2
4
8
mp
f
ff
f
443
4
8
445
ff
2
8
ff
3:2
3:2
446

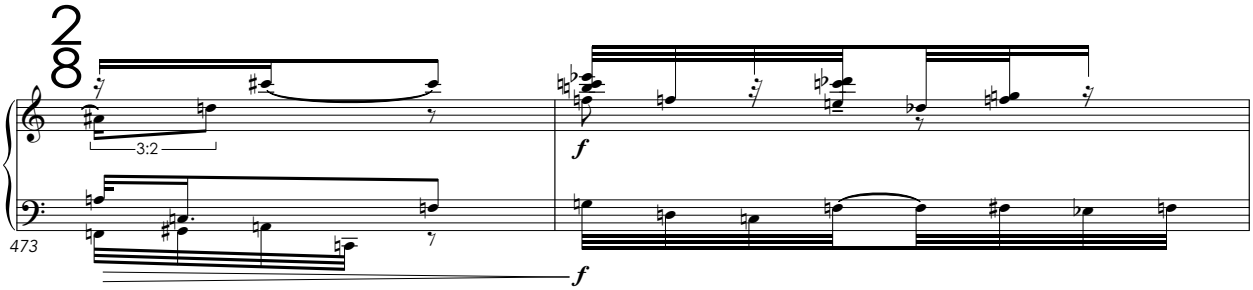

447
449
451
453
455
7:4
3:2
p
fp
f
mp
ff
fff
ppp

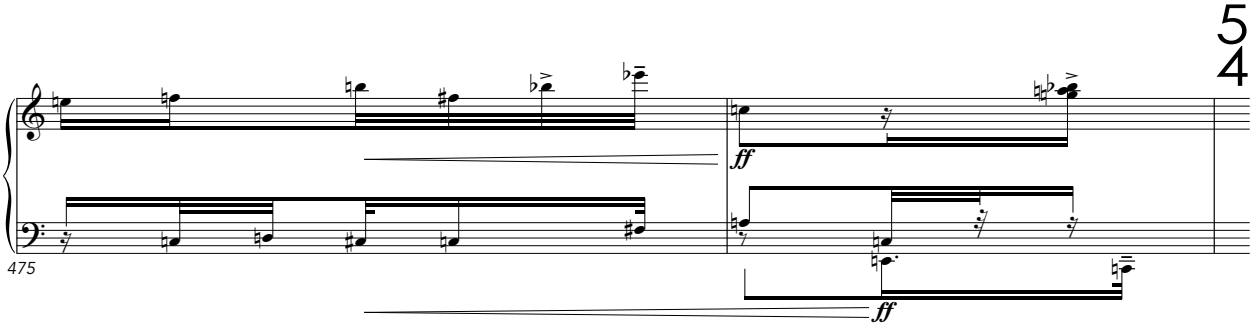

457
ffp
3:2
3:2
ff
459
f
mf
3:2
3:2
ff
461
3:2
3:2
ff
fff
5:4
463
5:4
465
p
mp
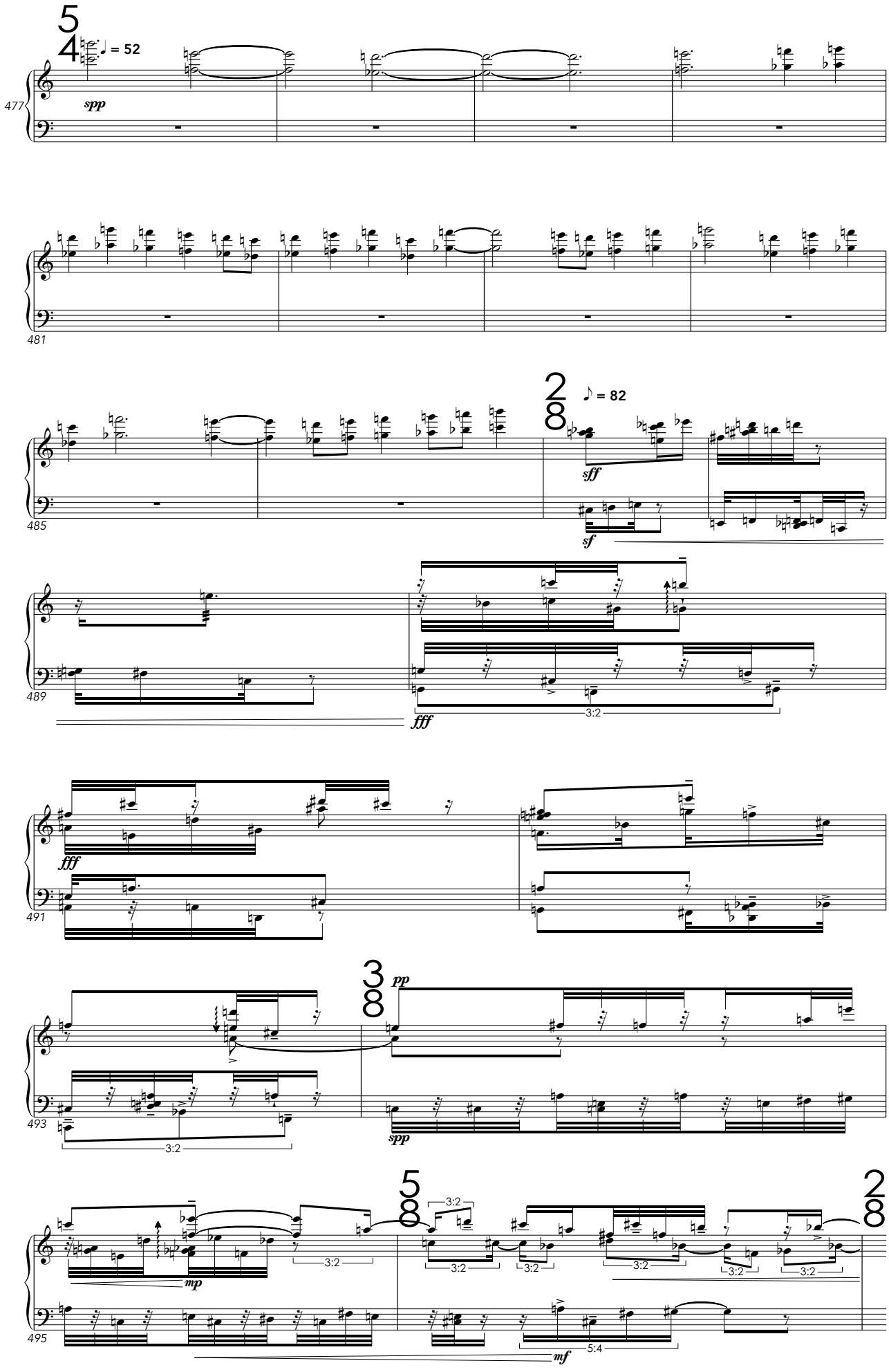

mf
467
mf
7:4

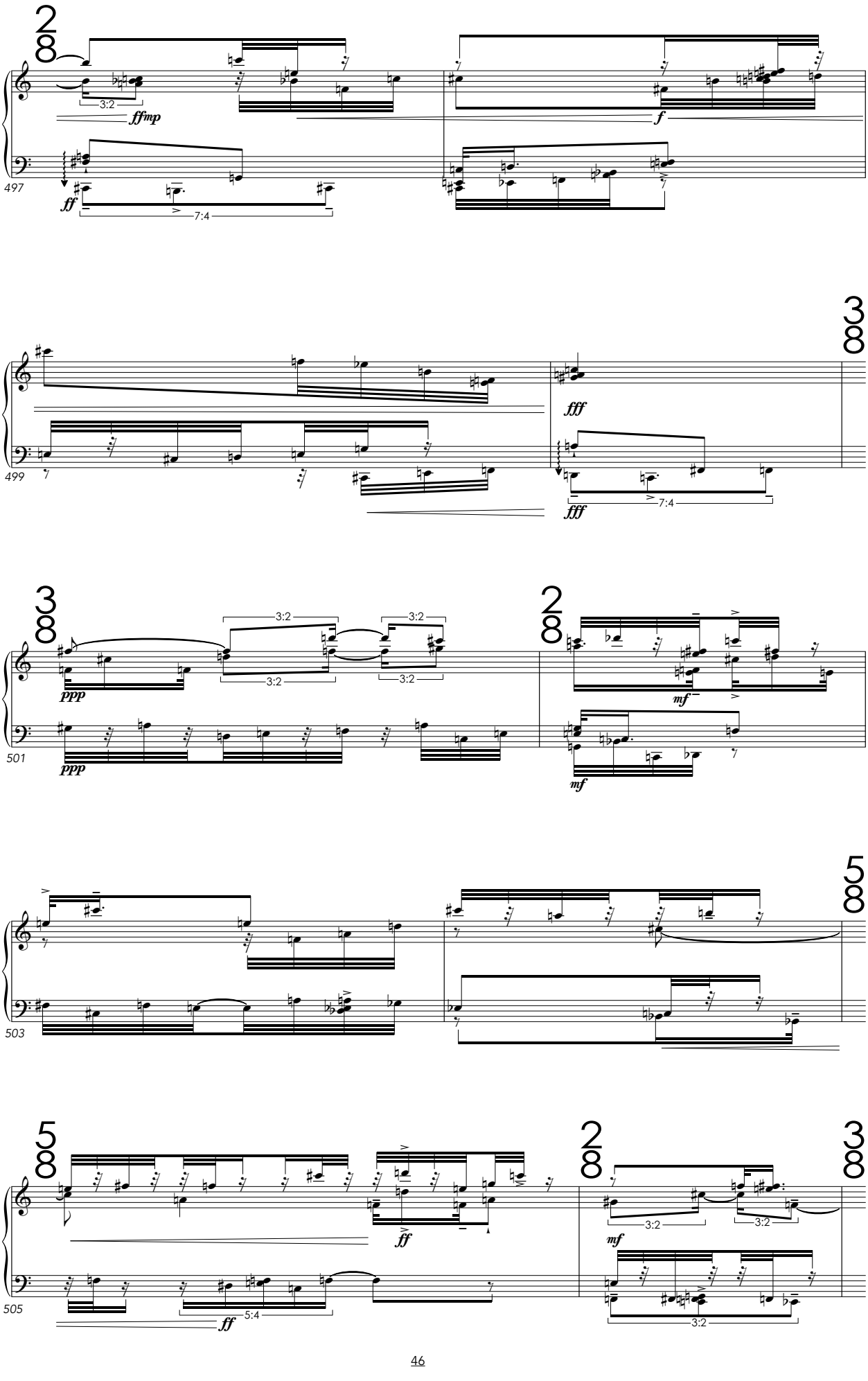

ff
469
ff

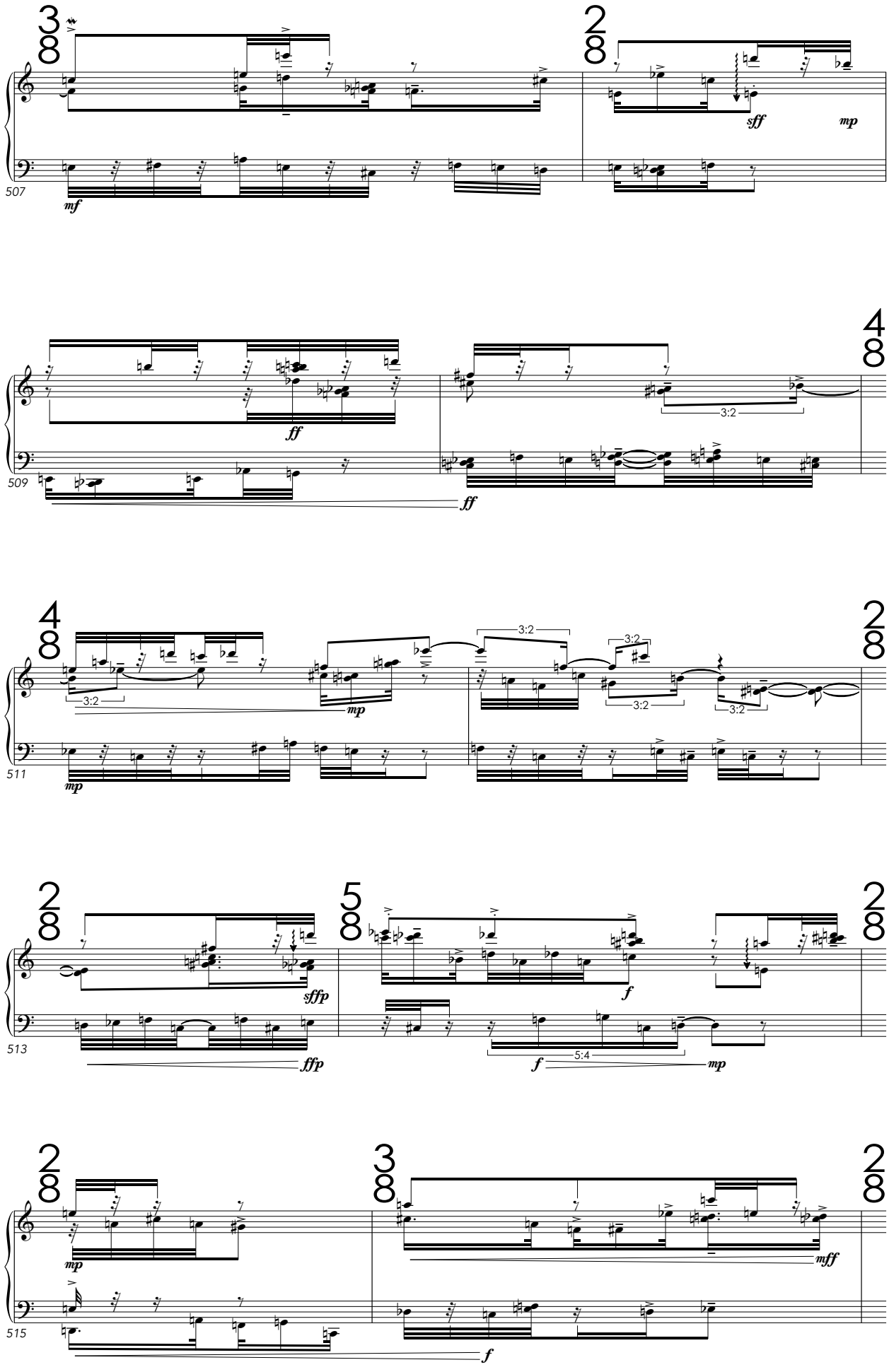

5
8
2
8
mp
f
sff
3:2
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471
mf
5:4
ff

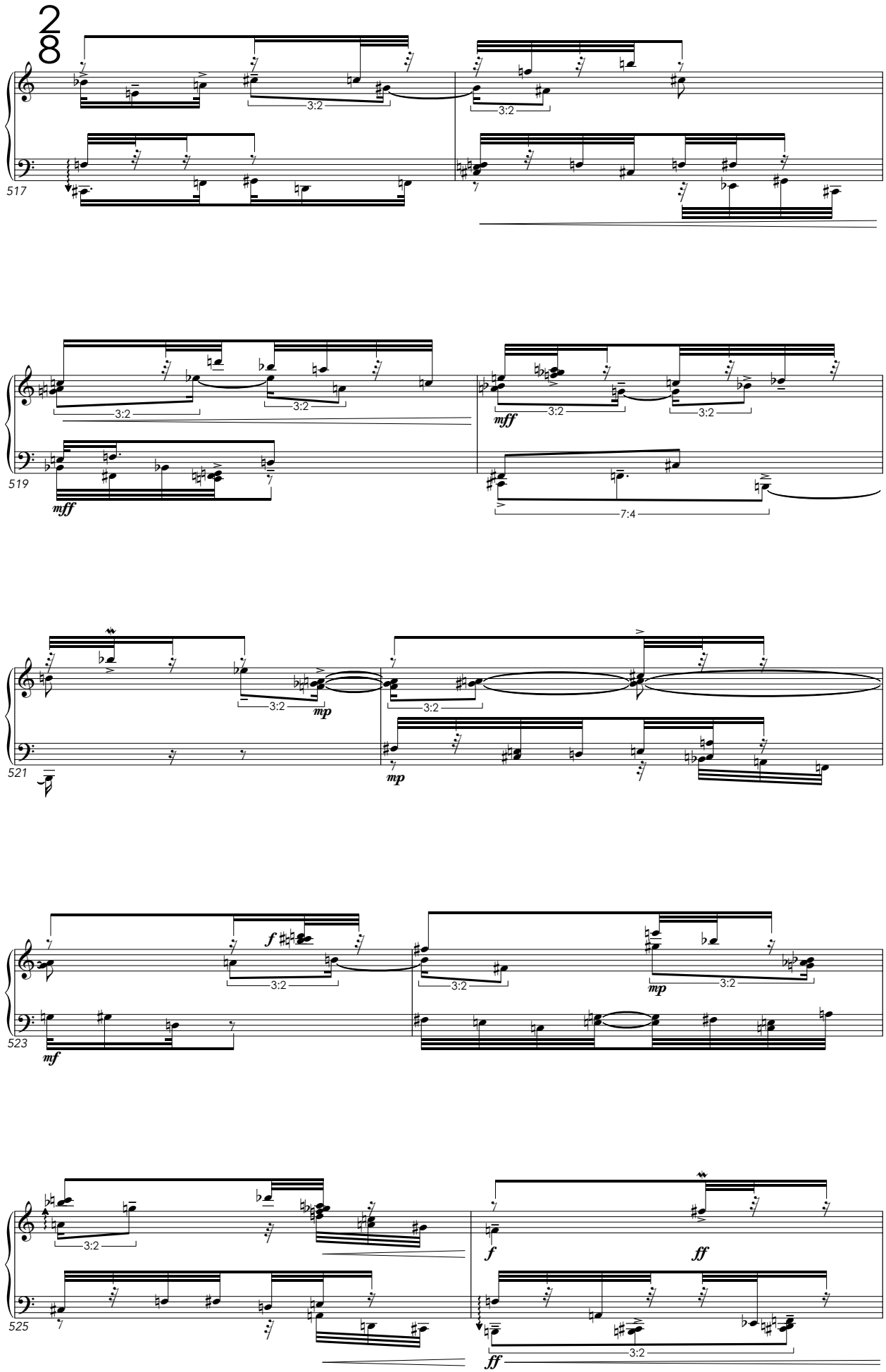

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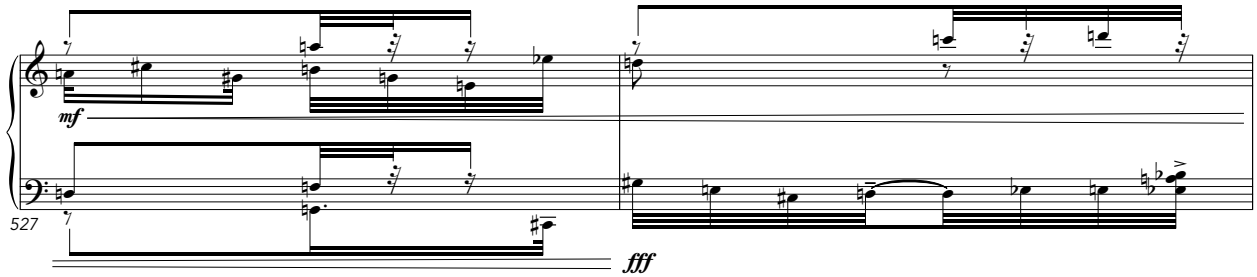

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475
ff

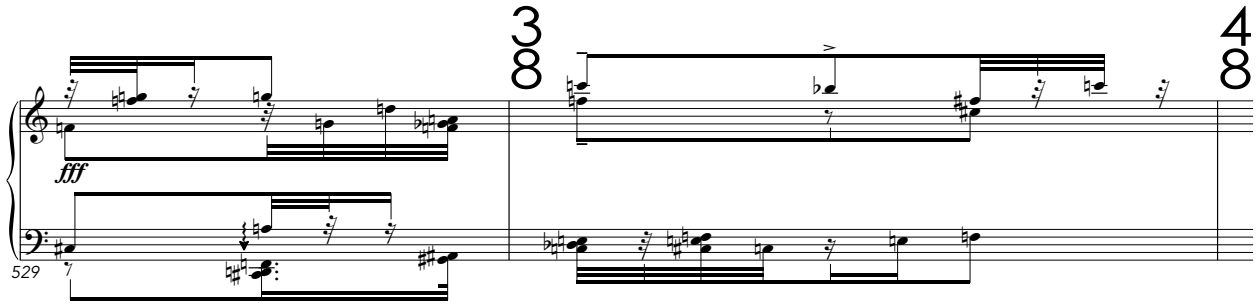

5/4
♩ = 52
spp
477
481
2/8
♪ = 82
sff
sf
485
489
fff
3:2
fff
491
3/8
pp
spp
493
3:2
5/8
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mp
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3:2
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3:2
2/8
495
mf
5:4

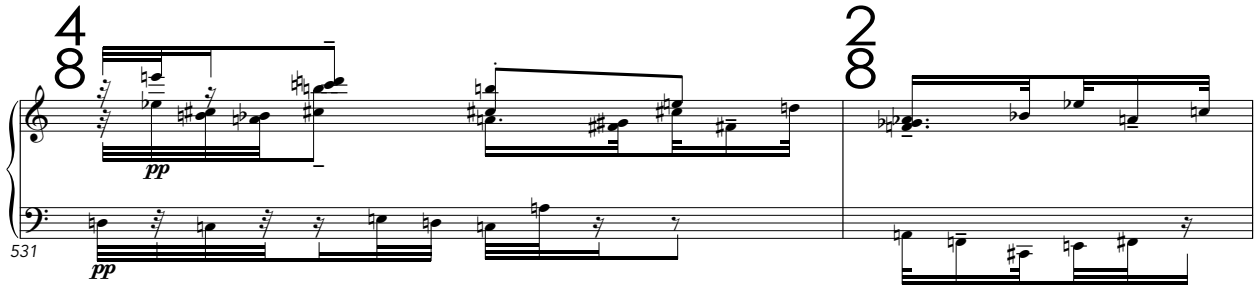

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ff
fff
ppp
mf

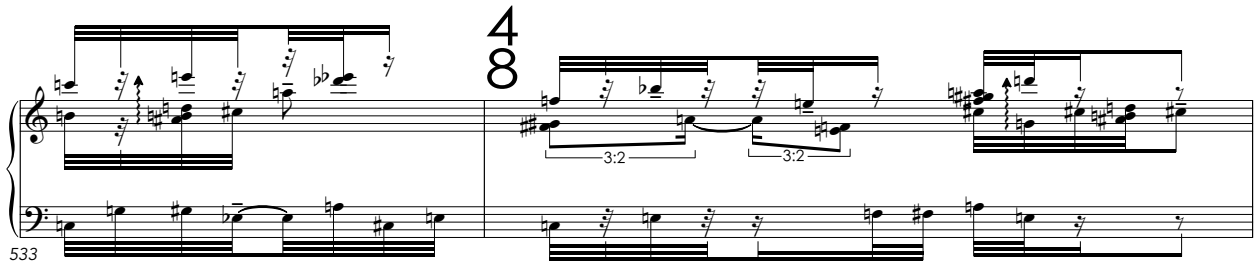

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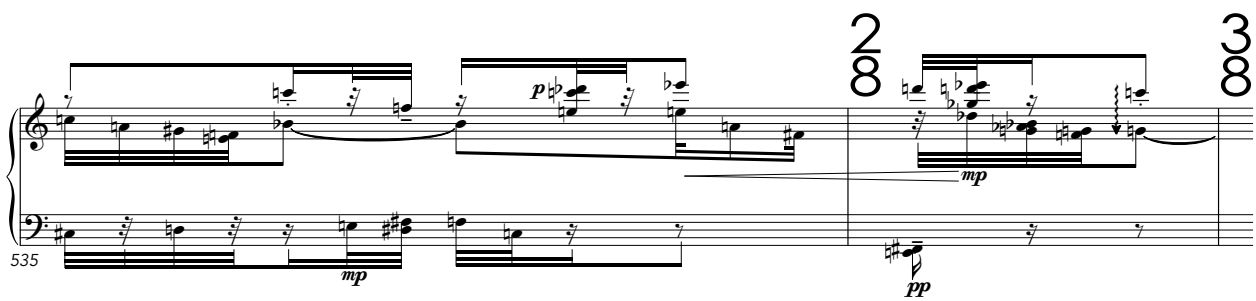

28
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mff
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ff
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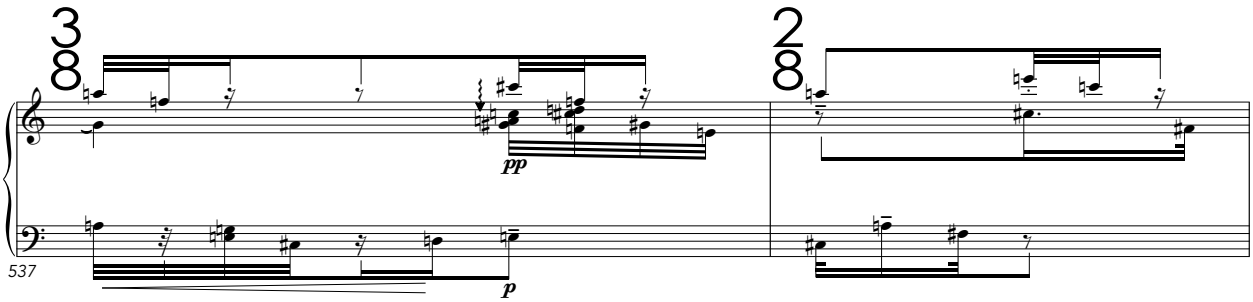

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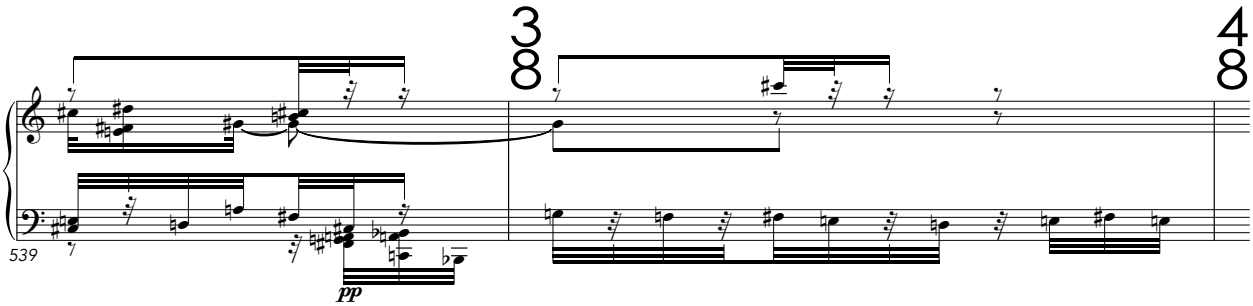

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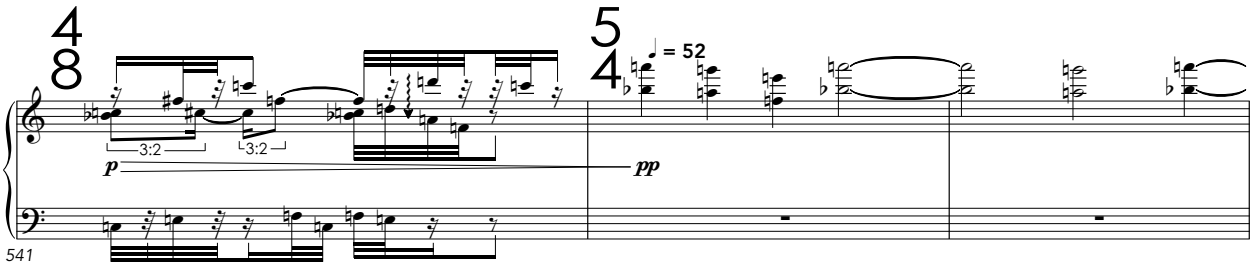

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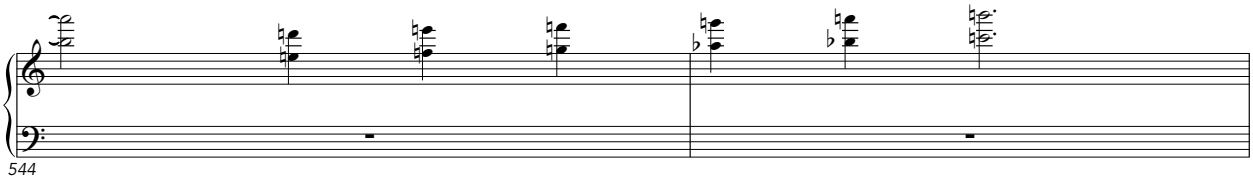

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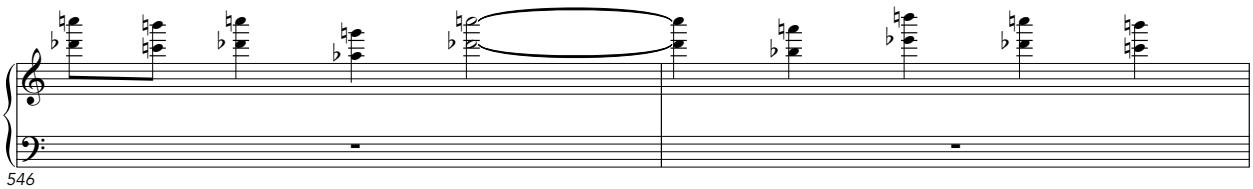

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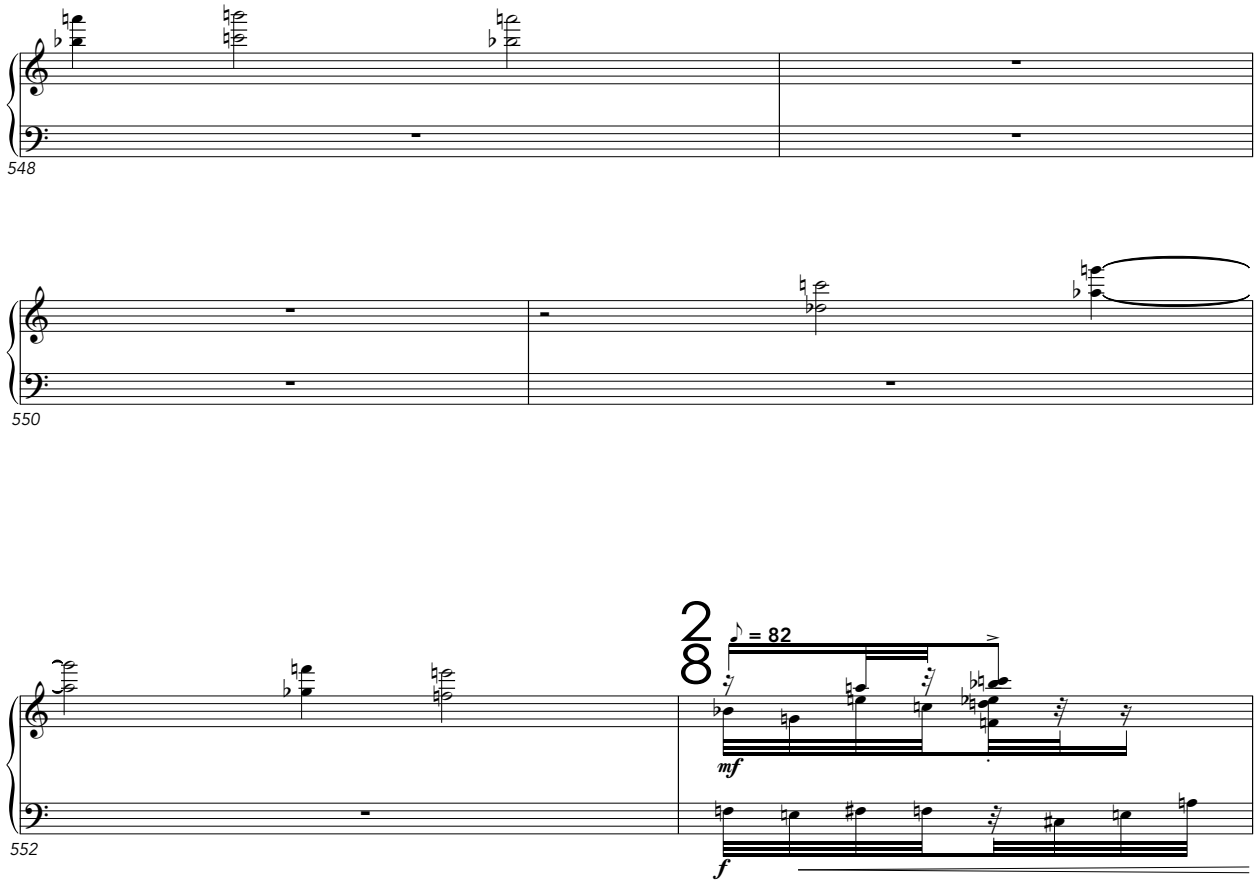

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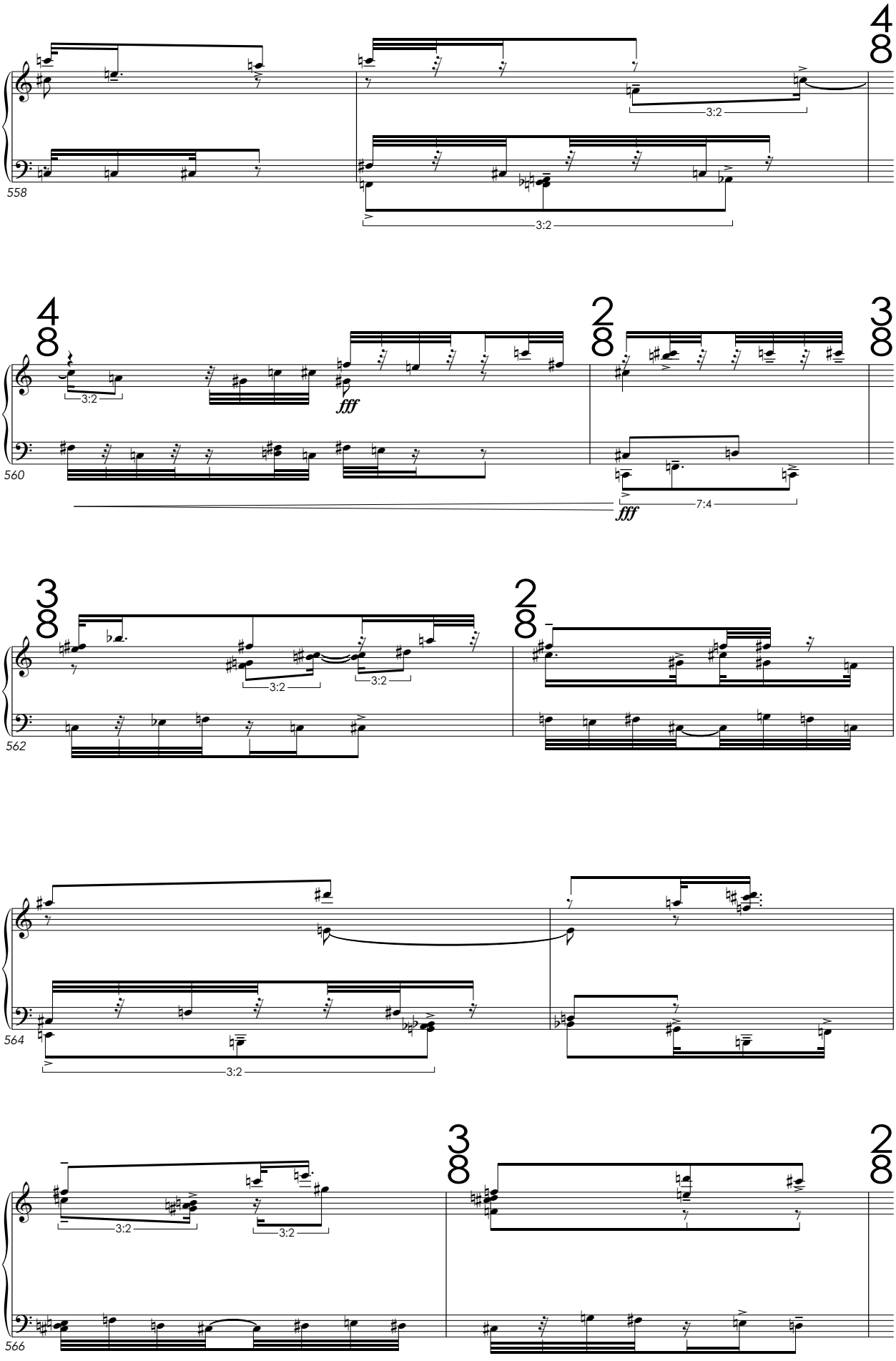

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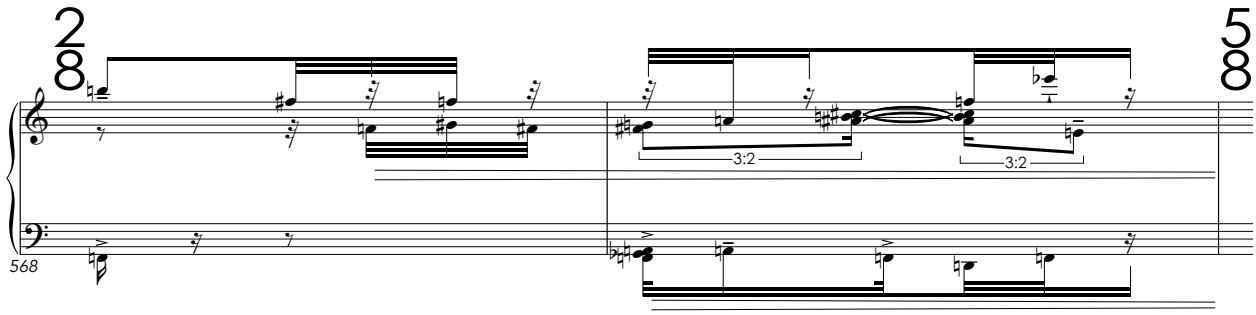

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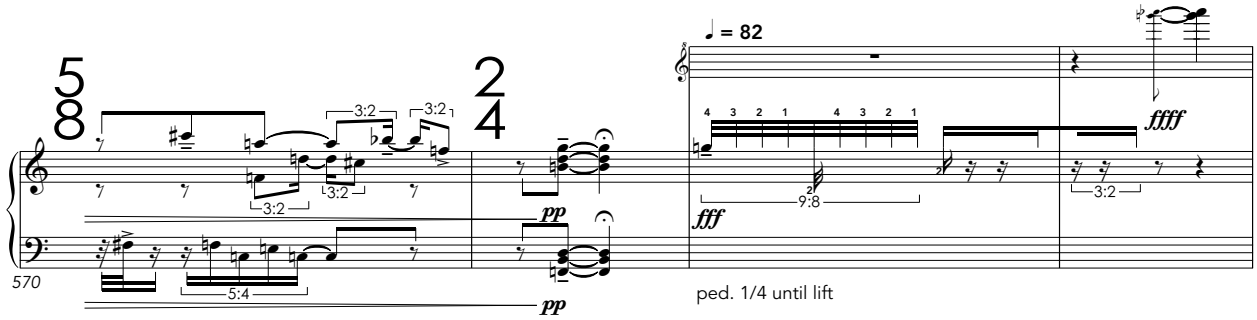

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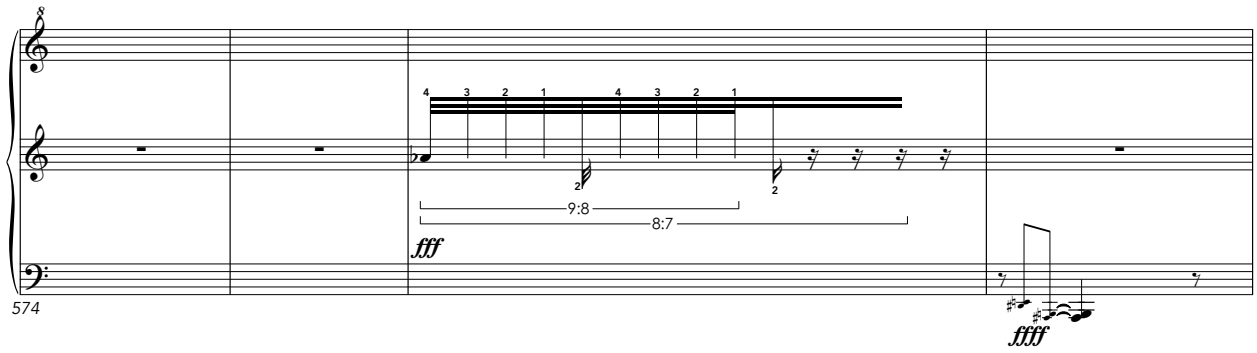

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3:2
ff
556

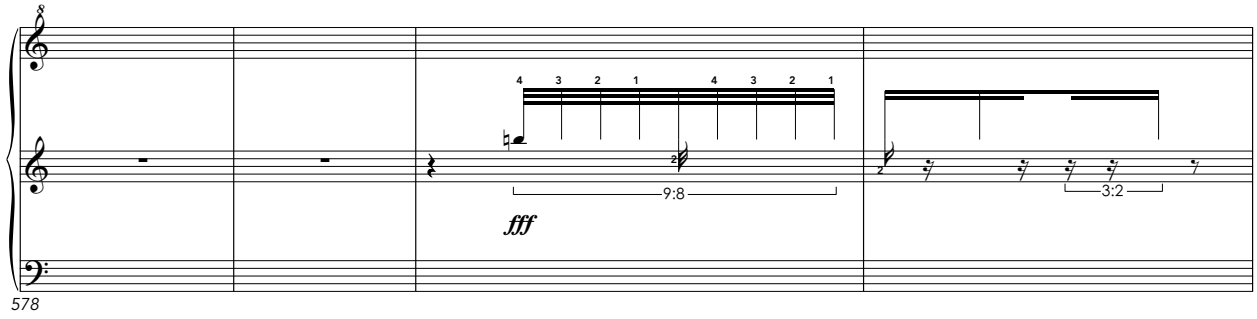

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564
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566
3:2
3:2

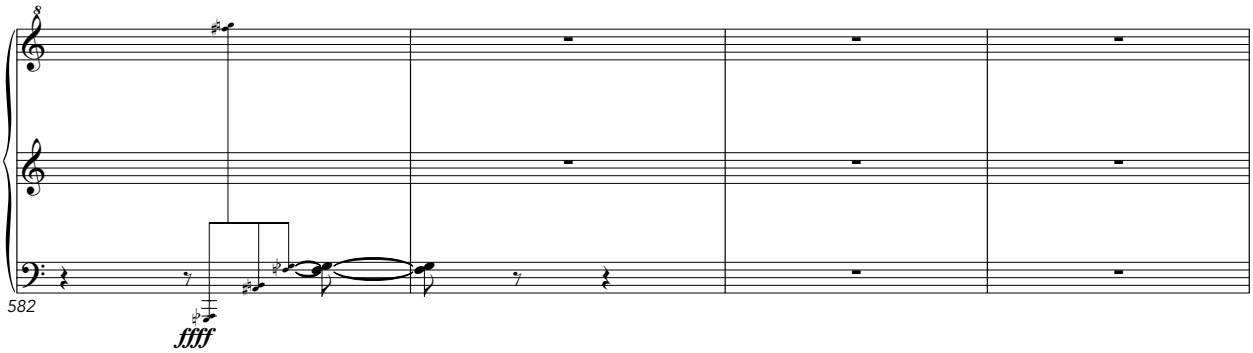


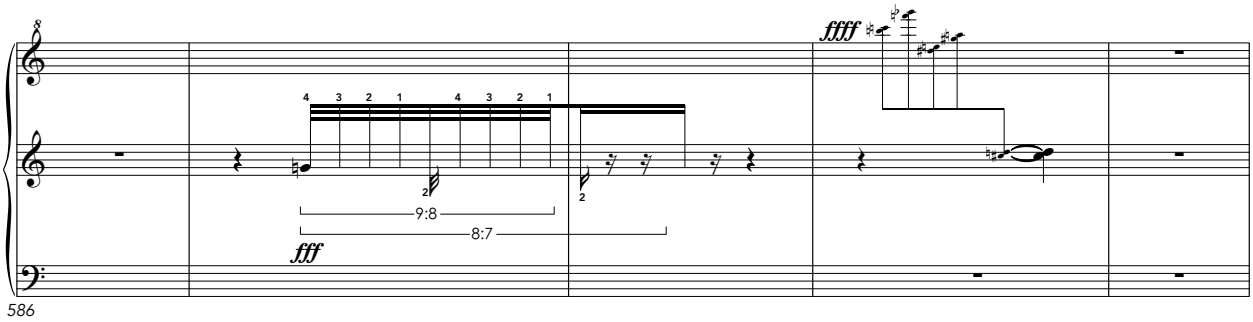


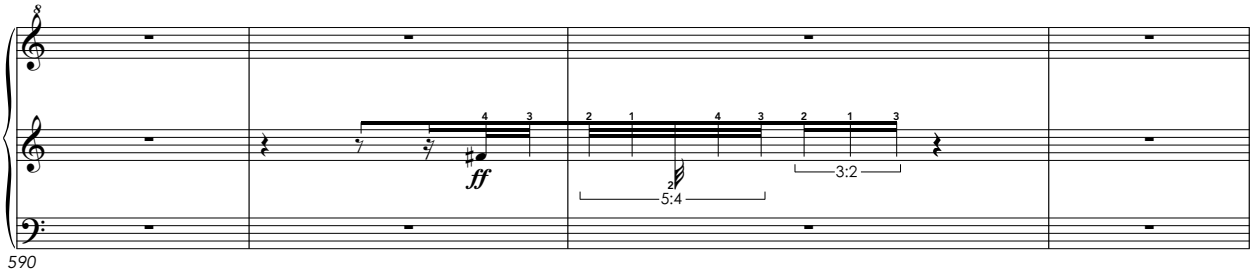
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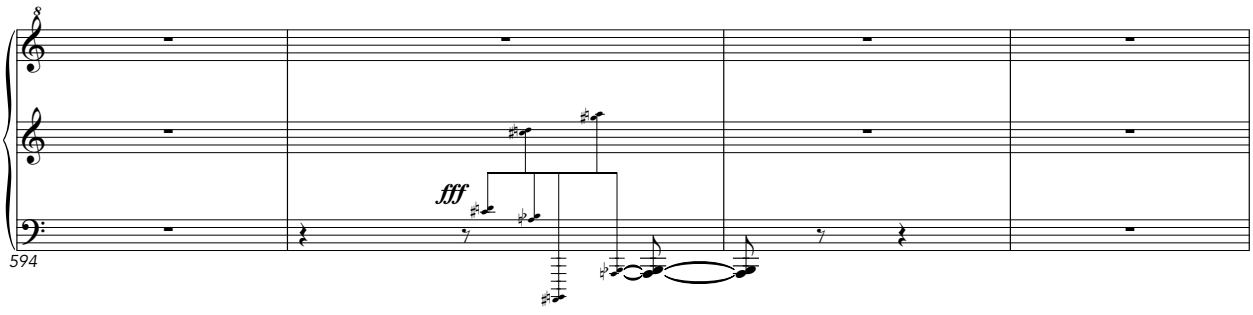


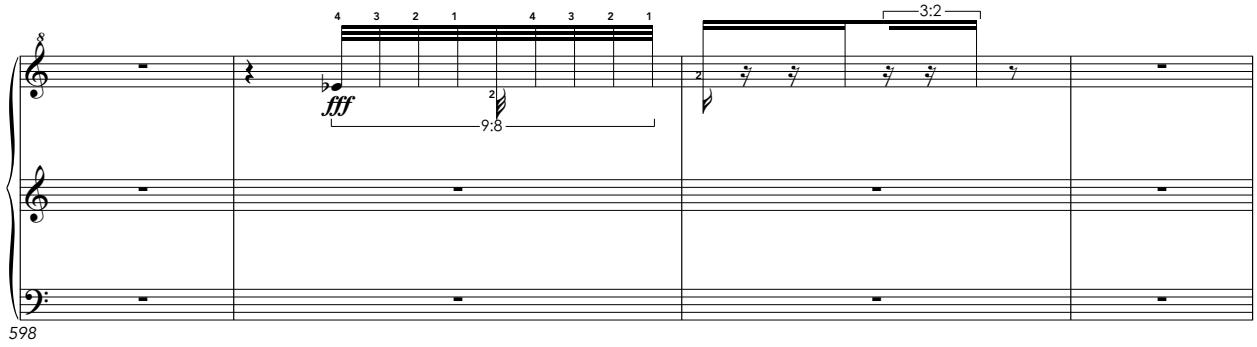


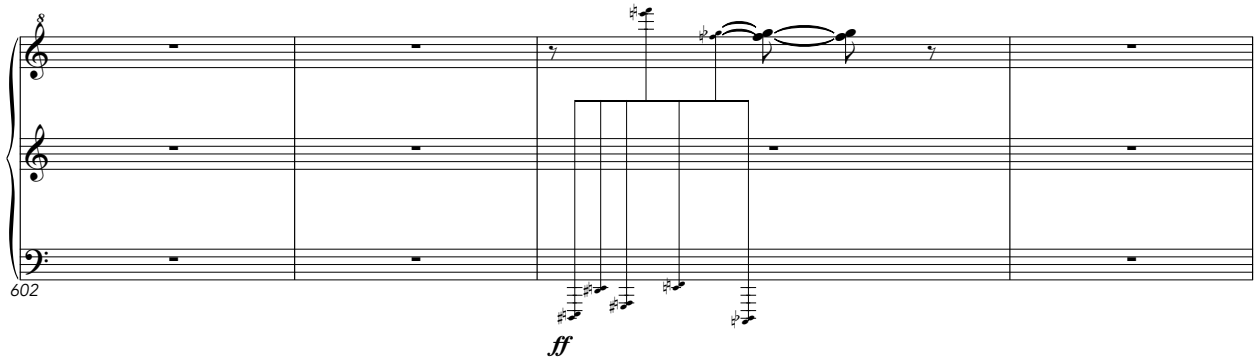

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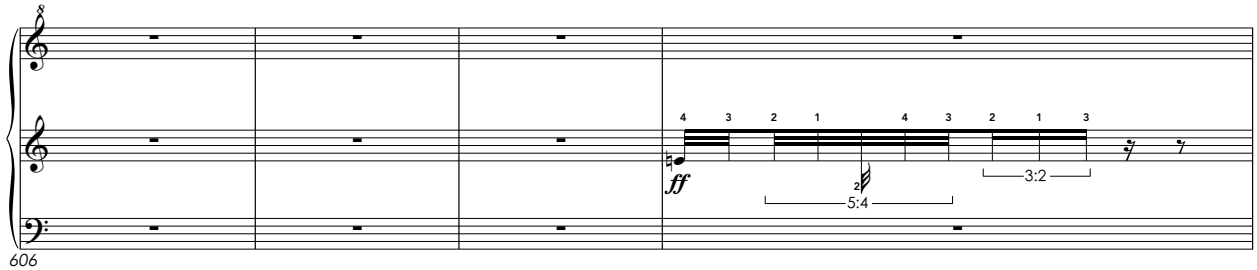

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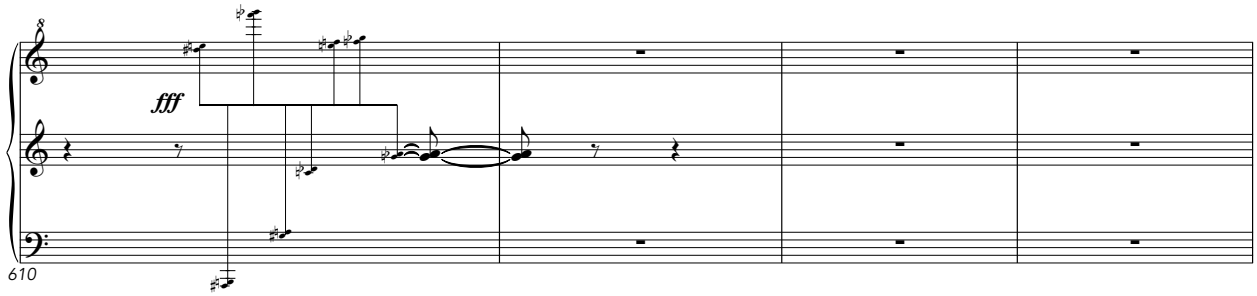

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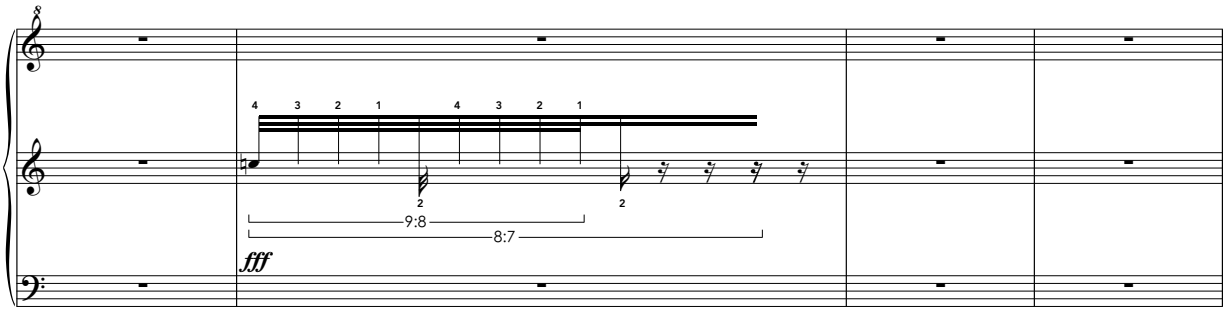

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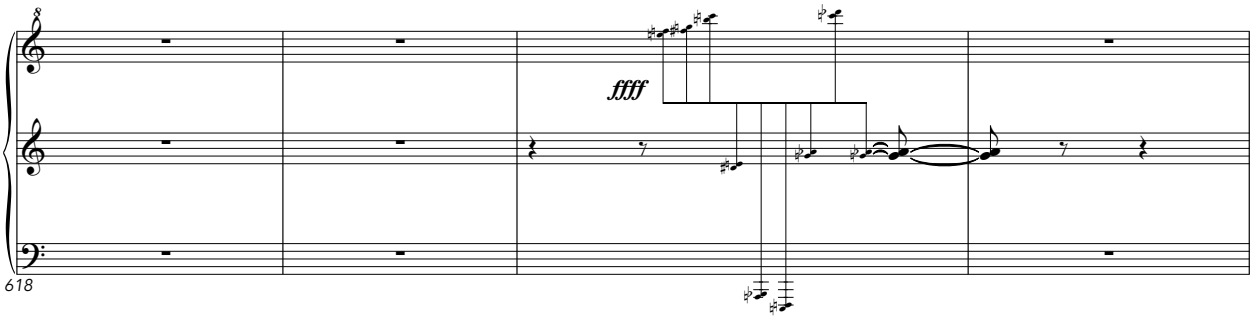

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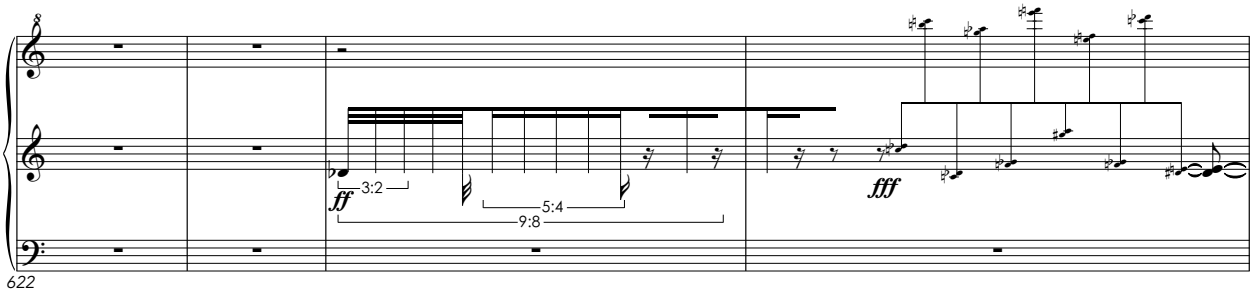

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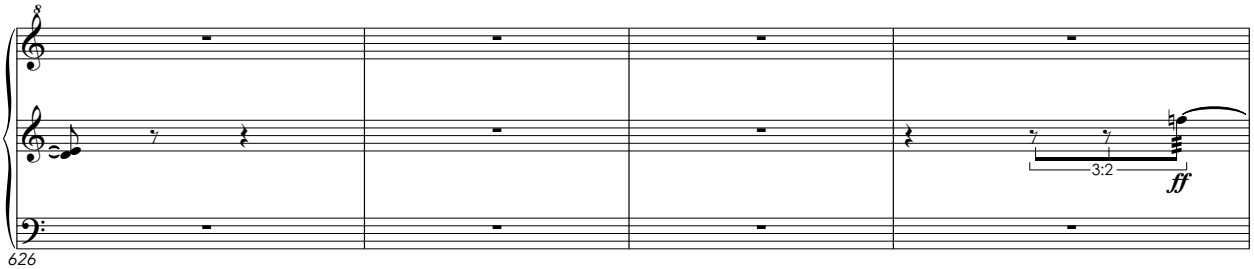
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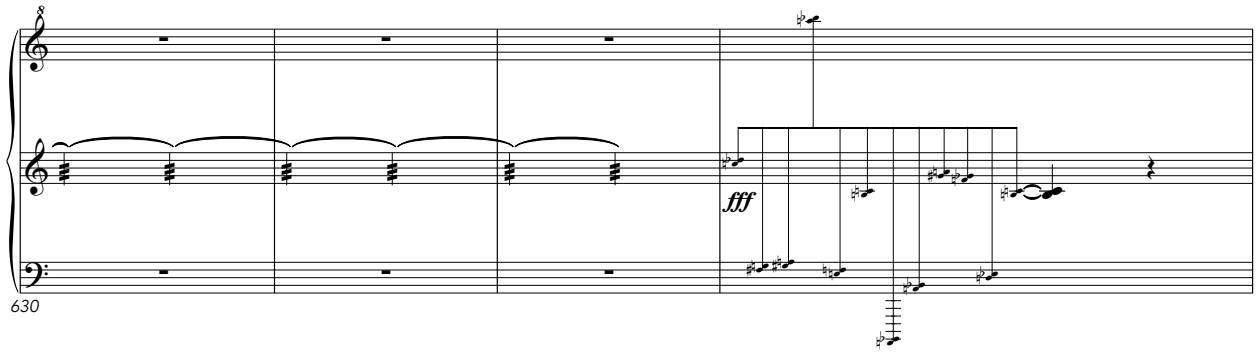
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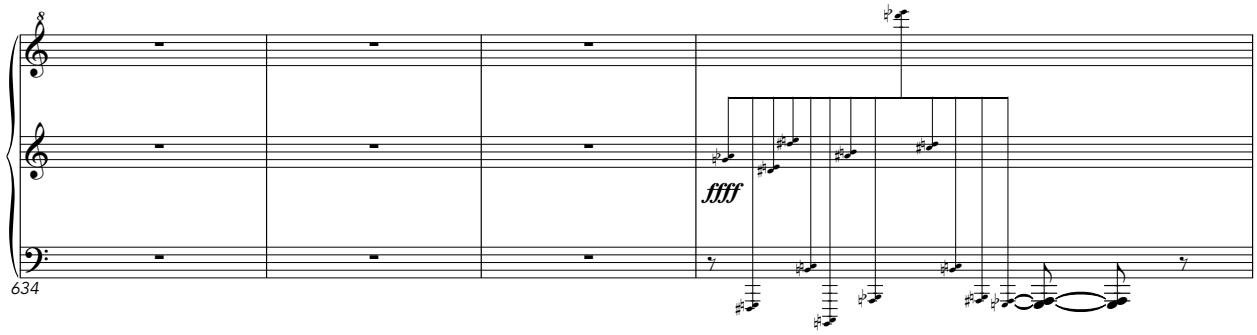


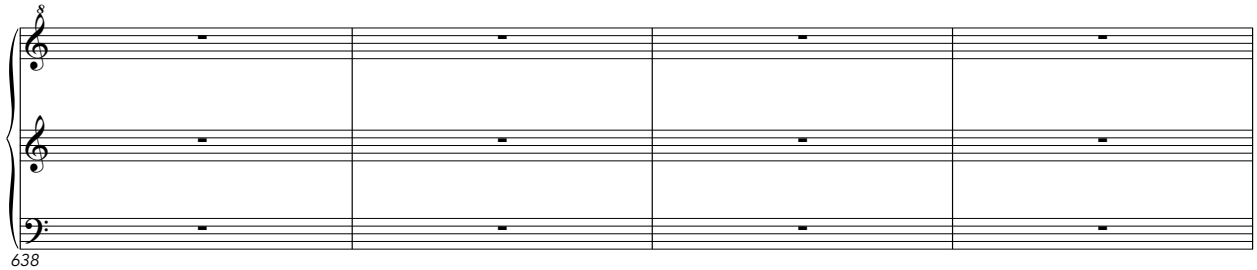
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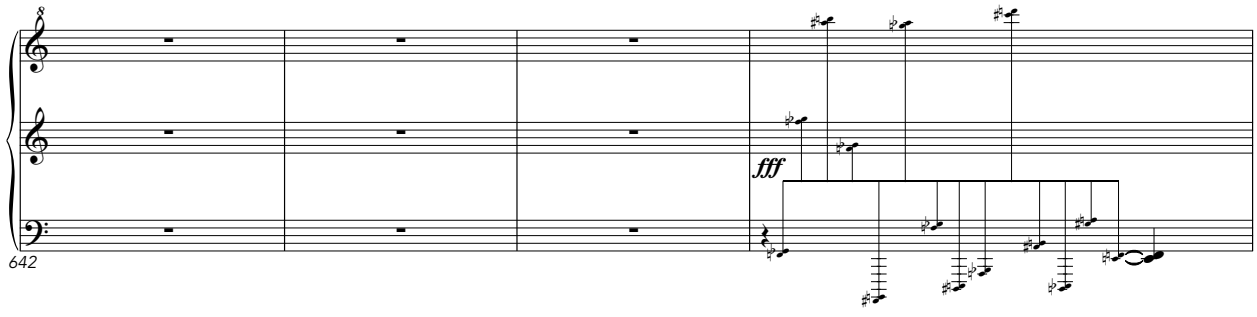


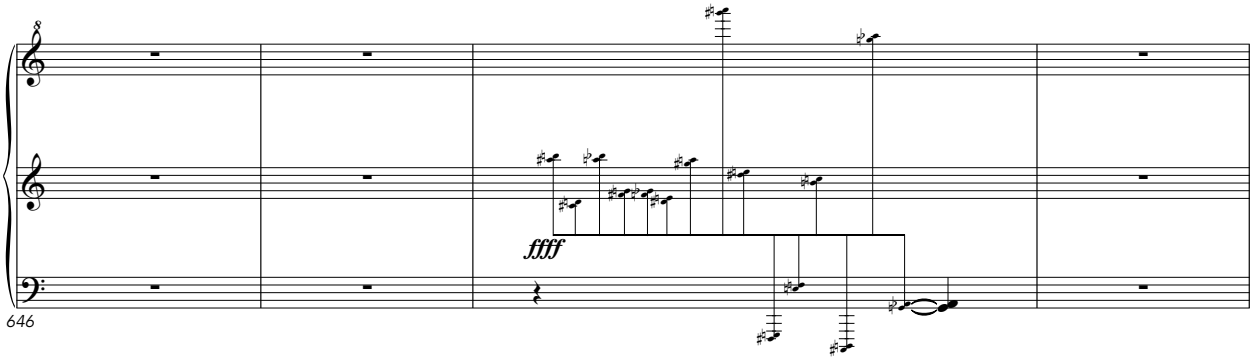
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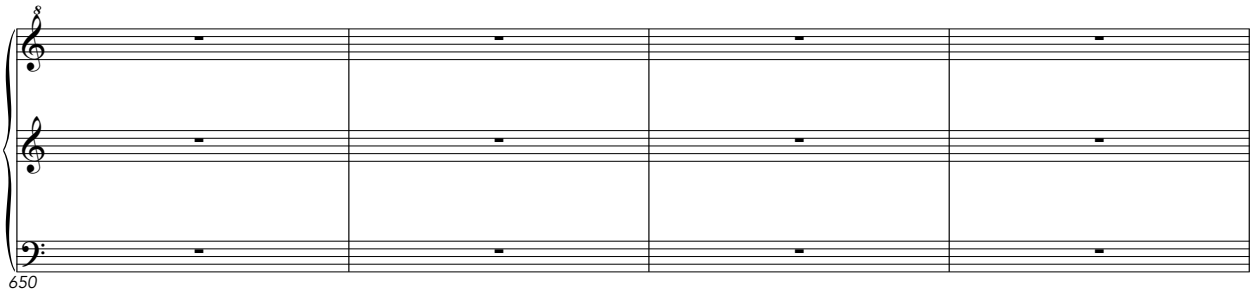

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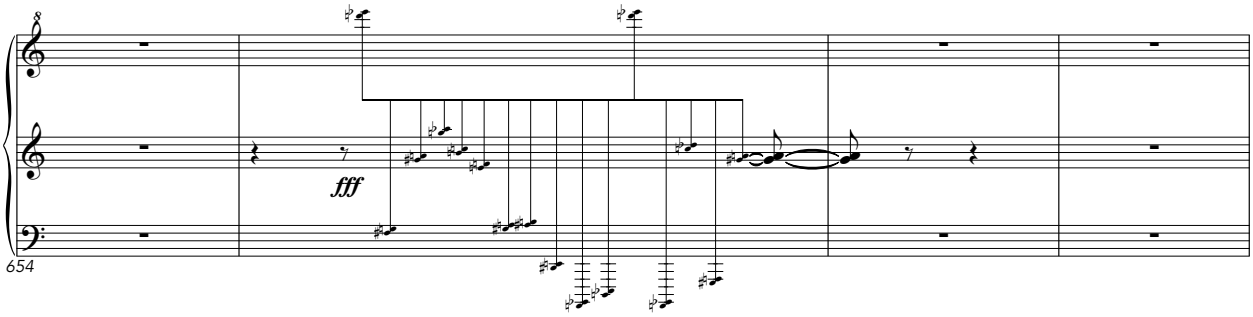

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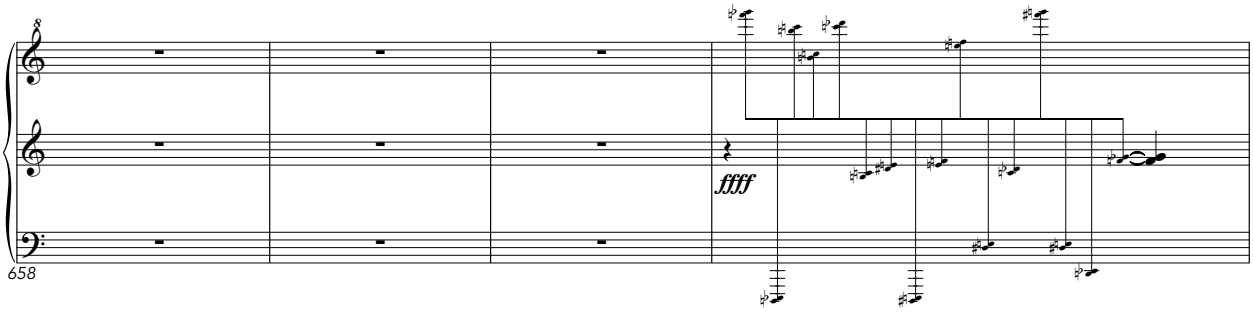

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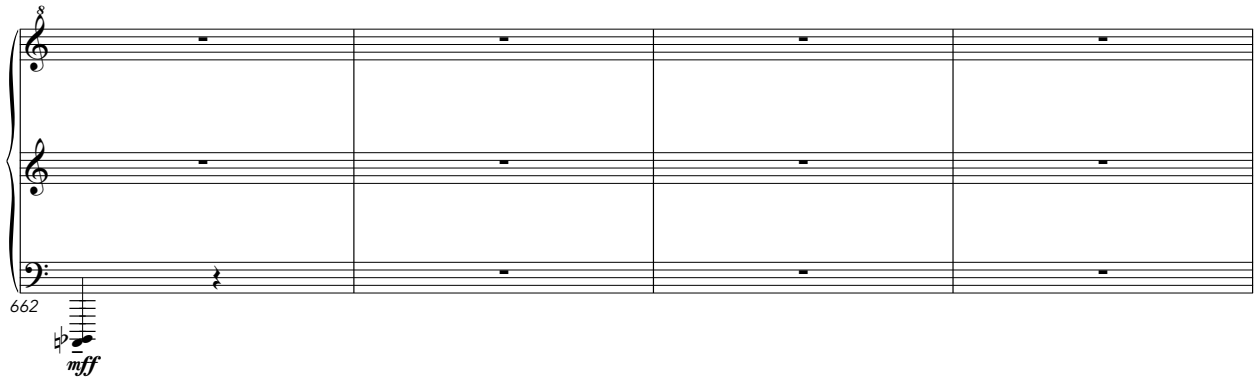

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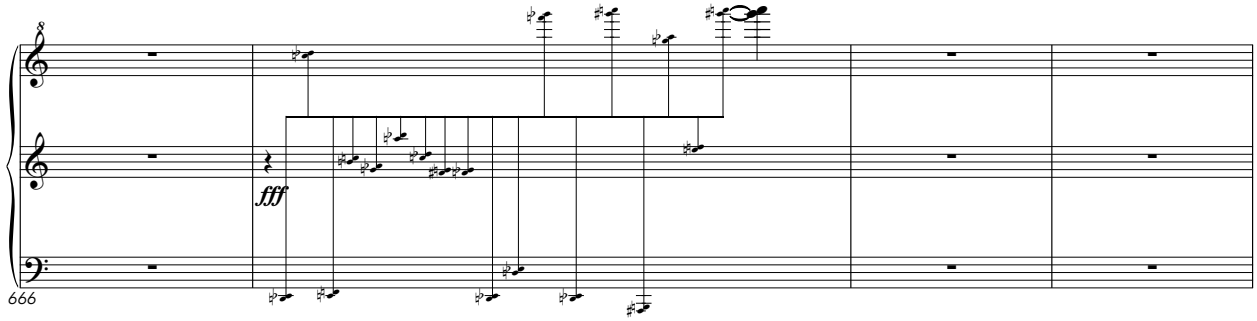

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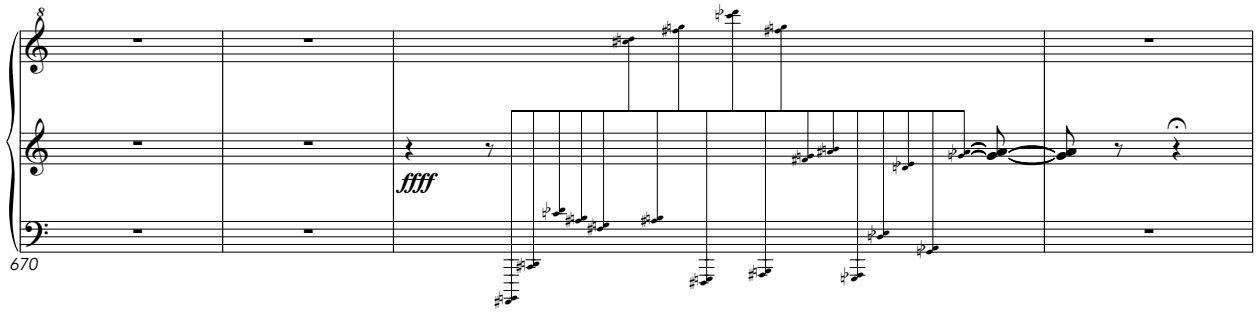

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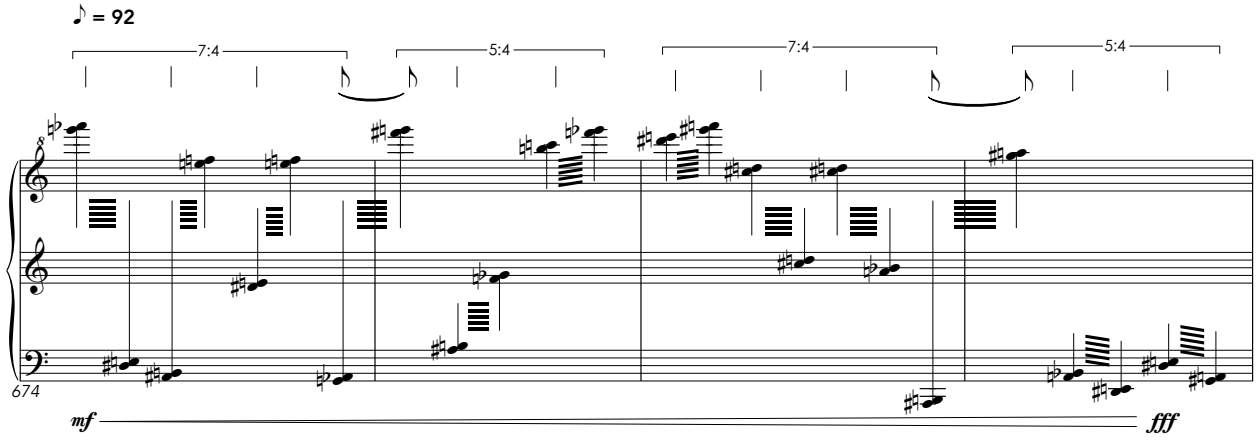

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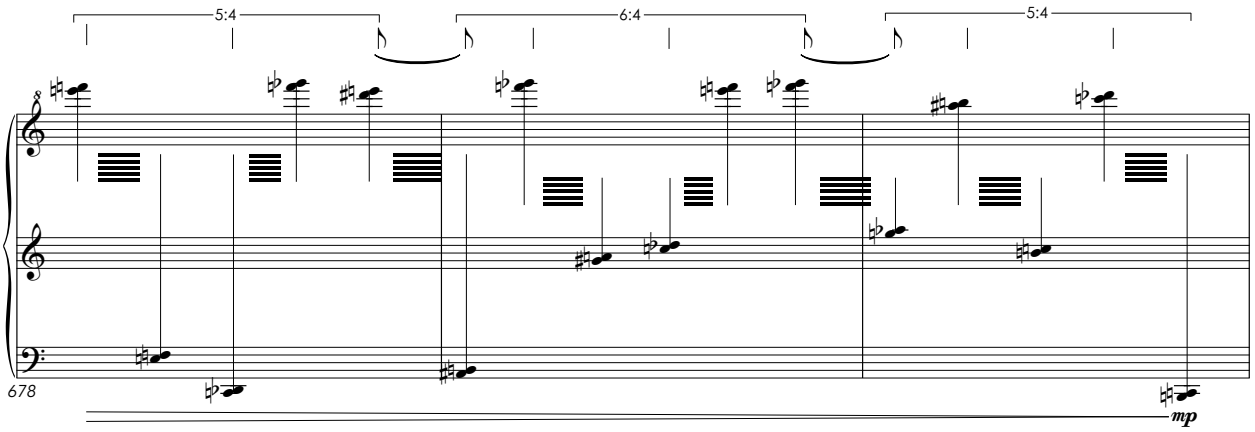

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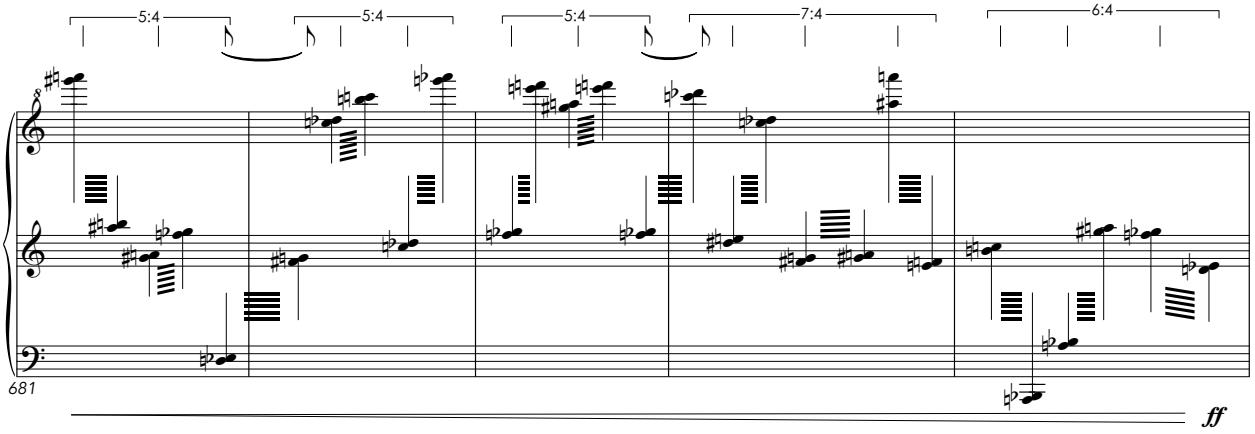

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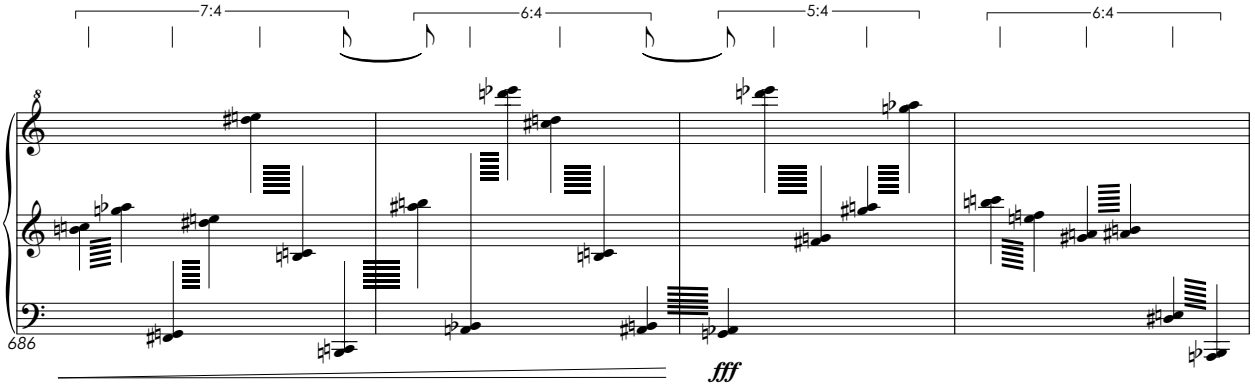

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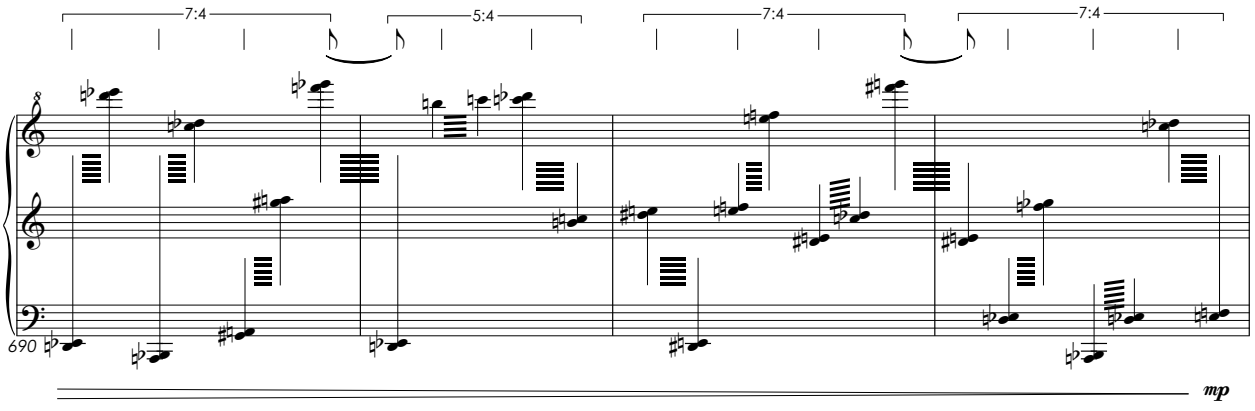

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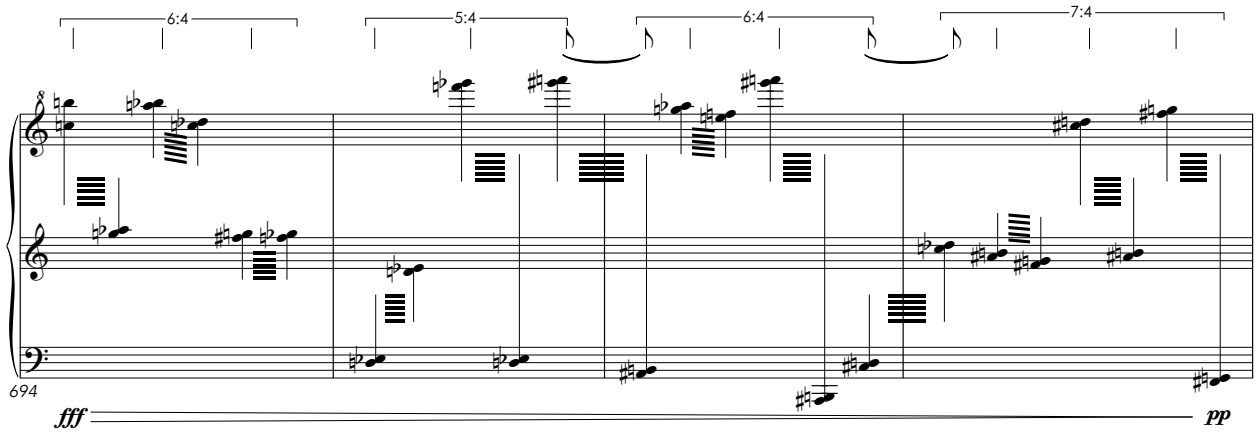

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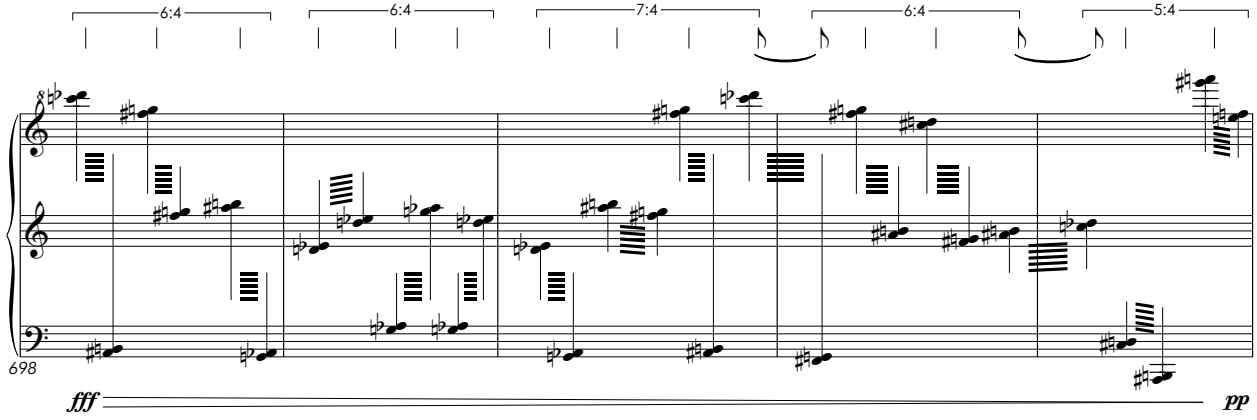

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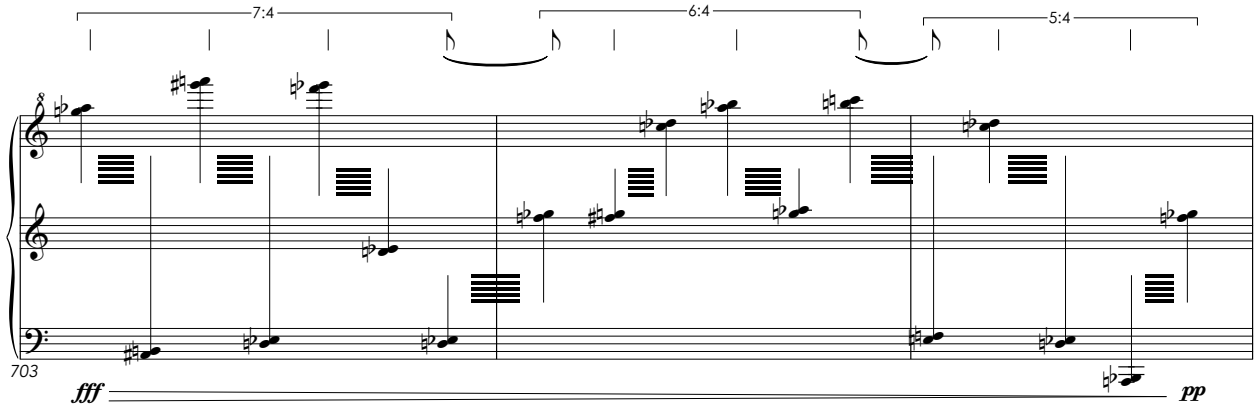

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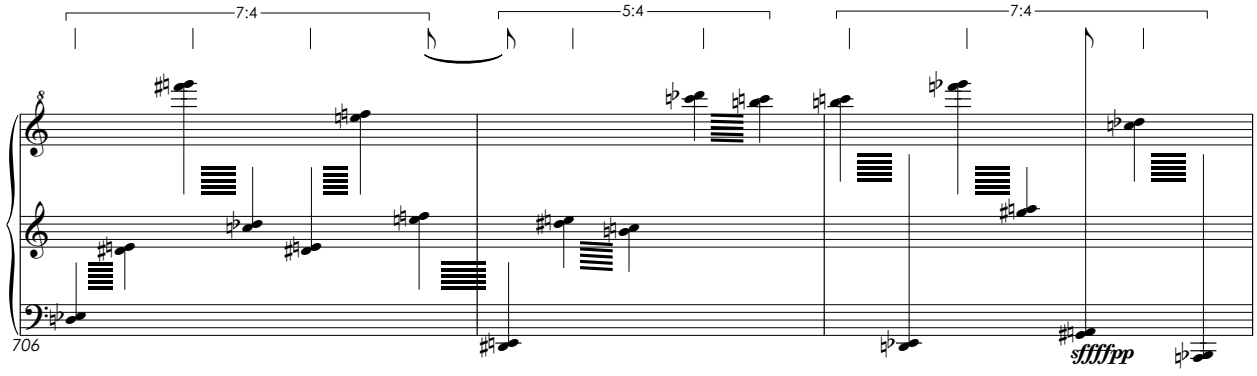

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686
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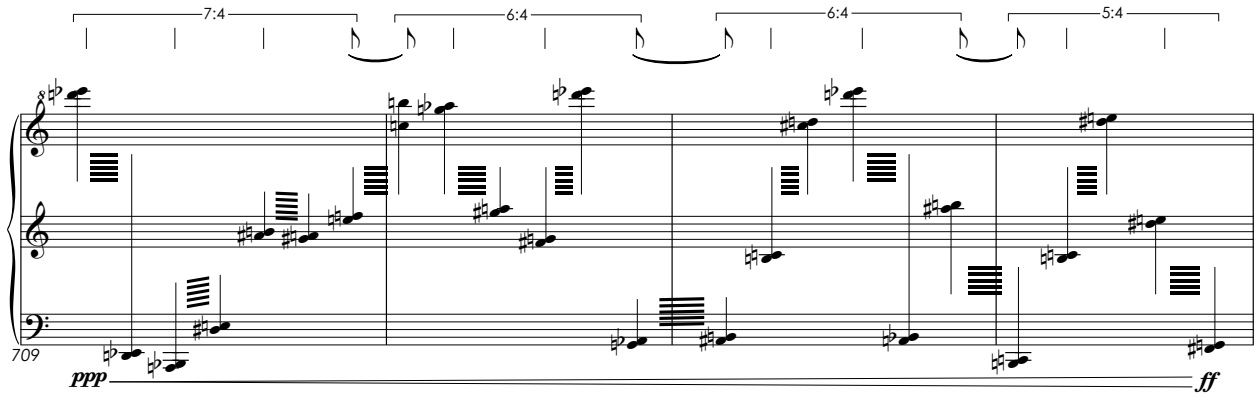

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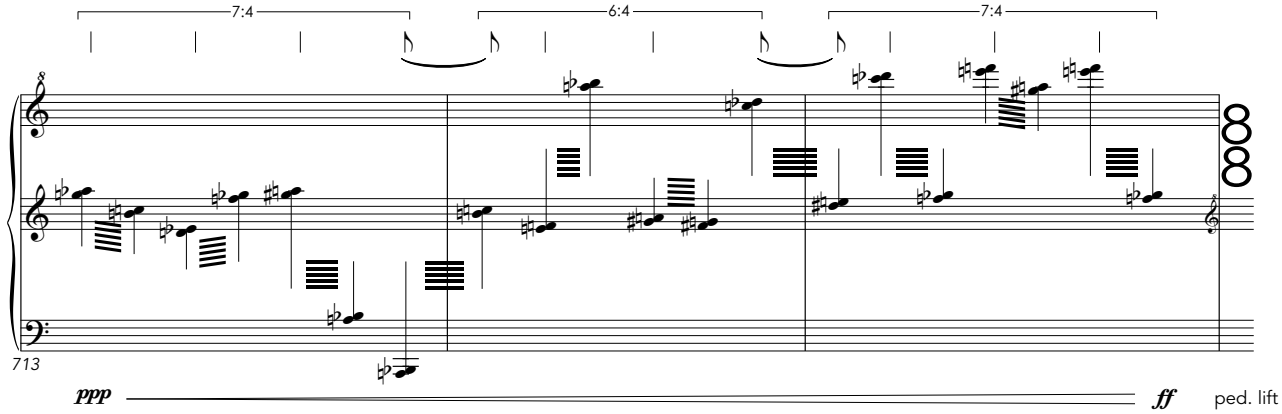

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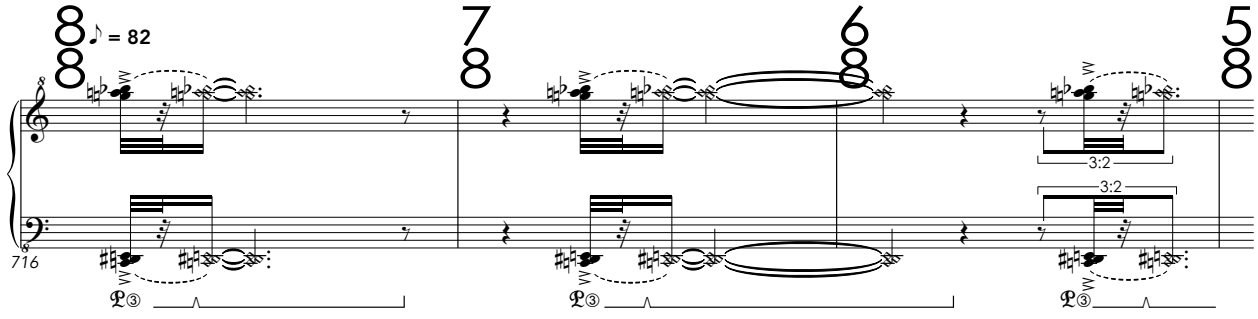

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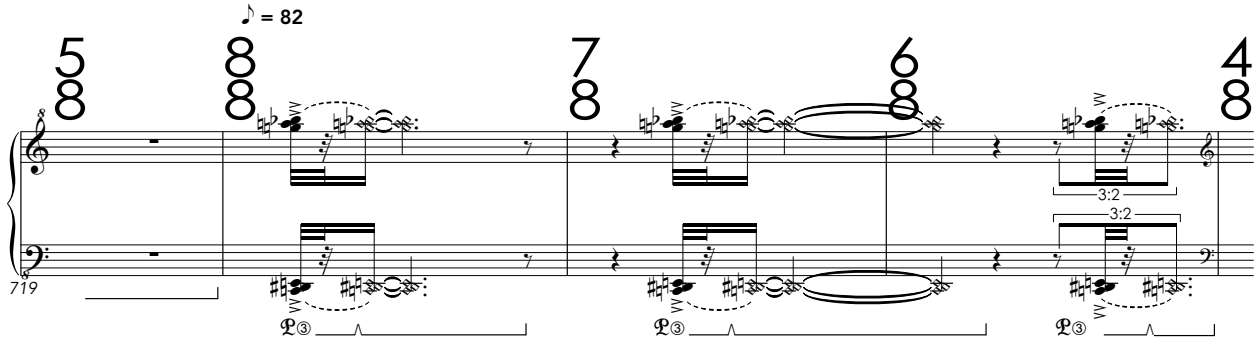

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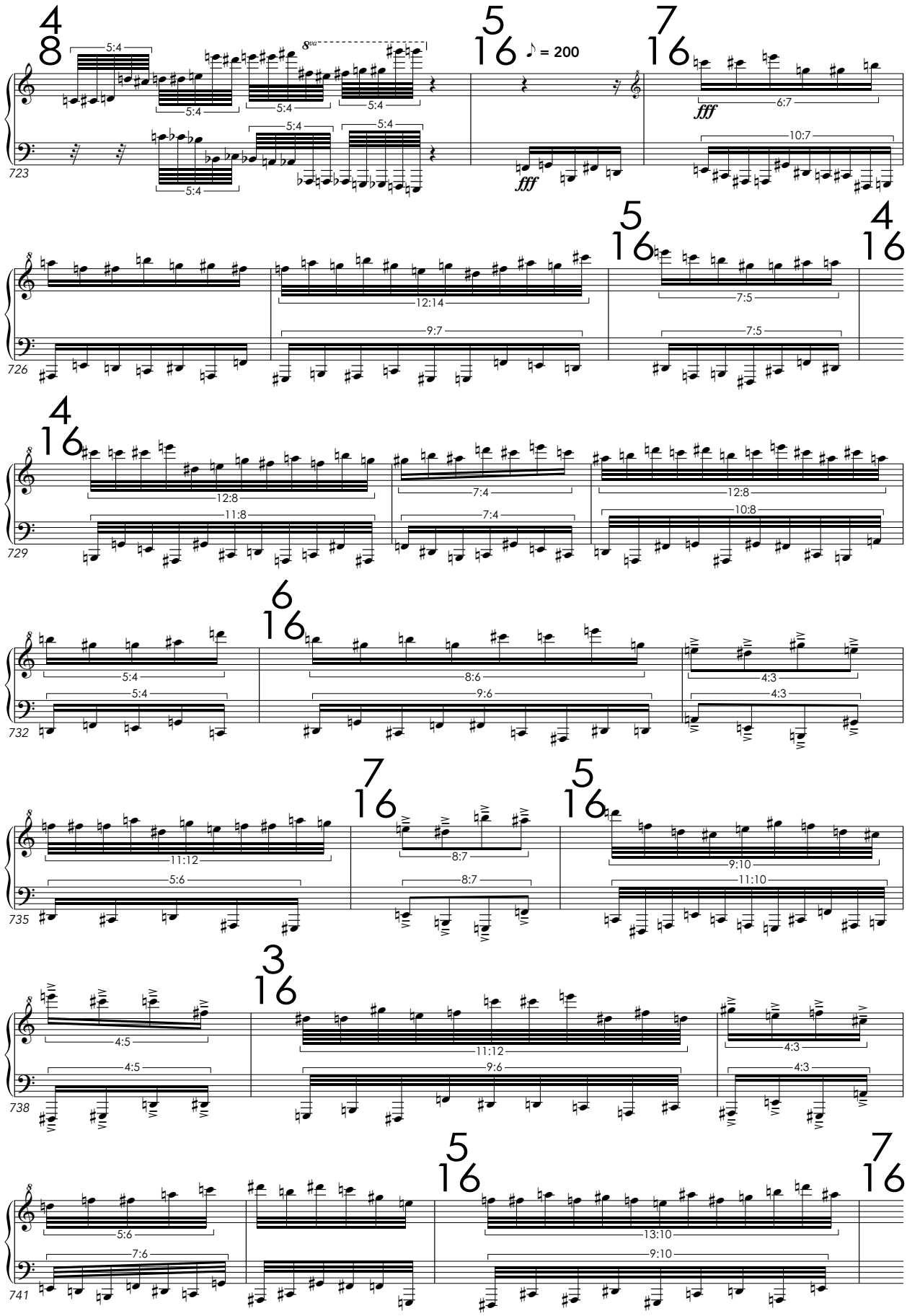

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706
sfffffpp

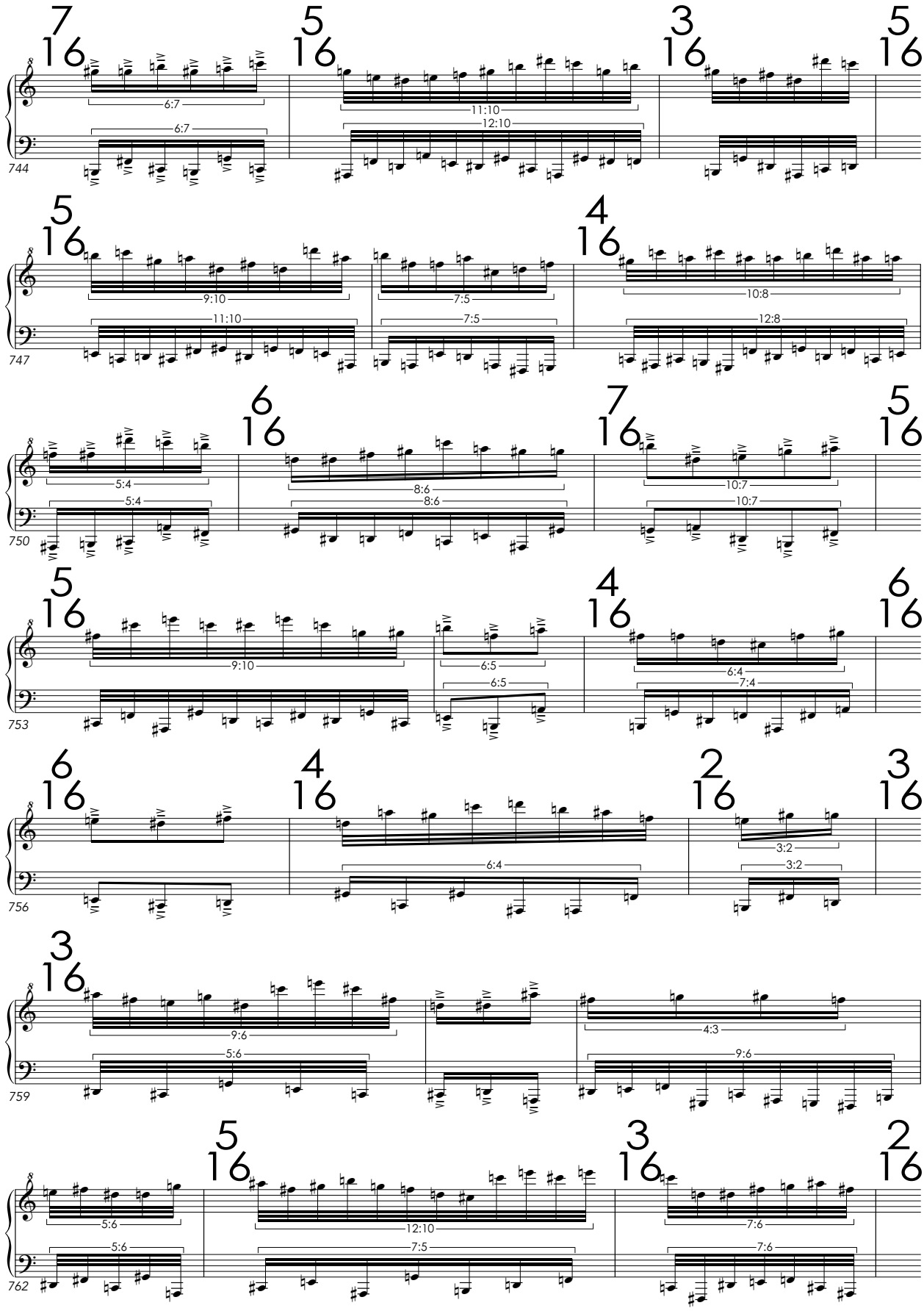

7:4
6:4
6:4
5:4
709
ppp
ff

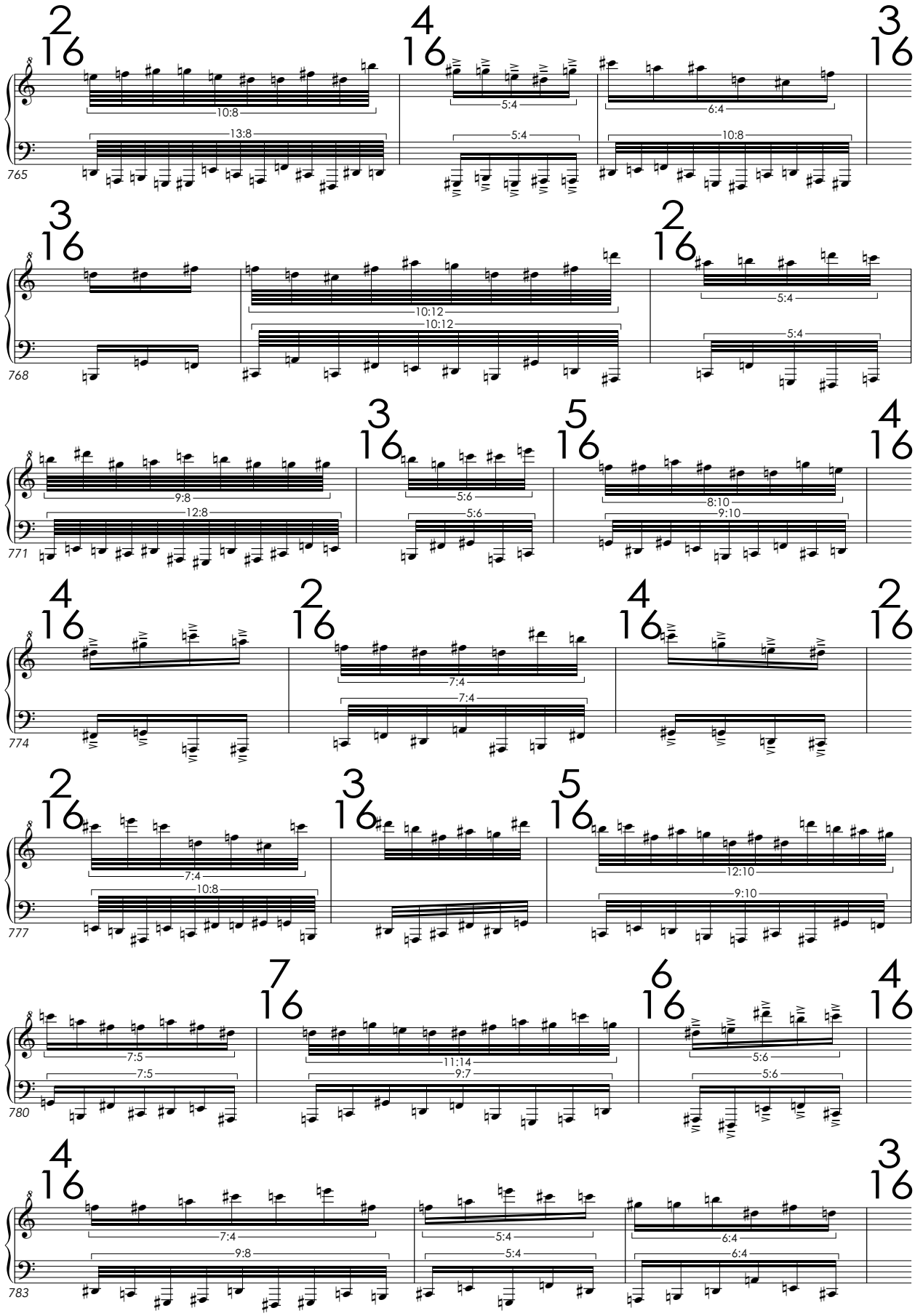

7:4
6:4
7:4
713
ppp
ff
ped. lift

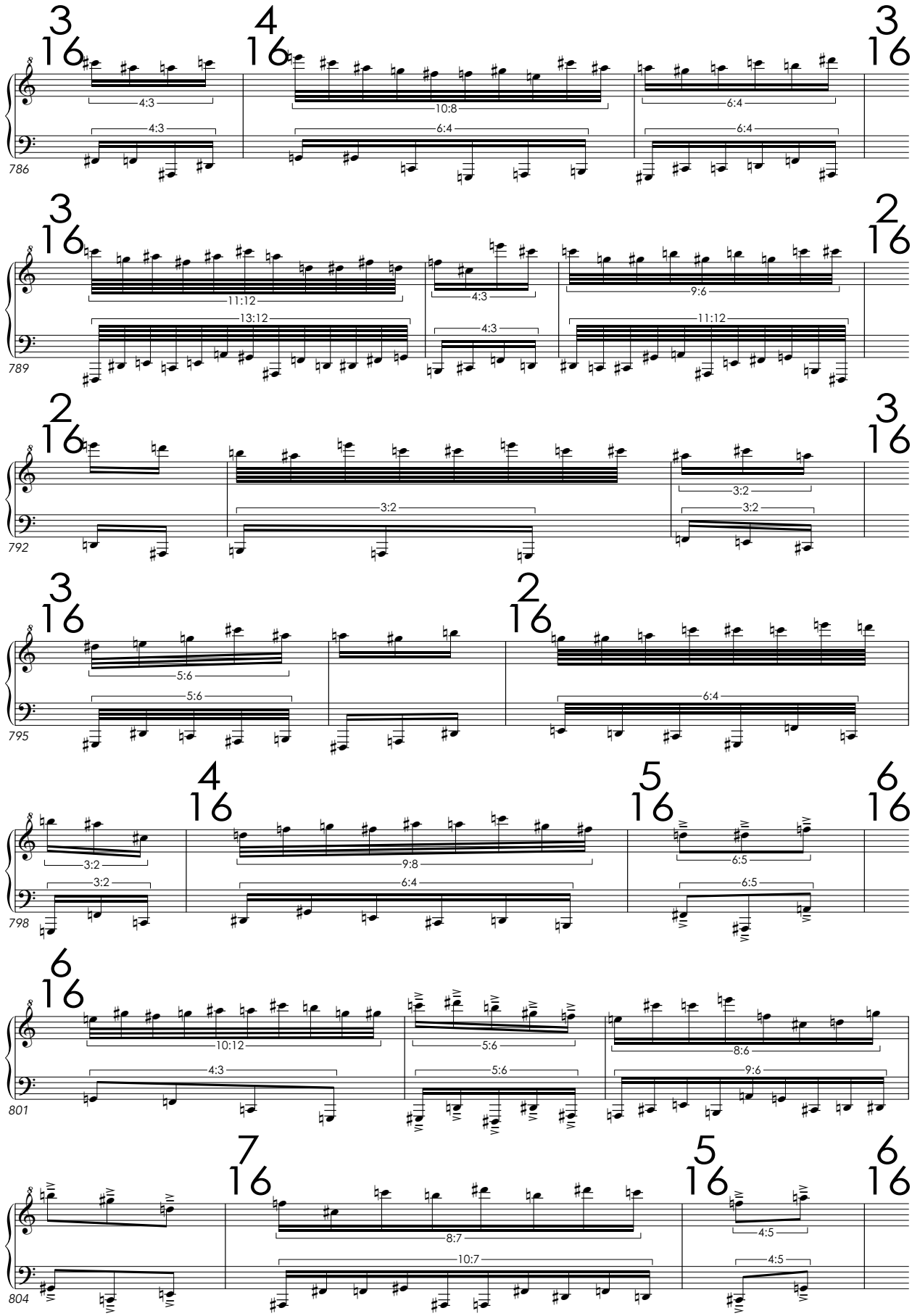

♪ = 82
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3:2
716

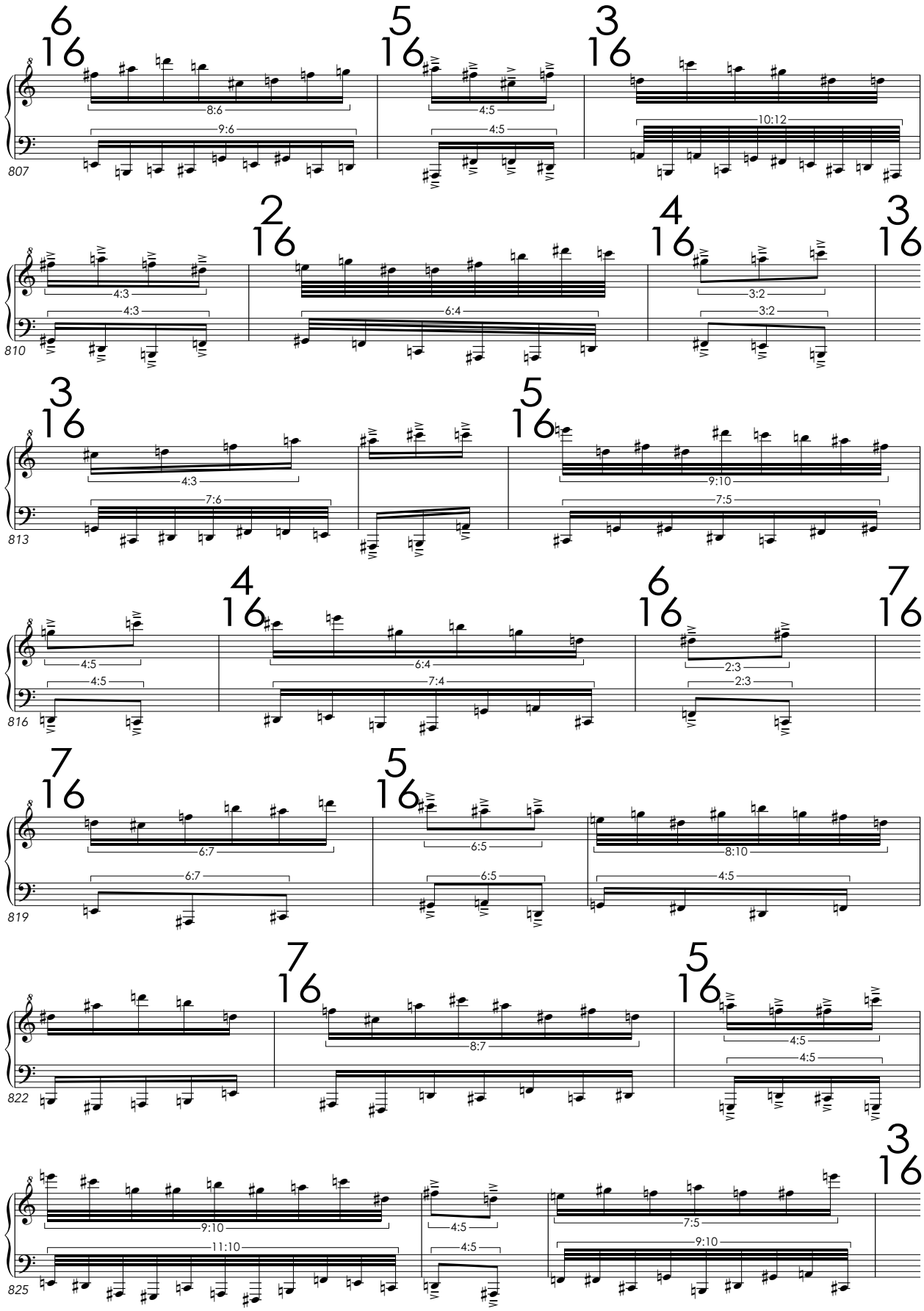

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3:2
719

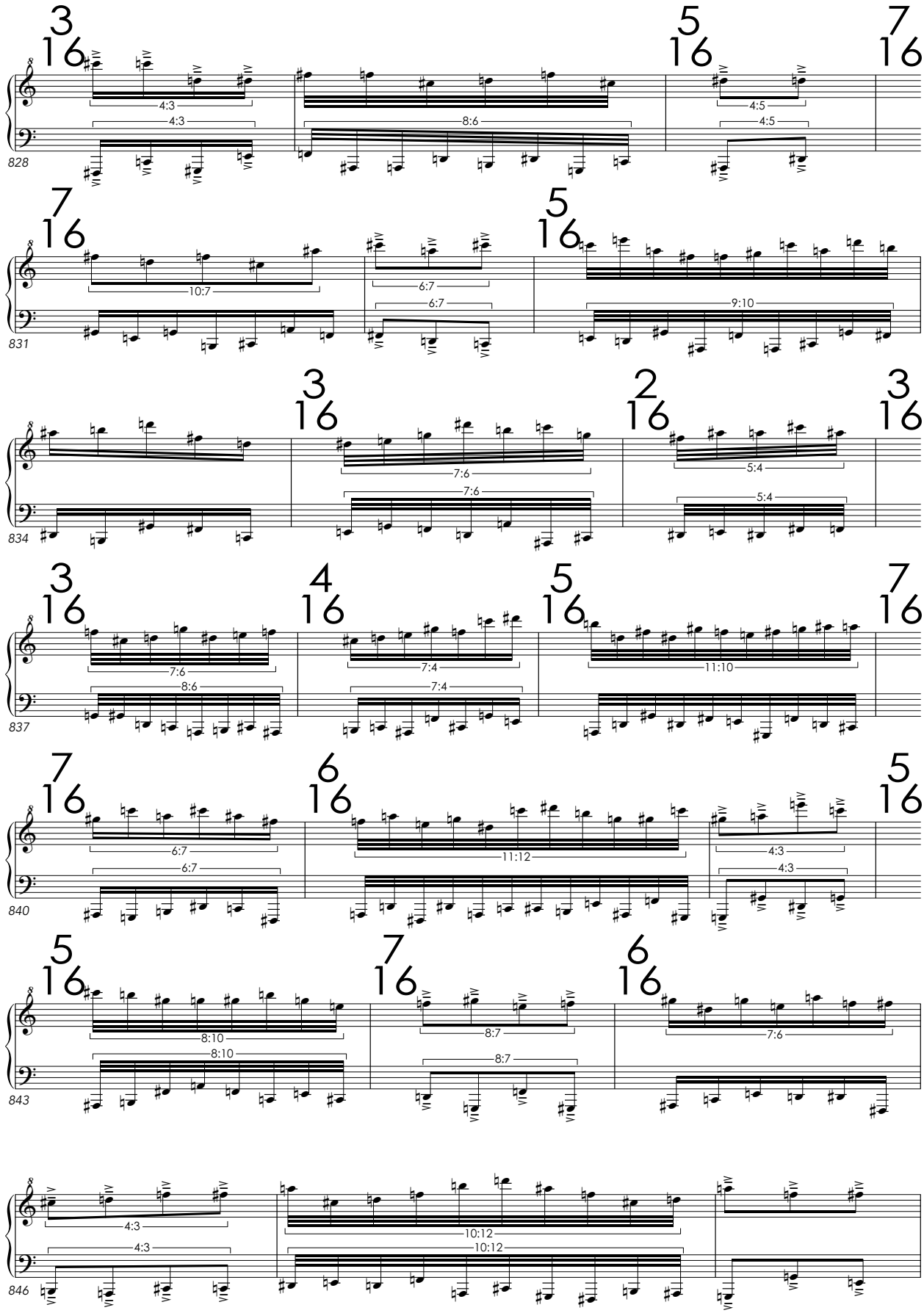

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726
729
732
735
738
741
♪ = 200
fff
fff

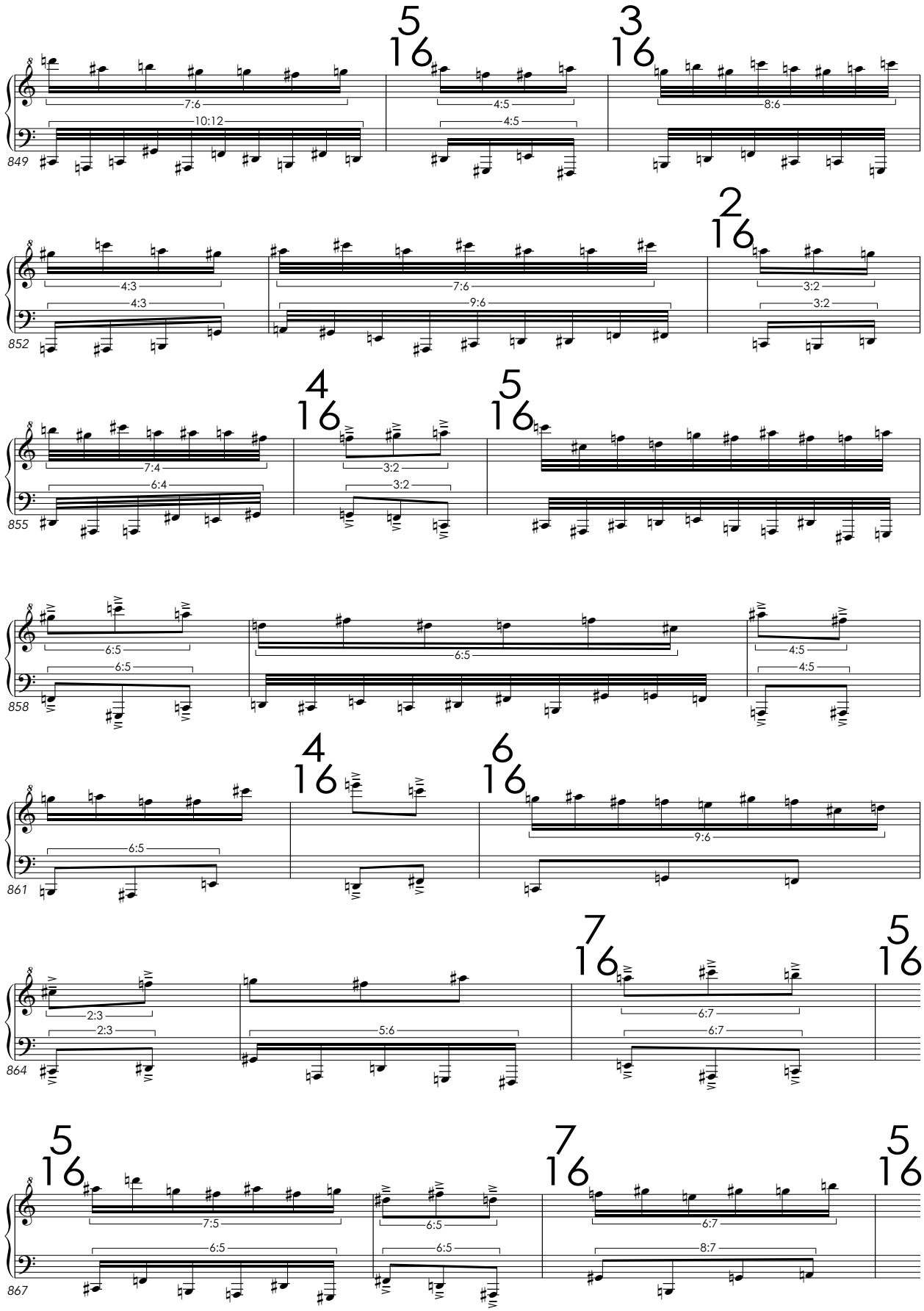

744
747
750
753
756
759
762

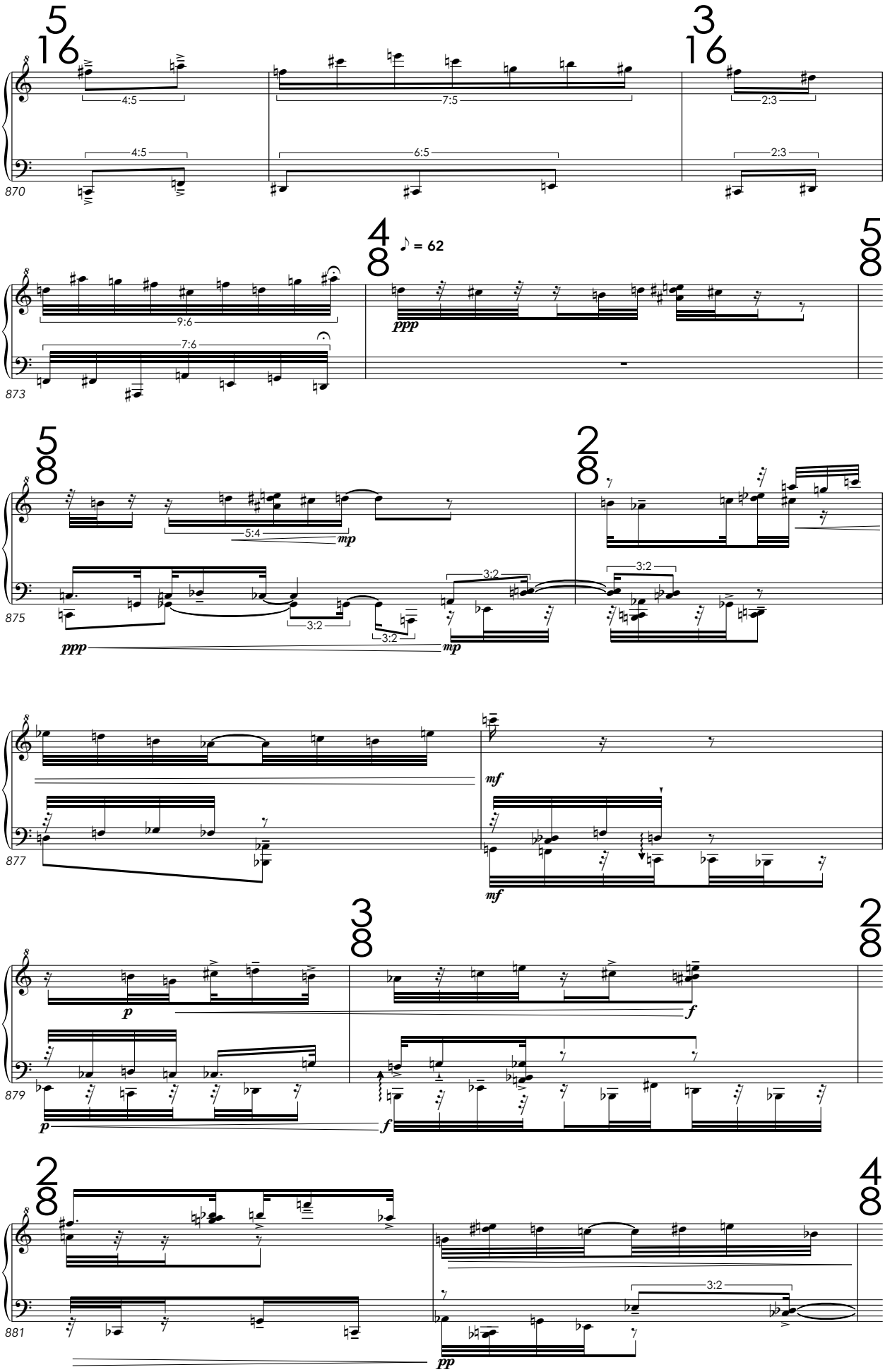

765
10:8
13:8
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6:4
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768
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771
9:8
12:8
5:6
5:6
8:10
9:10
774
7:4
7:4
777
7:4
10:8
12:10
9:10
780
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5:6
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783
7:4
9:8
5:4
5:4
6:4
6:4

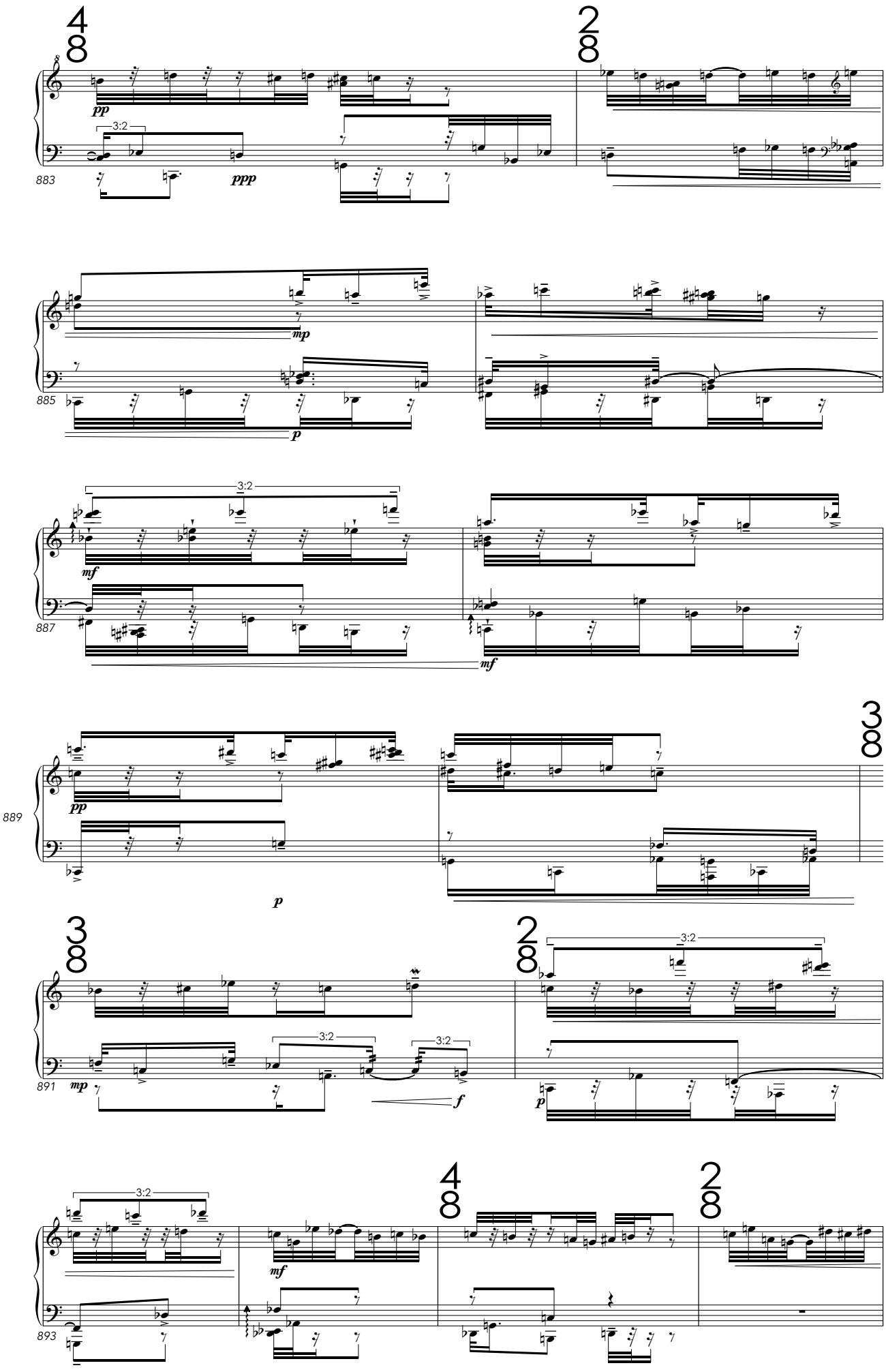

786
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9:6
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792
3:2
3:2
3:2
795
5:6
5:6
6:4
798
3:2
3:2
9:8
6:4
6:5
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804
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4:5
4:5

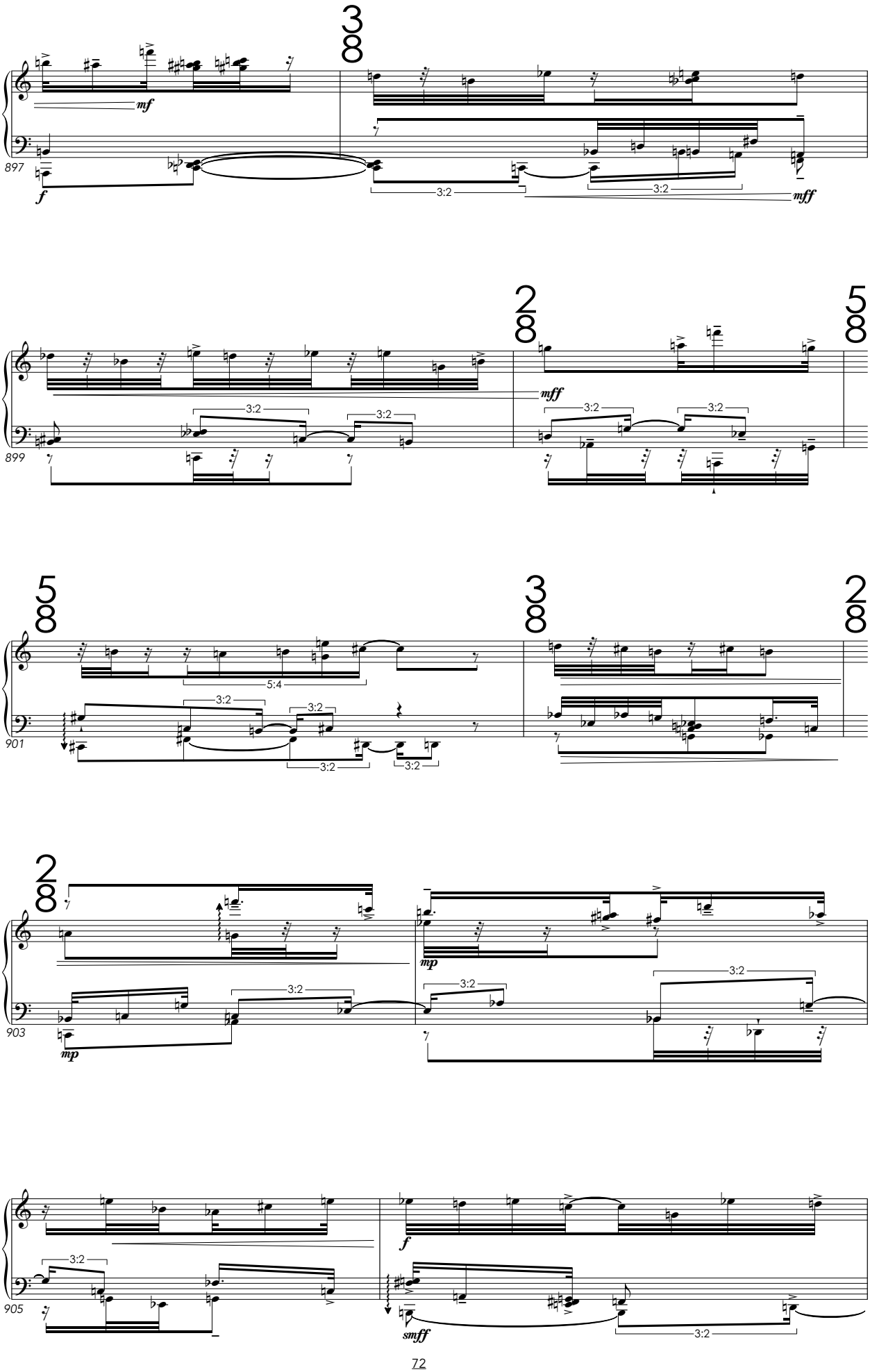

807
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7:6
9:10
7:5
816
4:5
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819
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9:10

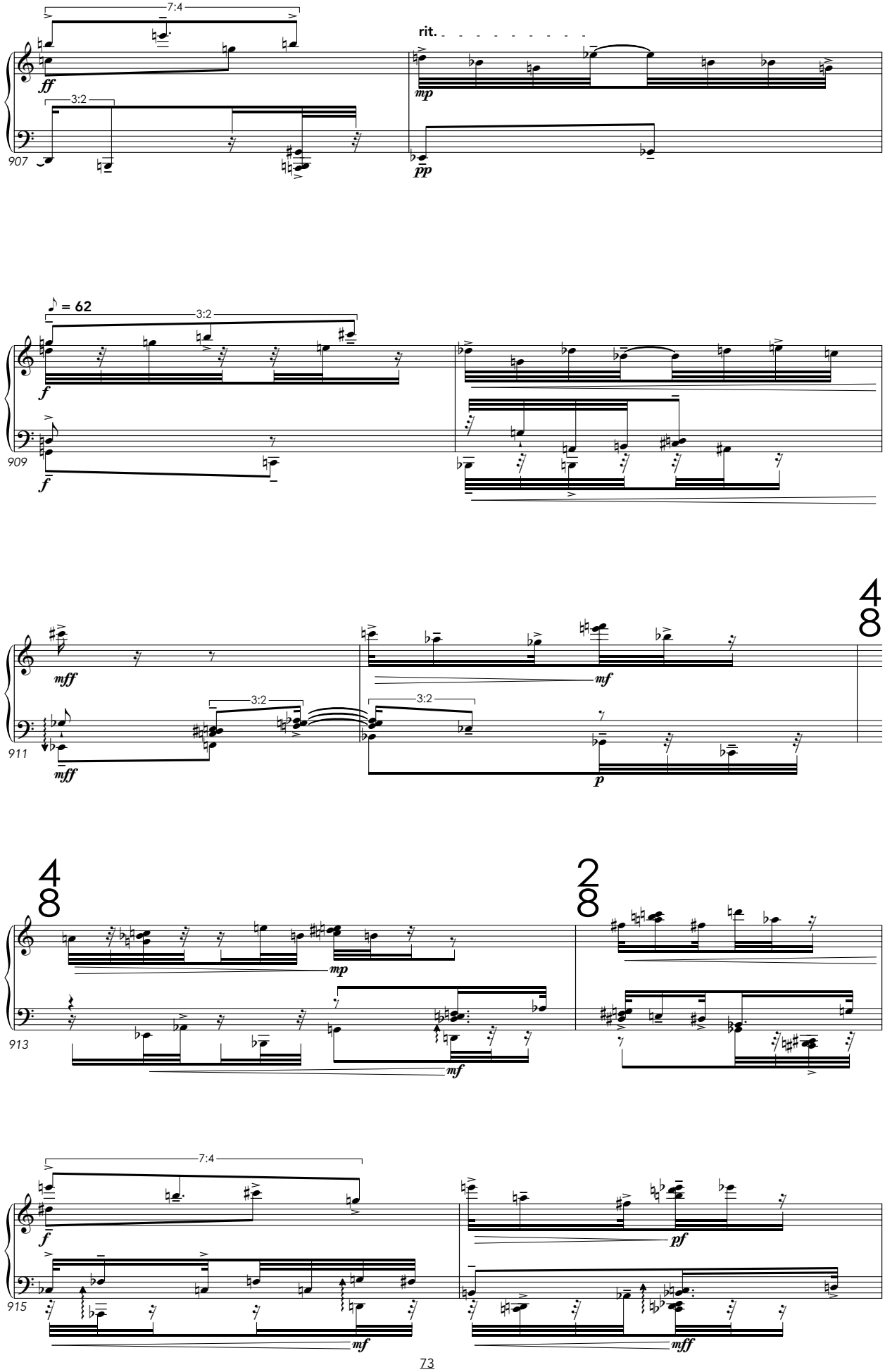

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837
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7:4
11:10
840
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6:7
11:12
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4:3
10:12
10:12

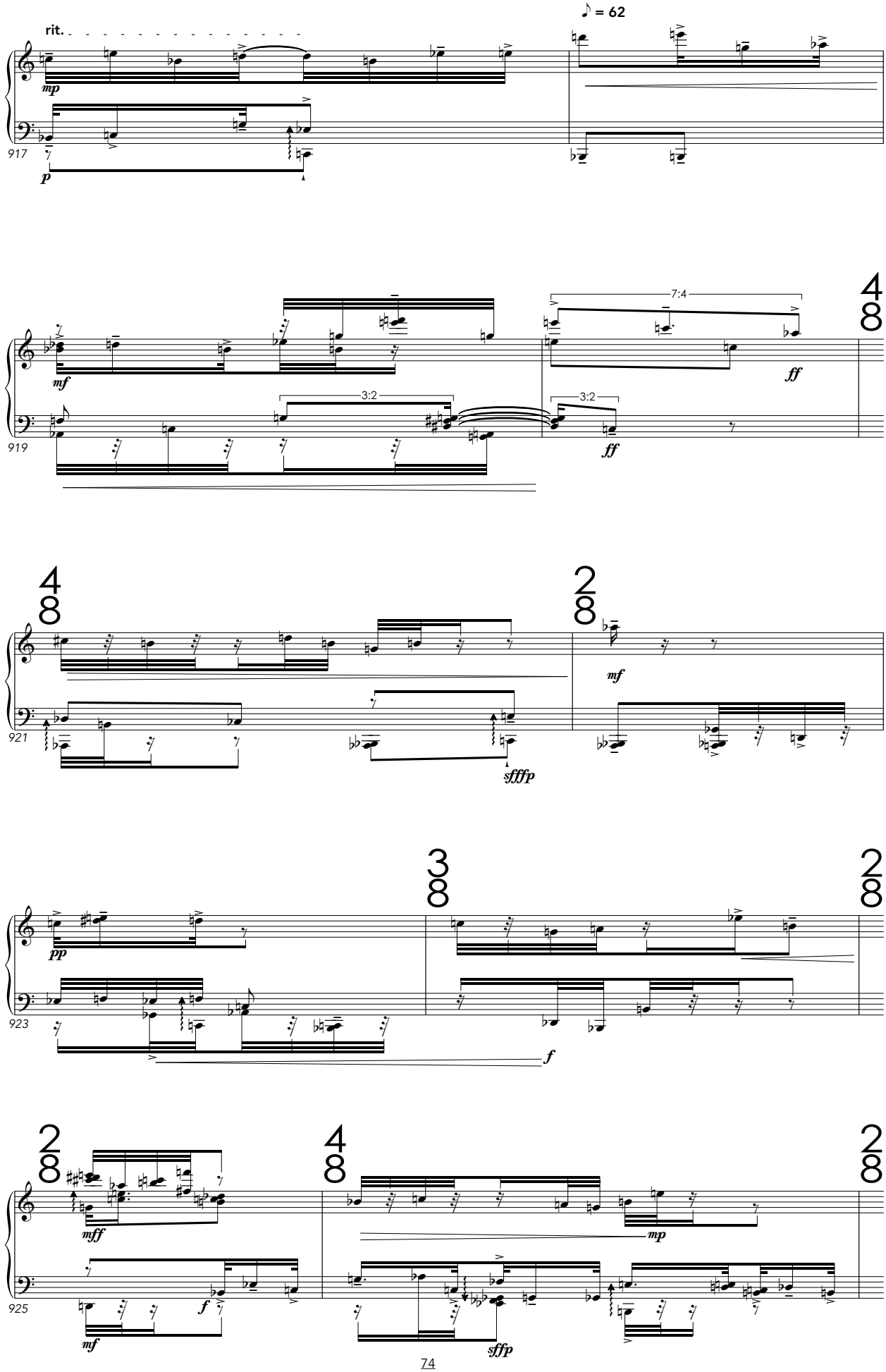

849
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5/16
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3/16
8:6
852
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4:3
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9:6
2/16
3:2
3:2
855
7:4
6:4
4/16
3:2
3:2
5/16
858
6:5
6:5
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4:5
4:5
861
6:5
4/16
6/16
9:6
864
2:3
2:3
5:6
7/16
6:7
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6:7
8:7
5/16

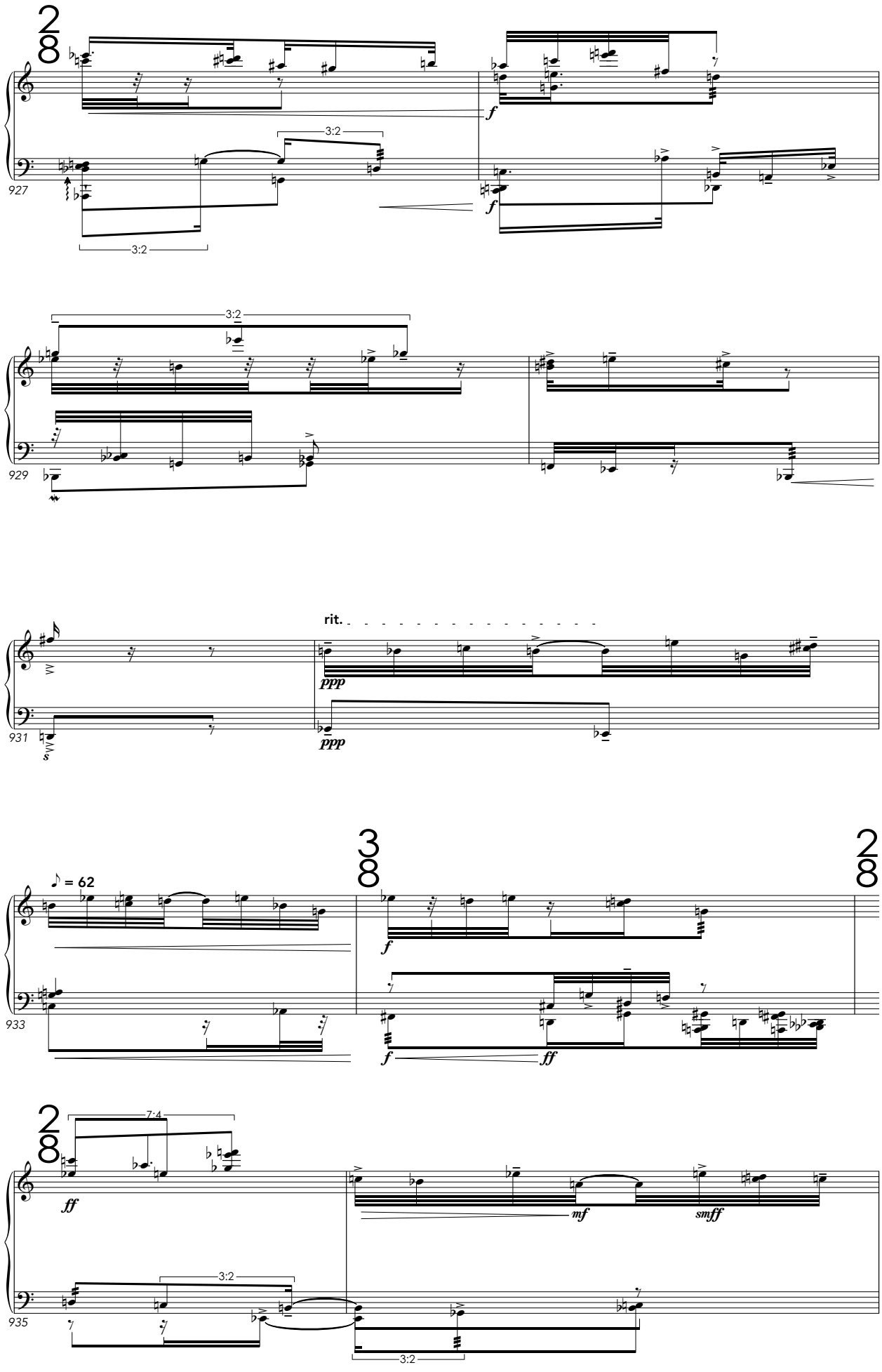

870
4:5
7:5
2:3
4:5
6:5
2:3
873
9:6
7:6
♪ = 62
ppp
875
5:4
mp
3:2
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ppp
mp
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p
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p
f
881
3:2
pp

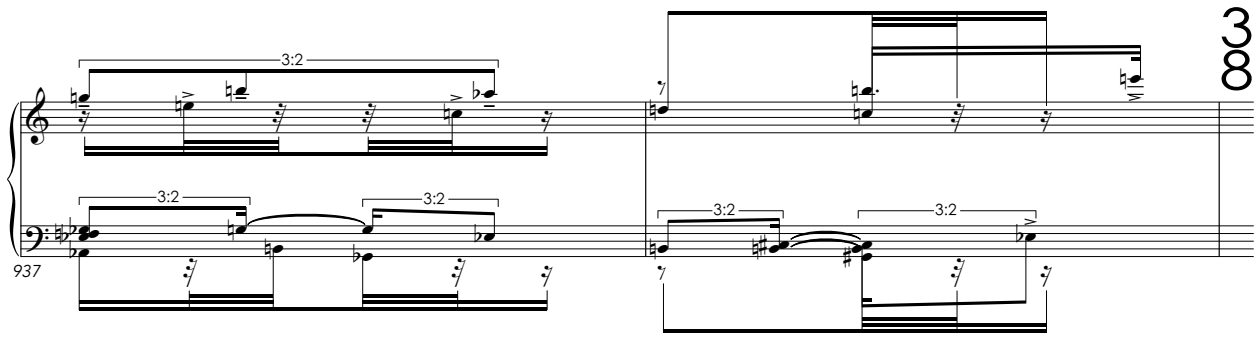

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891
893
3:2
pp
ppp
mp
p
mf
f

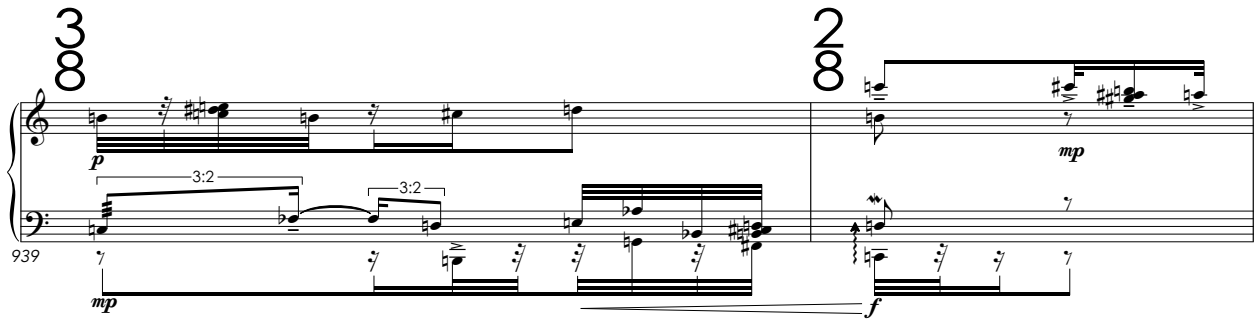

3/8
mf
897
f
3:2
3:2
mff
2/8
5/8
mff
899
3:2
3:2
3:2
3:2
5/8
3/8
2/8
901
5:4
3:2
3:2
3:2
3:2
2/8
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903
mp
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3:2
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3/8
905
3:2
f
smff
3:2

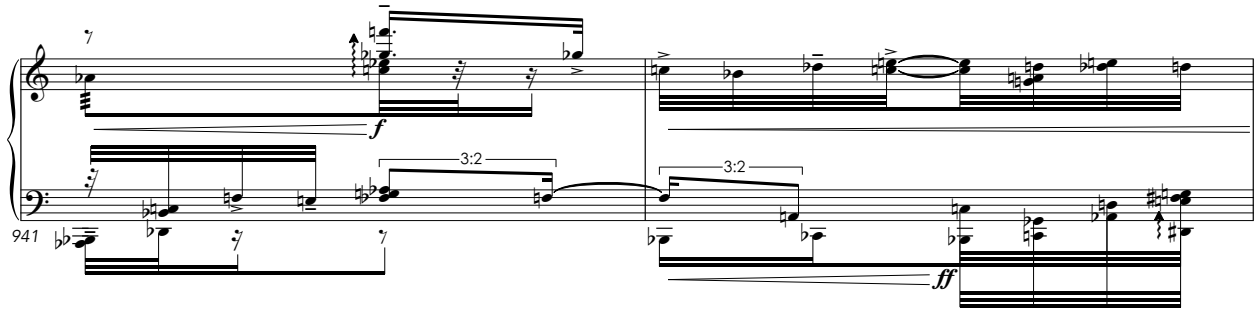

907
7:4
3:2
rit.
mp
pp
909
♪ = 62
3:2
f
f
911
mff
mff
3:2
3:2
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p
4
8
913
4
8
mp
mf
2
8
915
7:4
f
mf
pf
mff

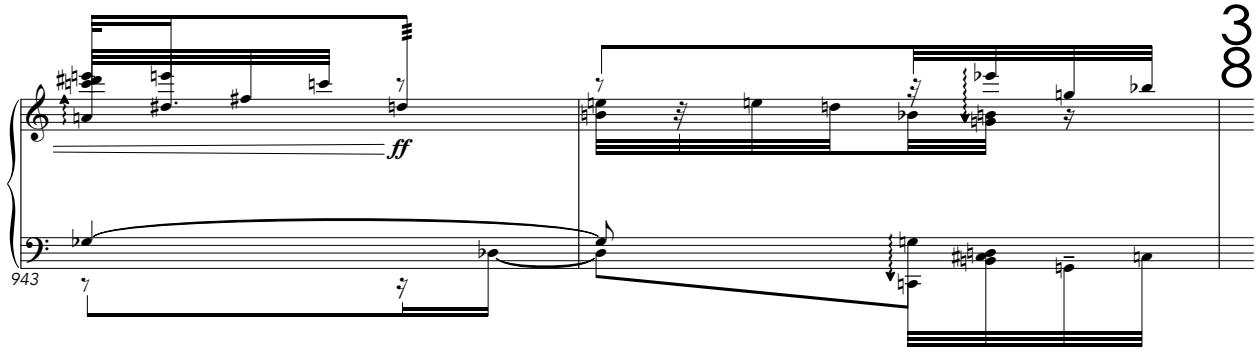

rit.
♪ = 62
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919
mf
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921
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923
pp
f
925
mff
sffp

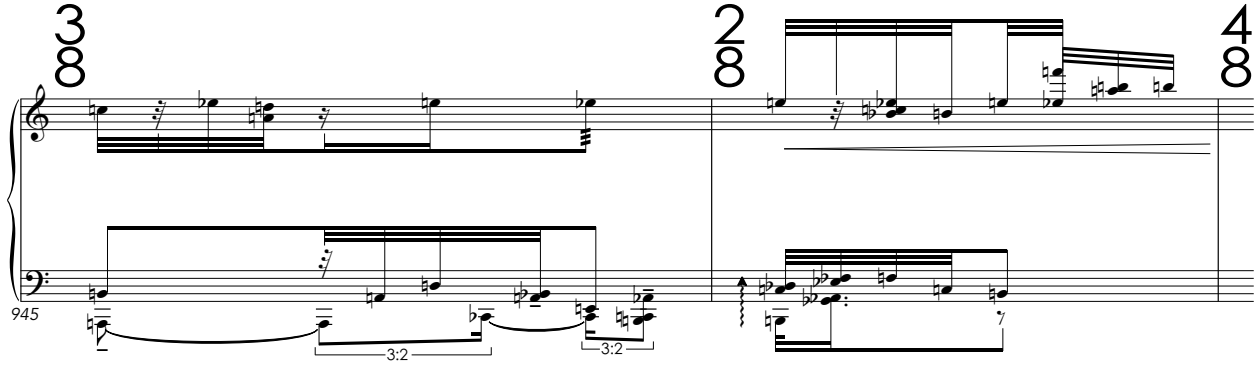

2/8
927
3:2
3:2
f
f
3:2
929
rit.
ppp
ppp
931
s
♪ = 62
3/8
2/8
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f
f
ff
2/8
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ff
mf
smff
3:2
935
3:2

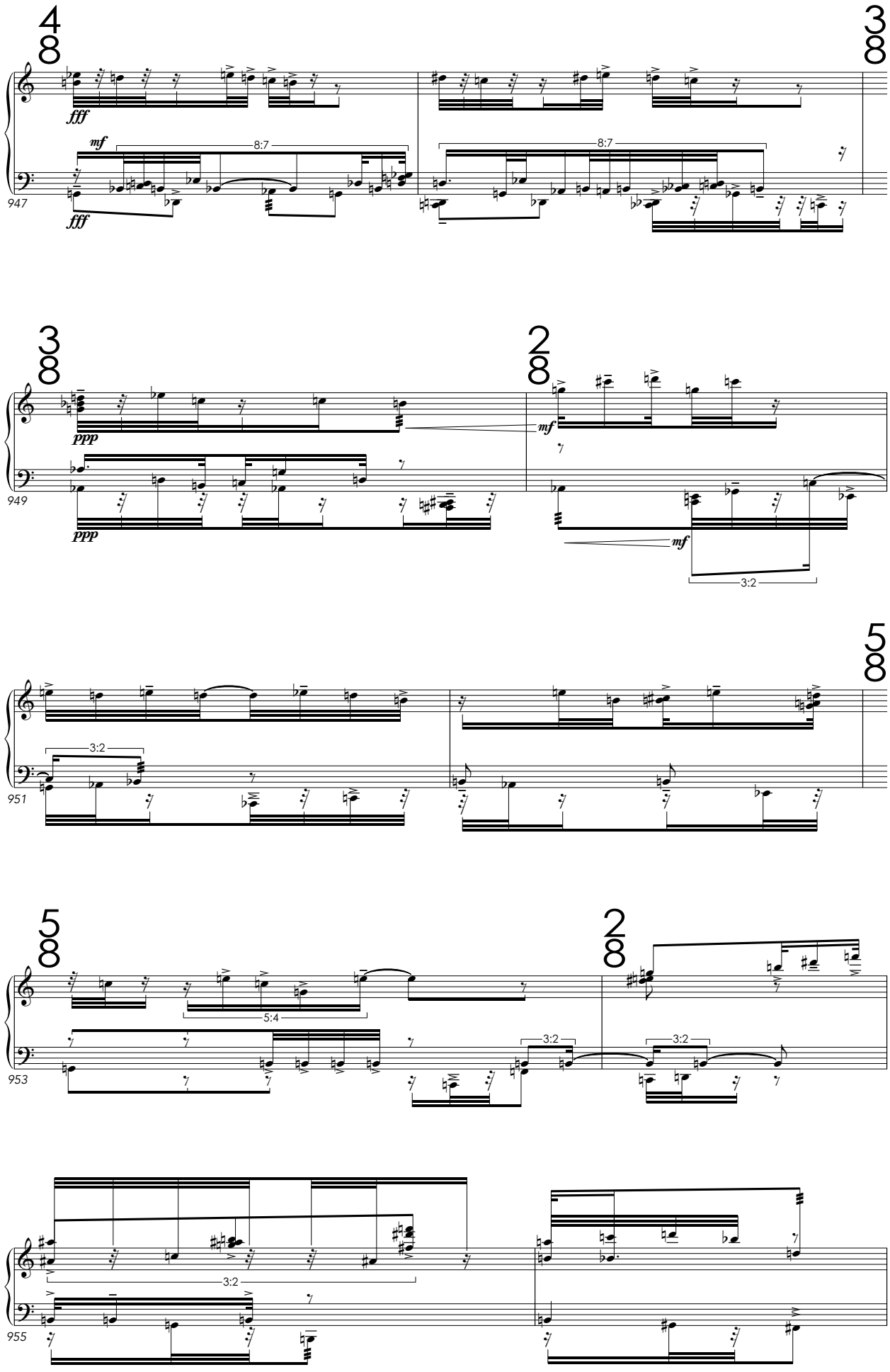

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937

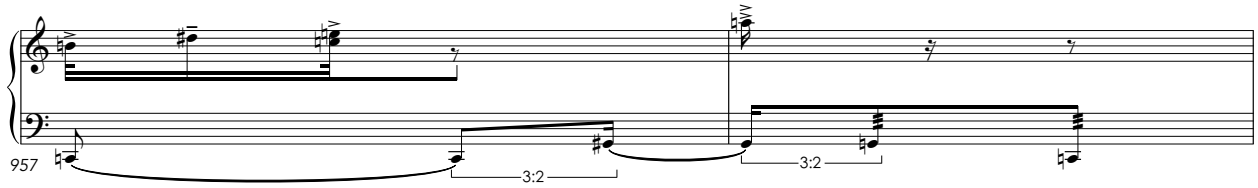

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mp
mp
f

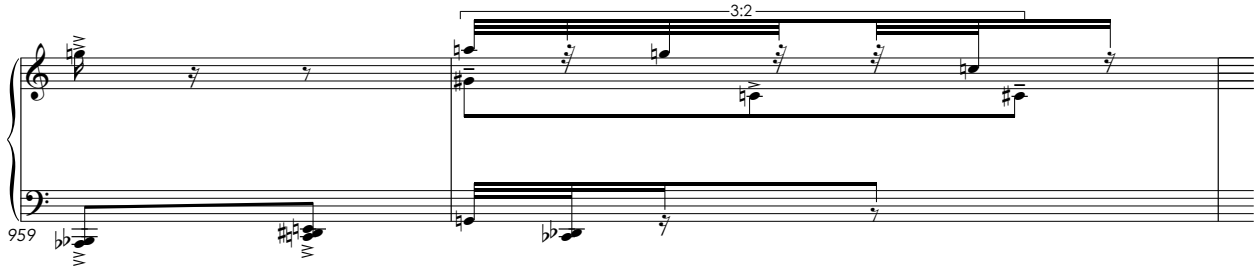

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3:2
941
ff

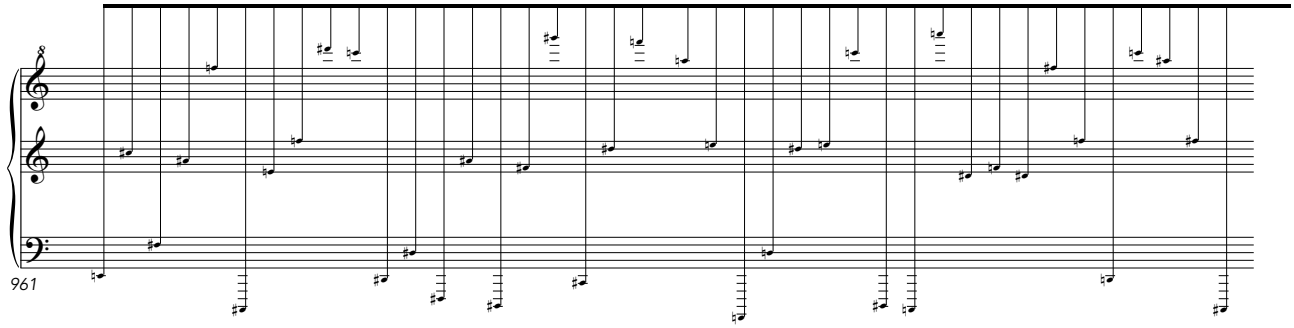

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943


3:2
3:2
945

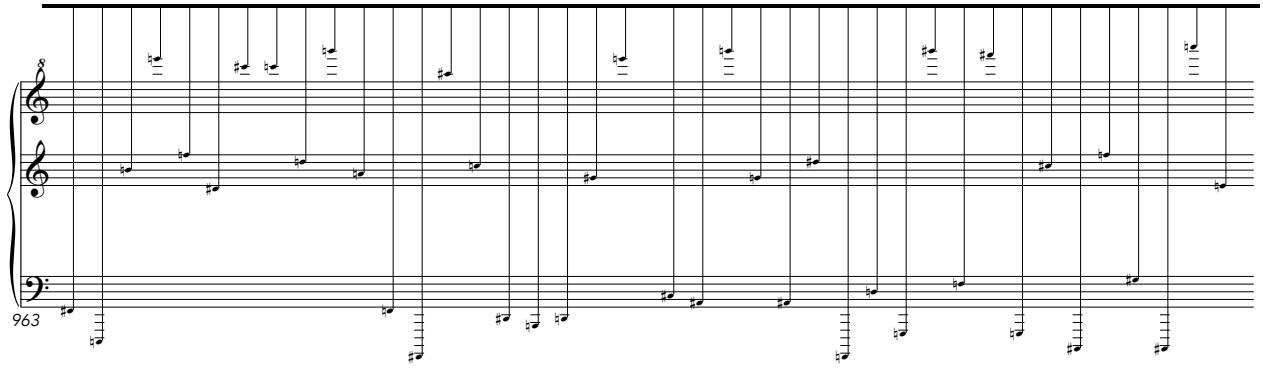

4/8
3/8
fff
mf
8:7
8:7
947
fff
3/8
2/8
ppp
mf
949
ppp
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3:2
953
3:2
955

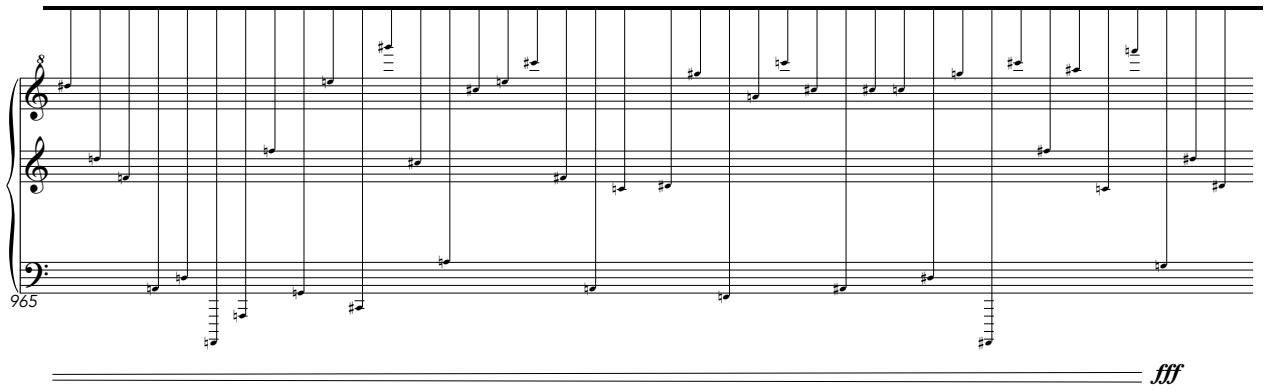


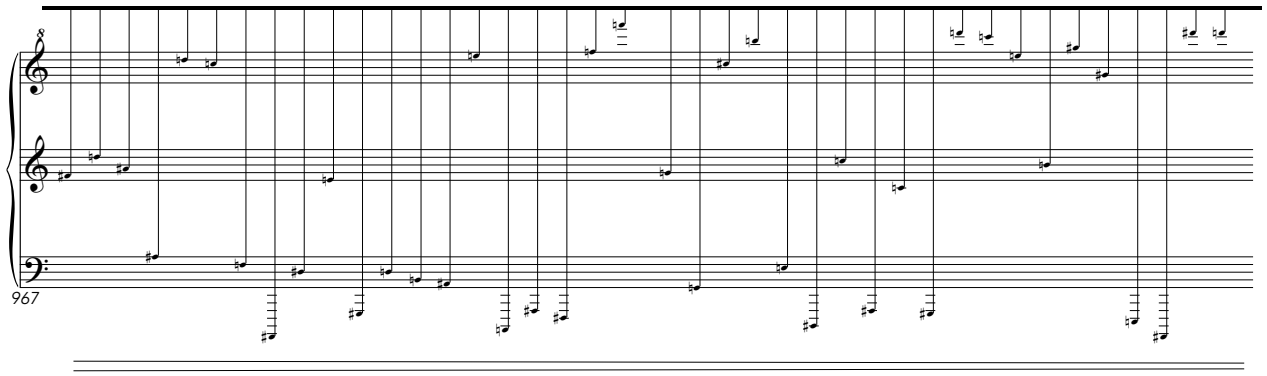


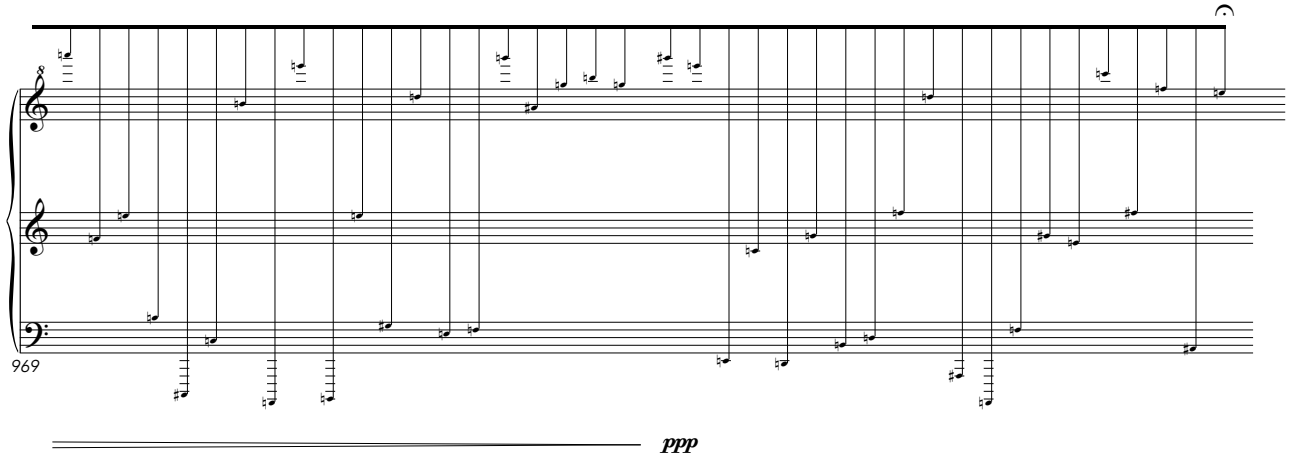


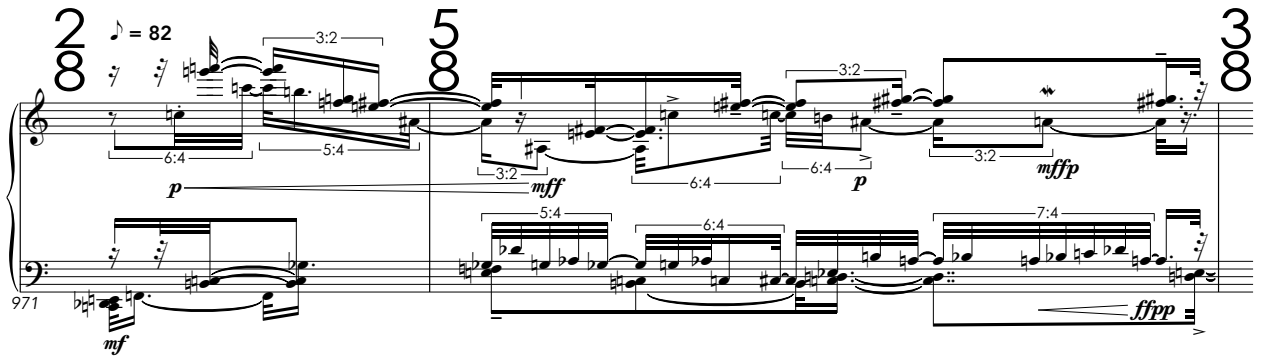
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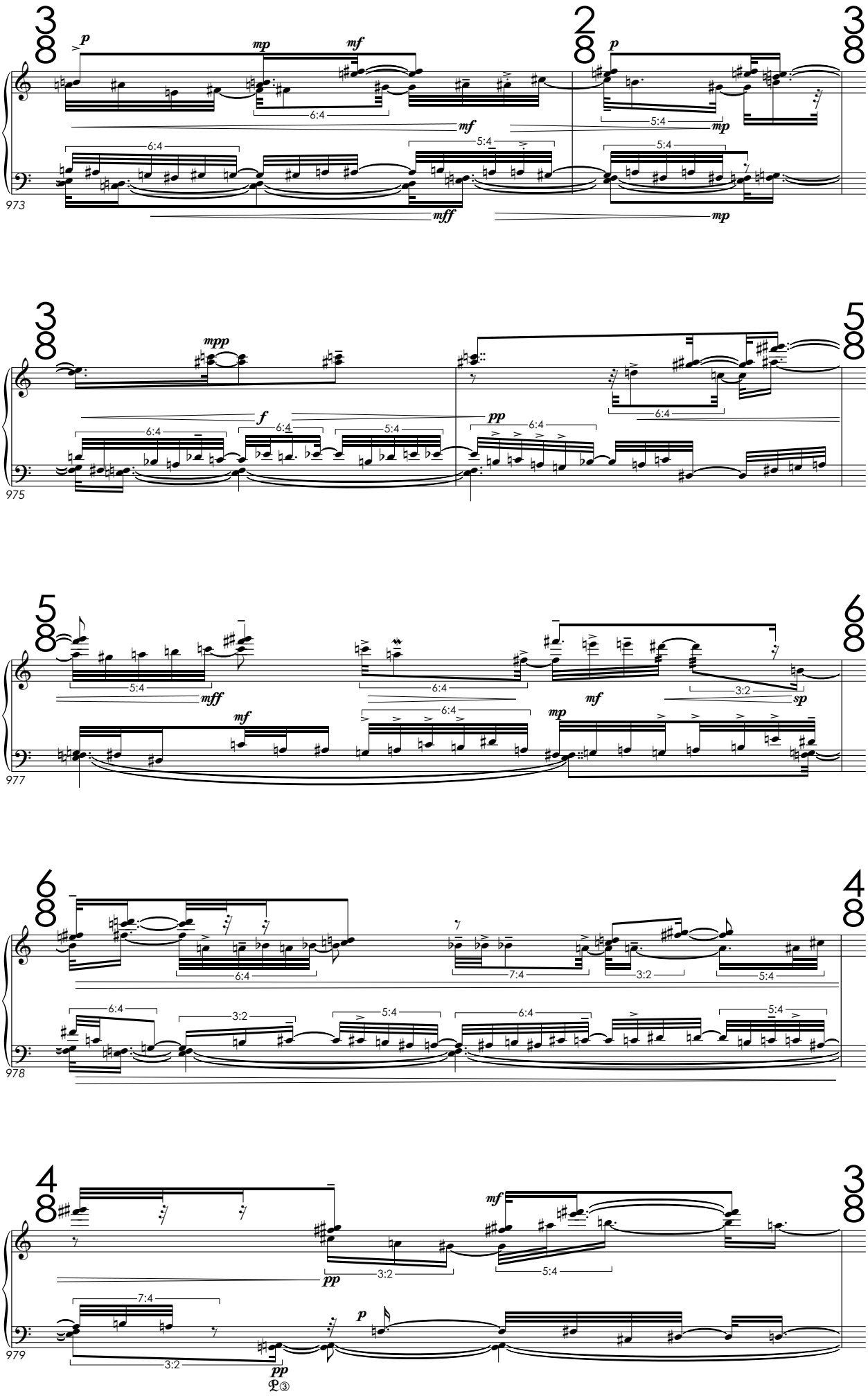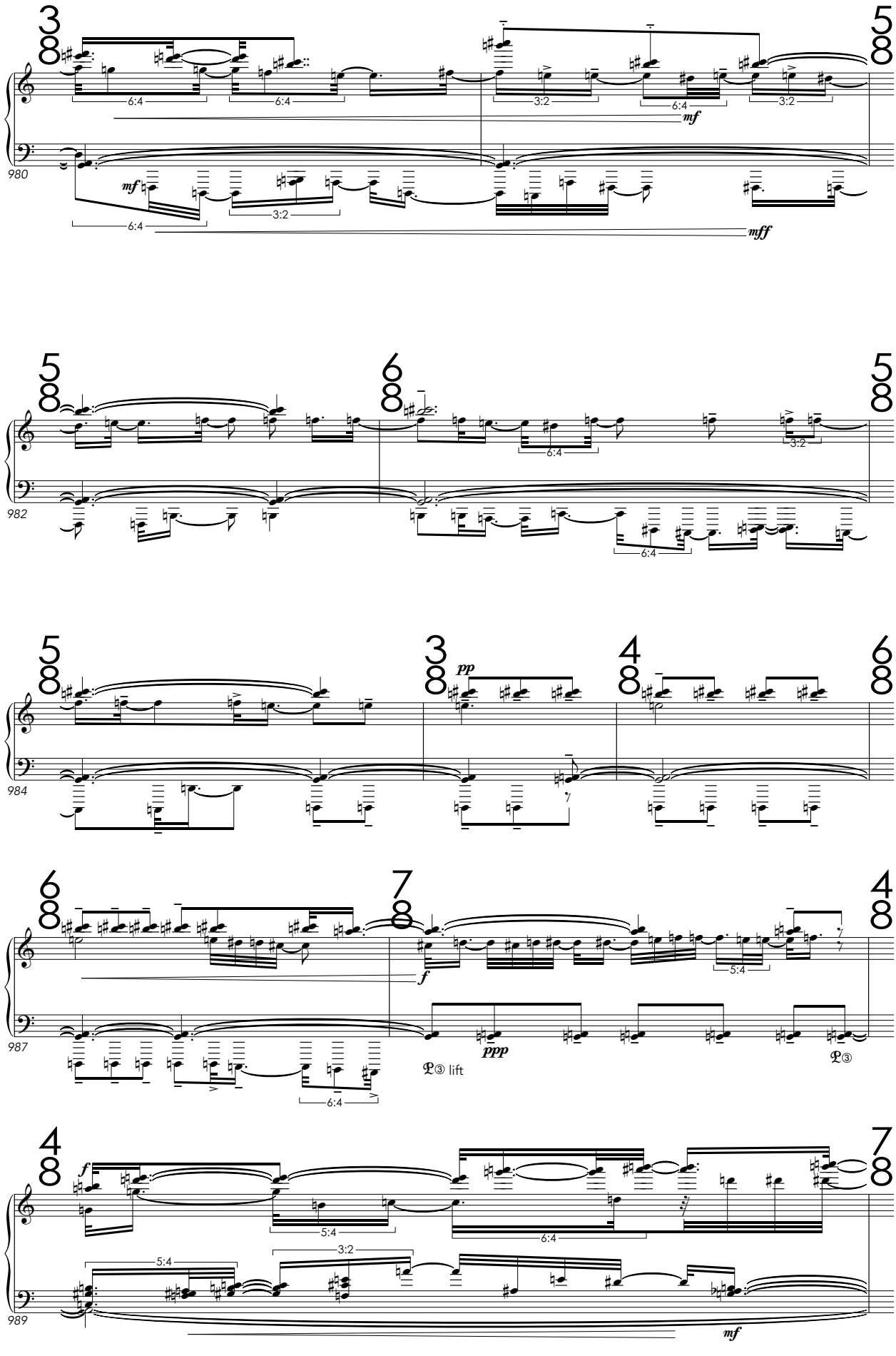



965
fff

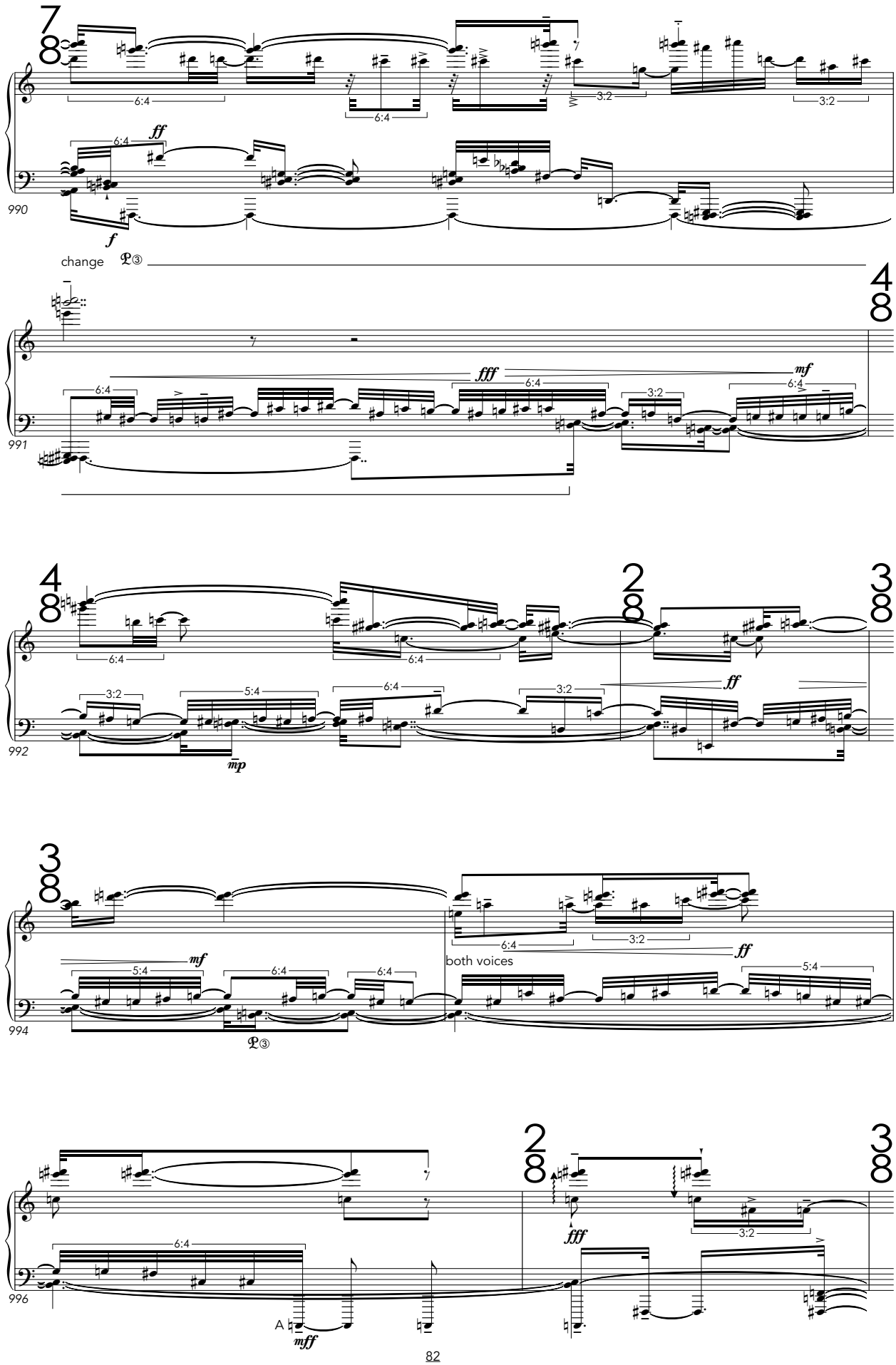

967

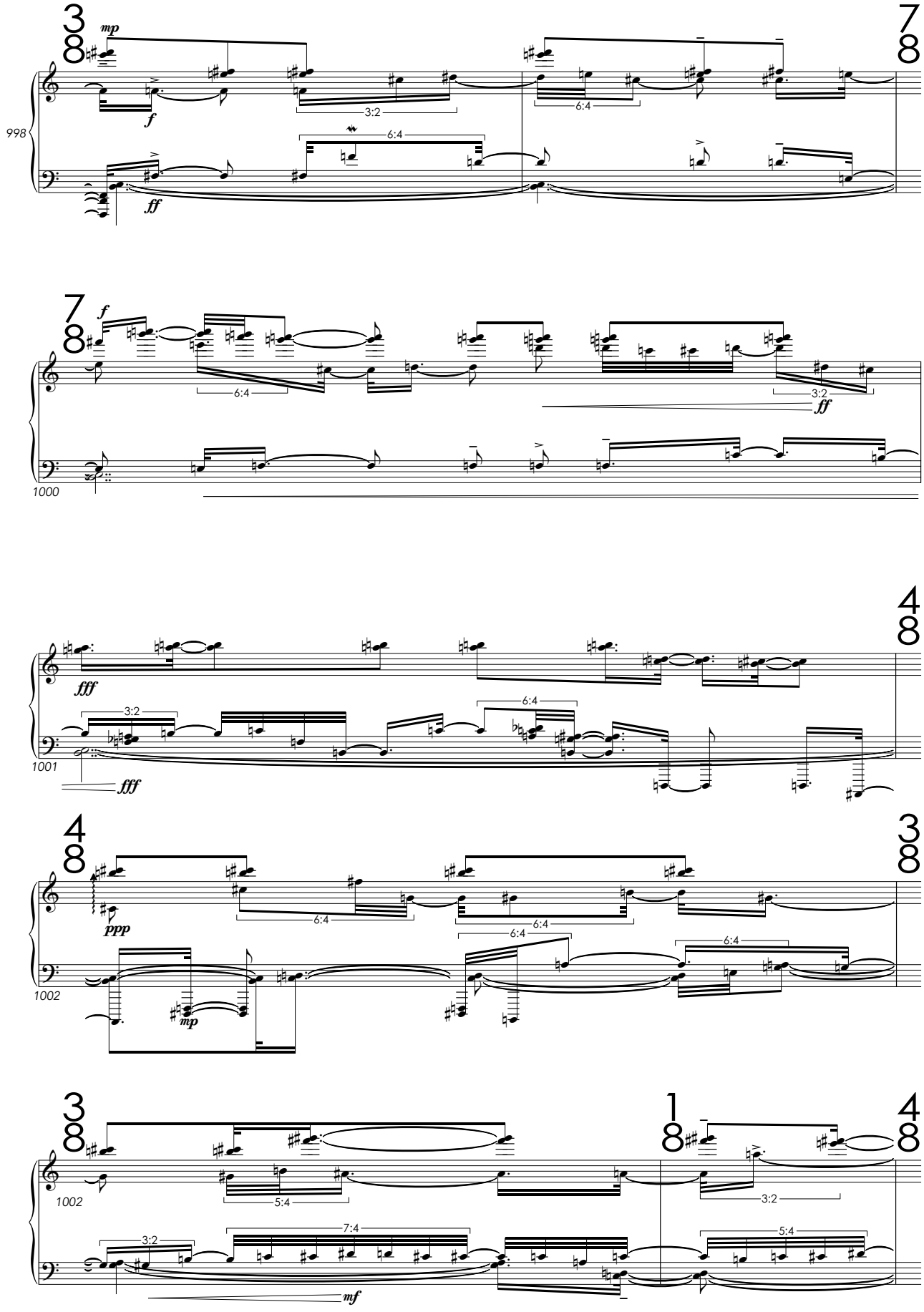

969
ppp

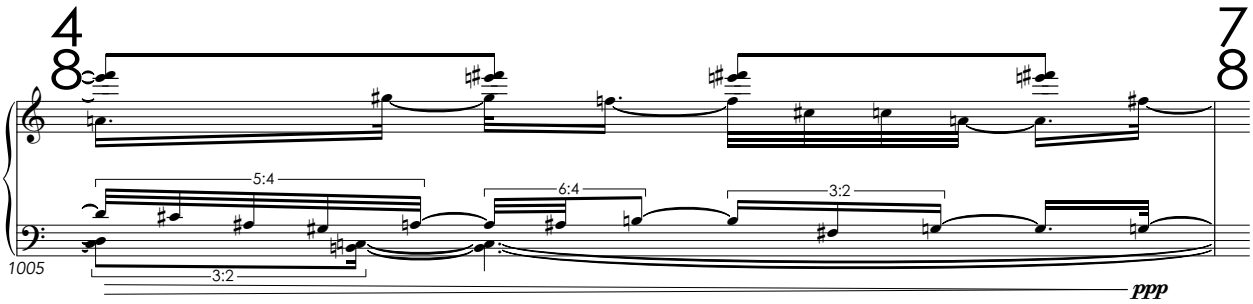

2/8
♪ = 82
3:2
6:4
5:4
p
5/8
3:2
mff
6:4
3:2
6:4
p
3:2
mffp
3/8
971
mf
5:4
6:4
7:4
ffpp

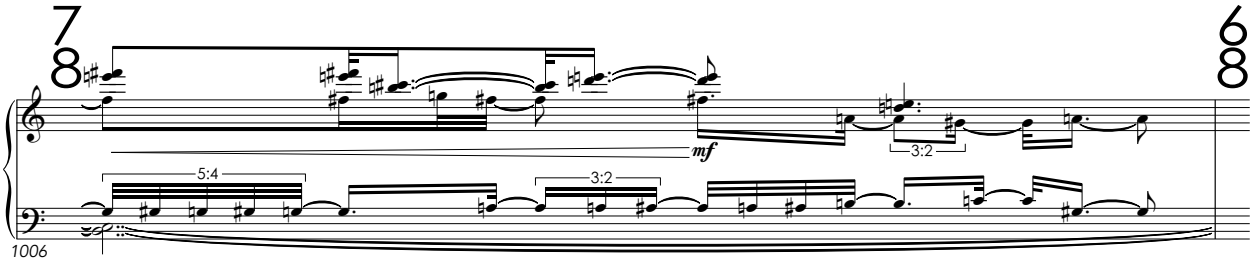

973
975
977
978
979
6:4
5:4
7:4
3:2
p
mp
mf
mff
mpp
f
pp
sp

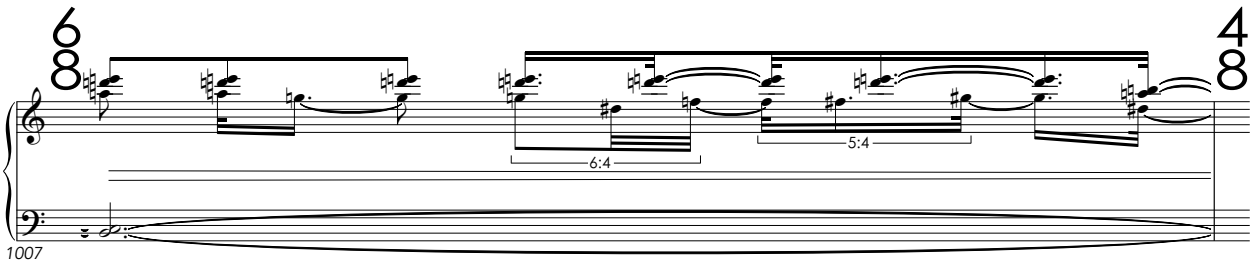

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mff
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984
pp
987
f
ppp
lift
989
f
mf

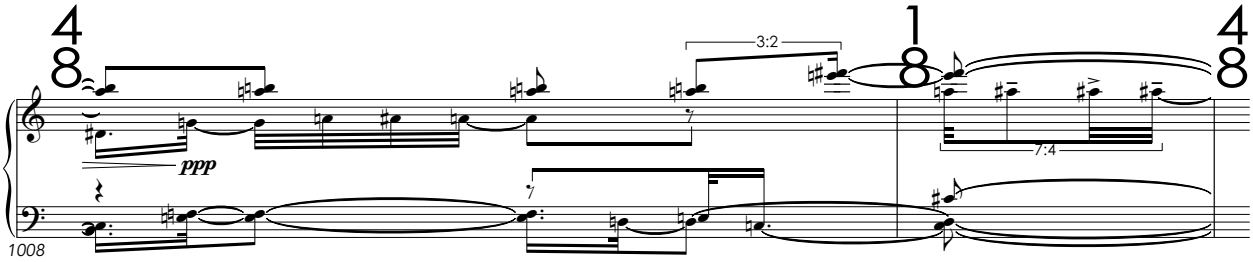

990
991
992
994
996
change
both voices
A

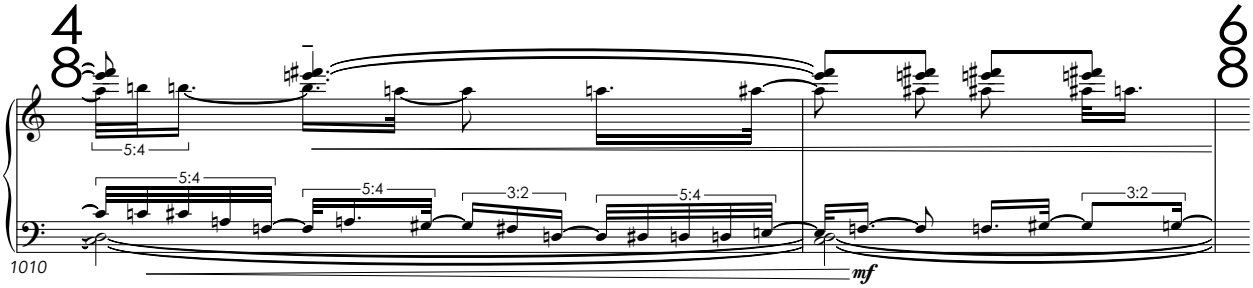

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1002
1002

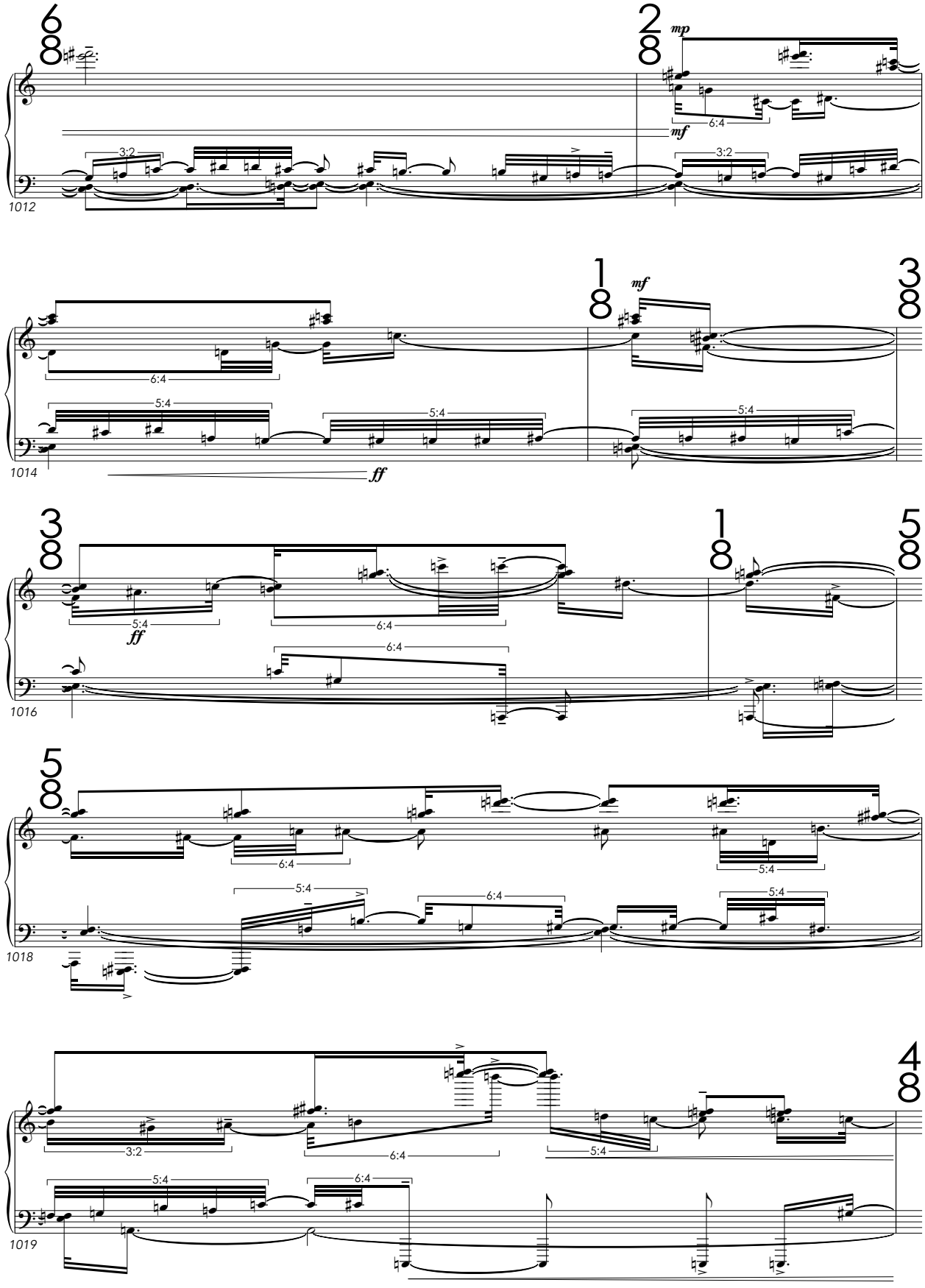

4/8
7/8
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6:4
3:2
3:2
1005
ppp
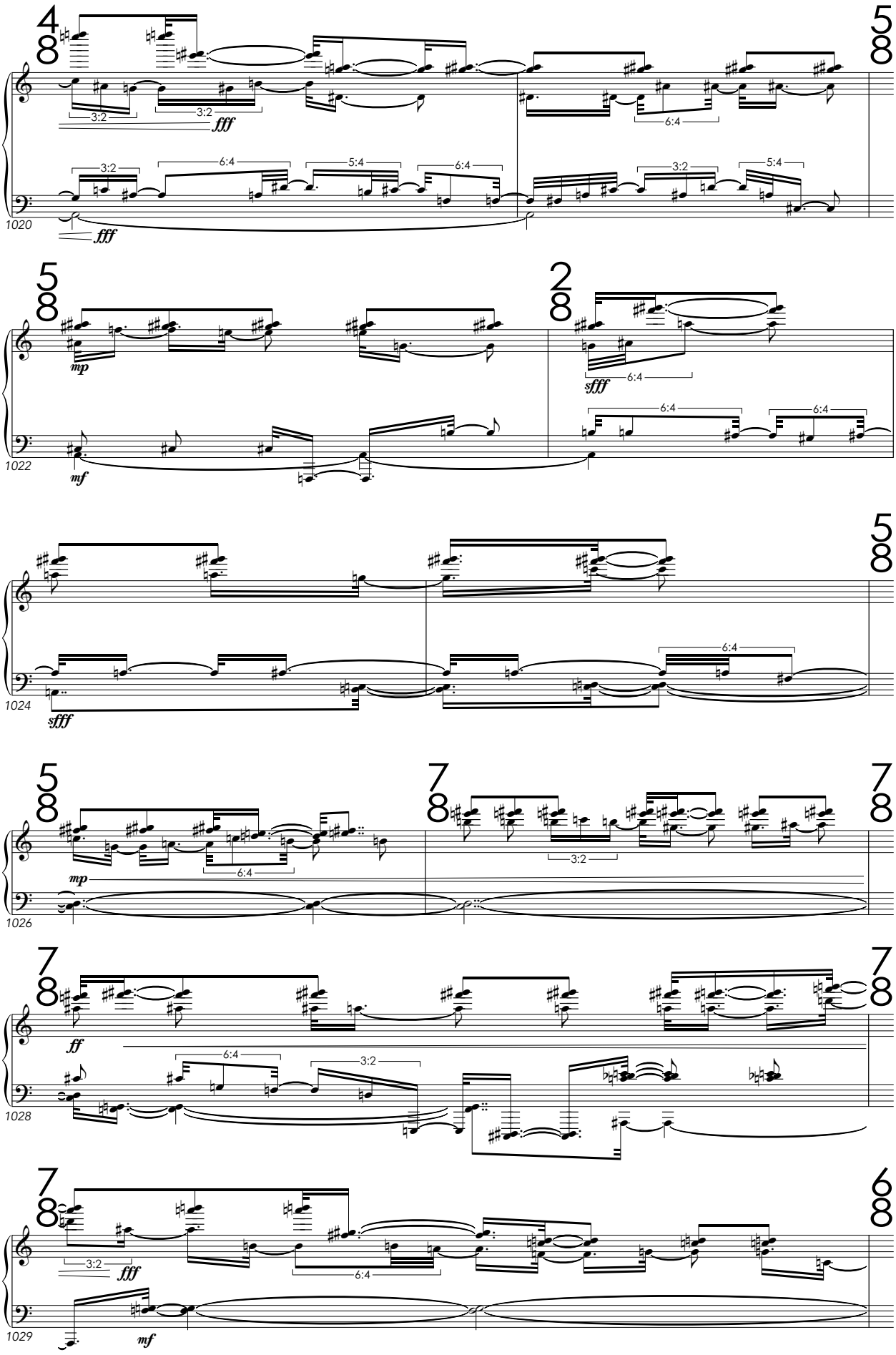

7/8
6/8
mf
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5:4
3:2
1006

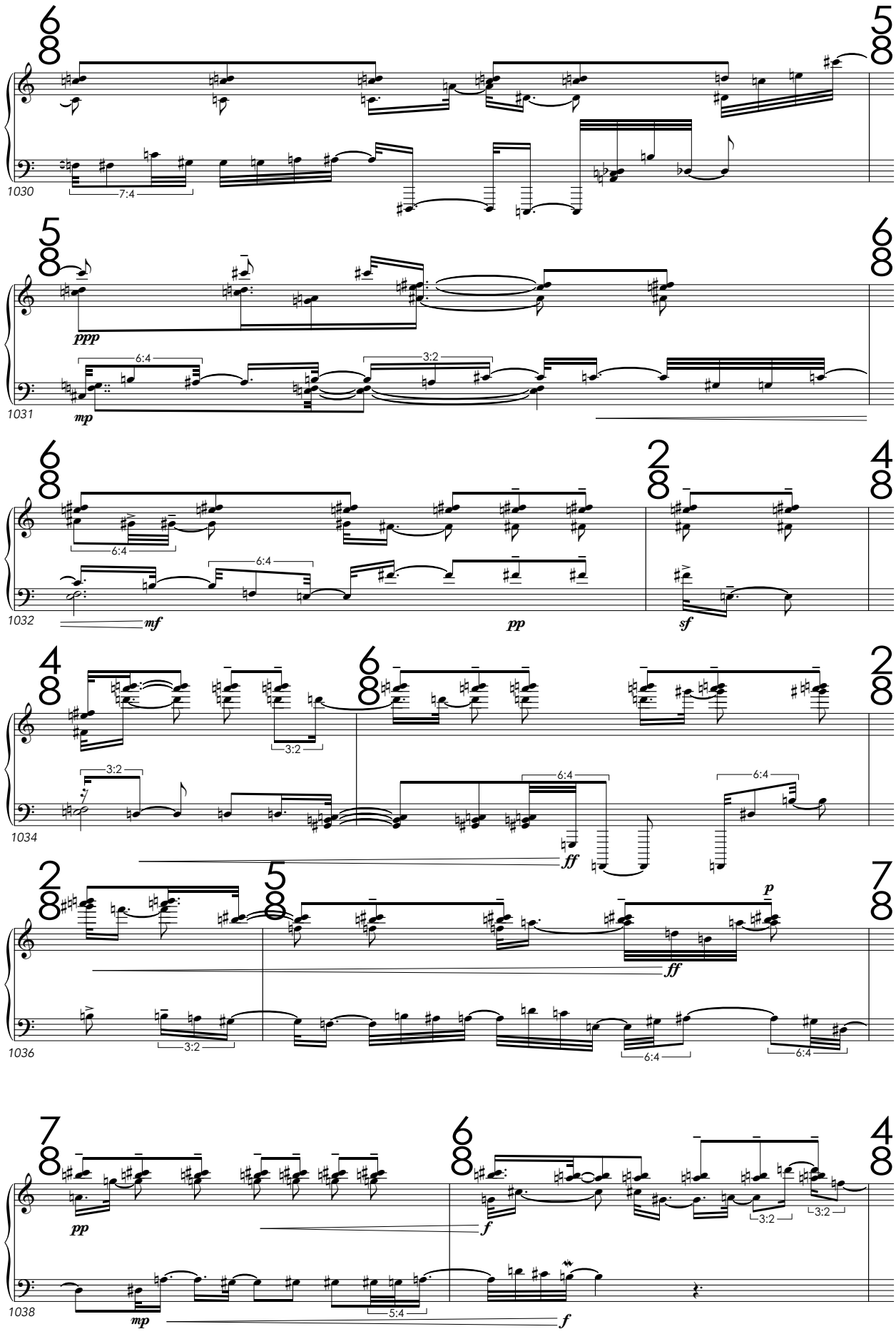

6/8
4/8
6:4
5:4
1007

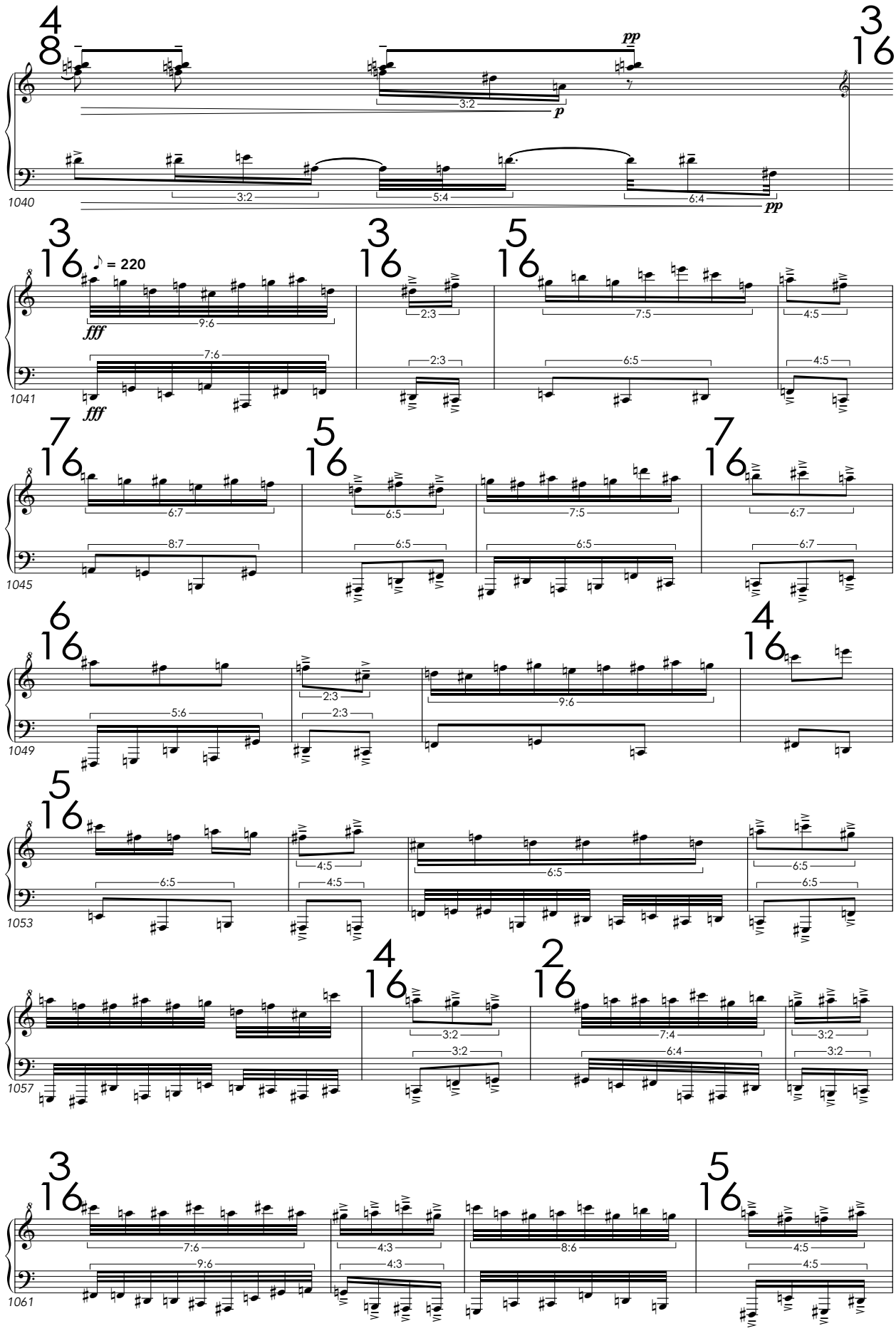

4/8
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4/8
ppp
7:4
1008

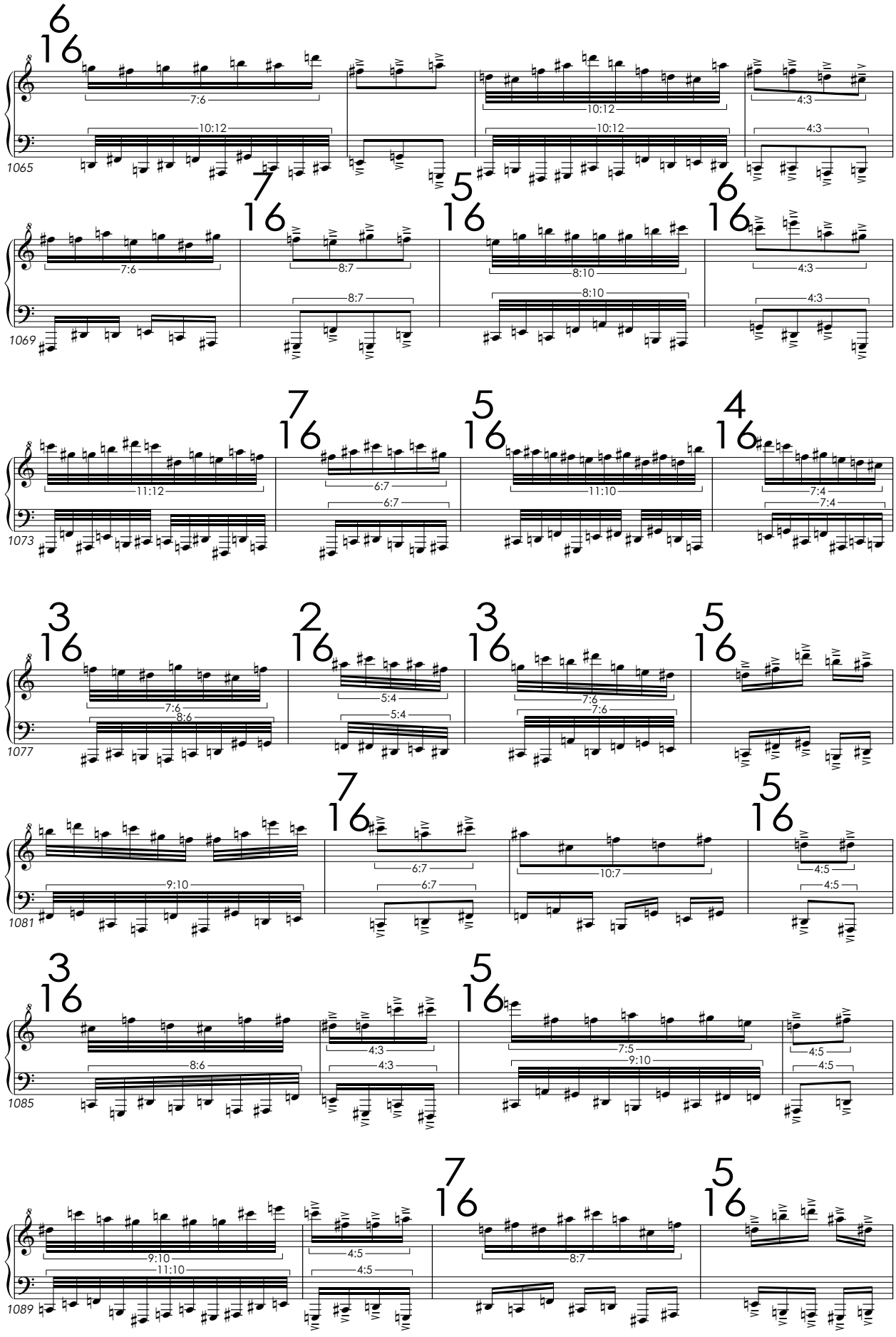

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6/8
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5:4
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5:4
3:2
1010
mf

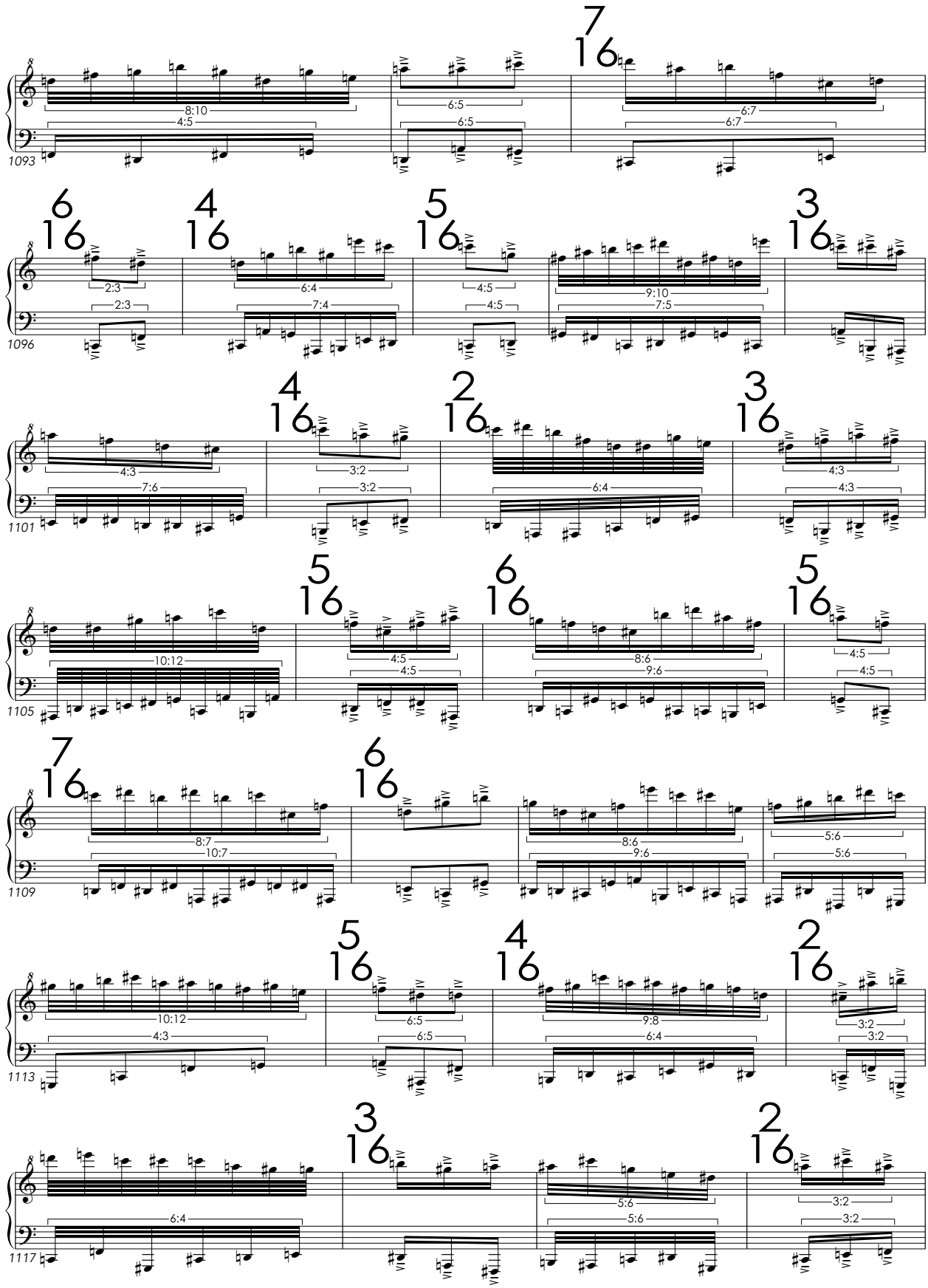

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mf
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6:4
1014
ff
5:4
1016
1018
1019
4/8

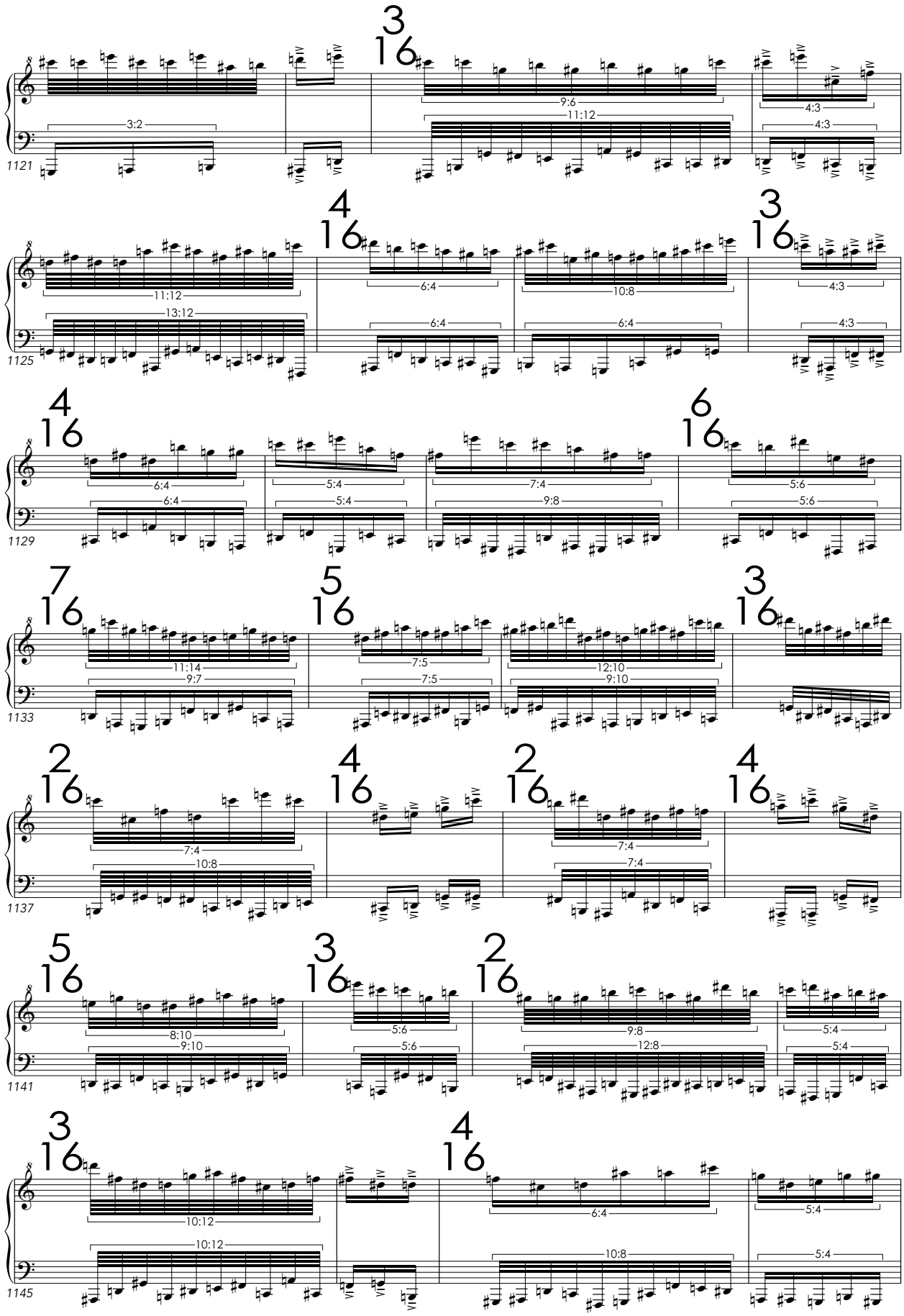

4/8
5/8
3:2
3:2
fff
6:4
1020
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3:2
5:4
fff
5/8
2/8
mp
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6:4
1022
mf
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5/8
7/8
7/8
mp
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7/8
7/8
ff
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3:2
1028
7/8
6/8
3:2
fff
6:4
1029
mf

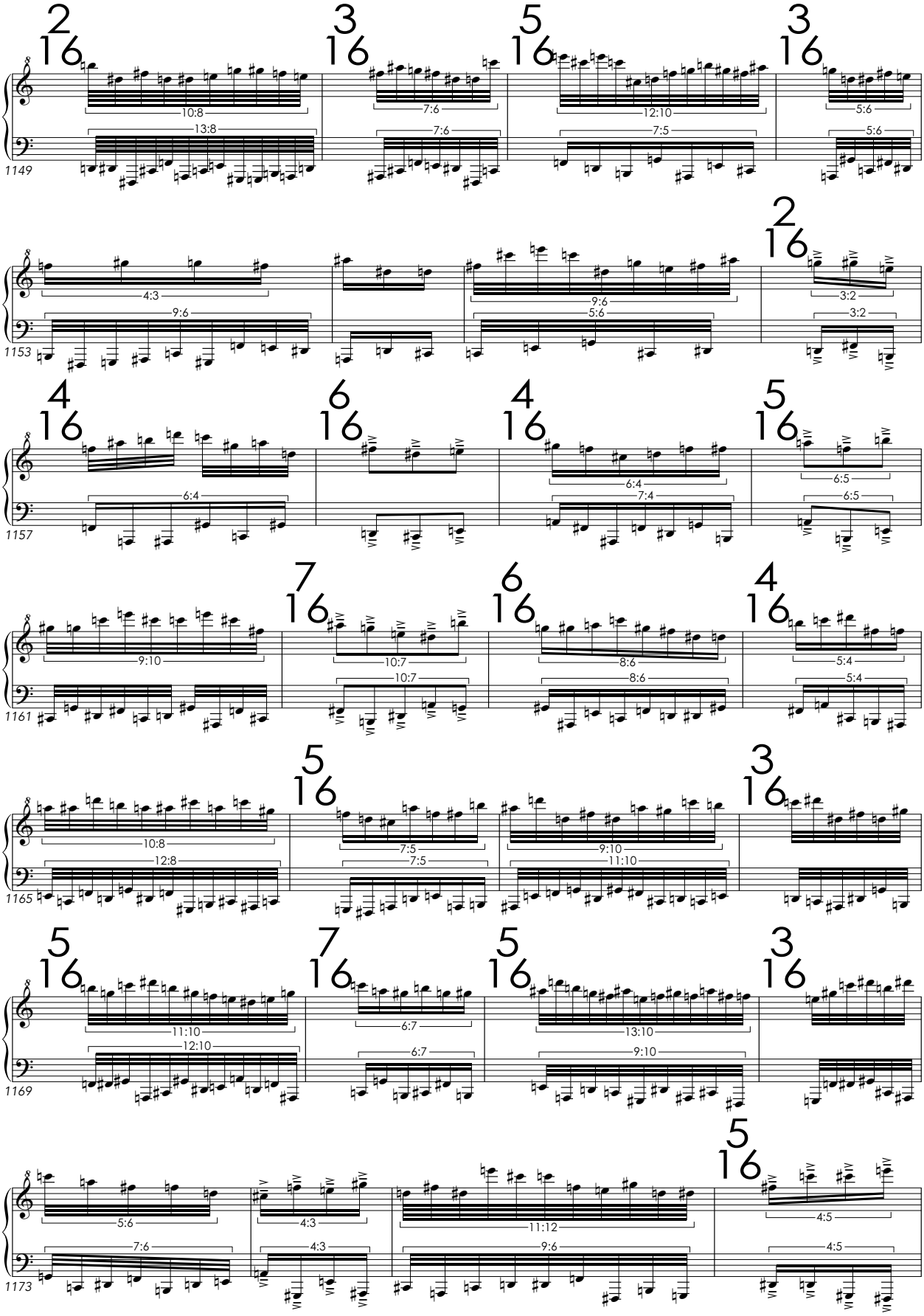

1030
7:4
1031
ppp
mp
6:4
3:2
1032
mf
pp
sf
1034
ff
1036
p
ff
1038
pp
mp
f
f
5:4

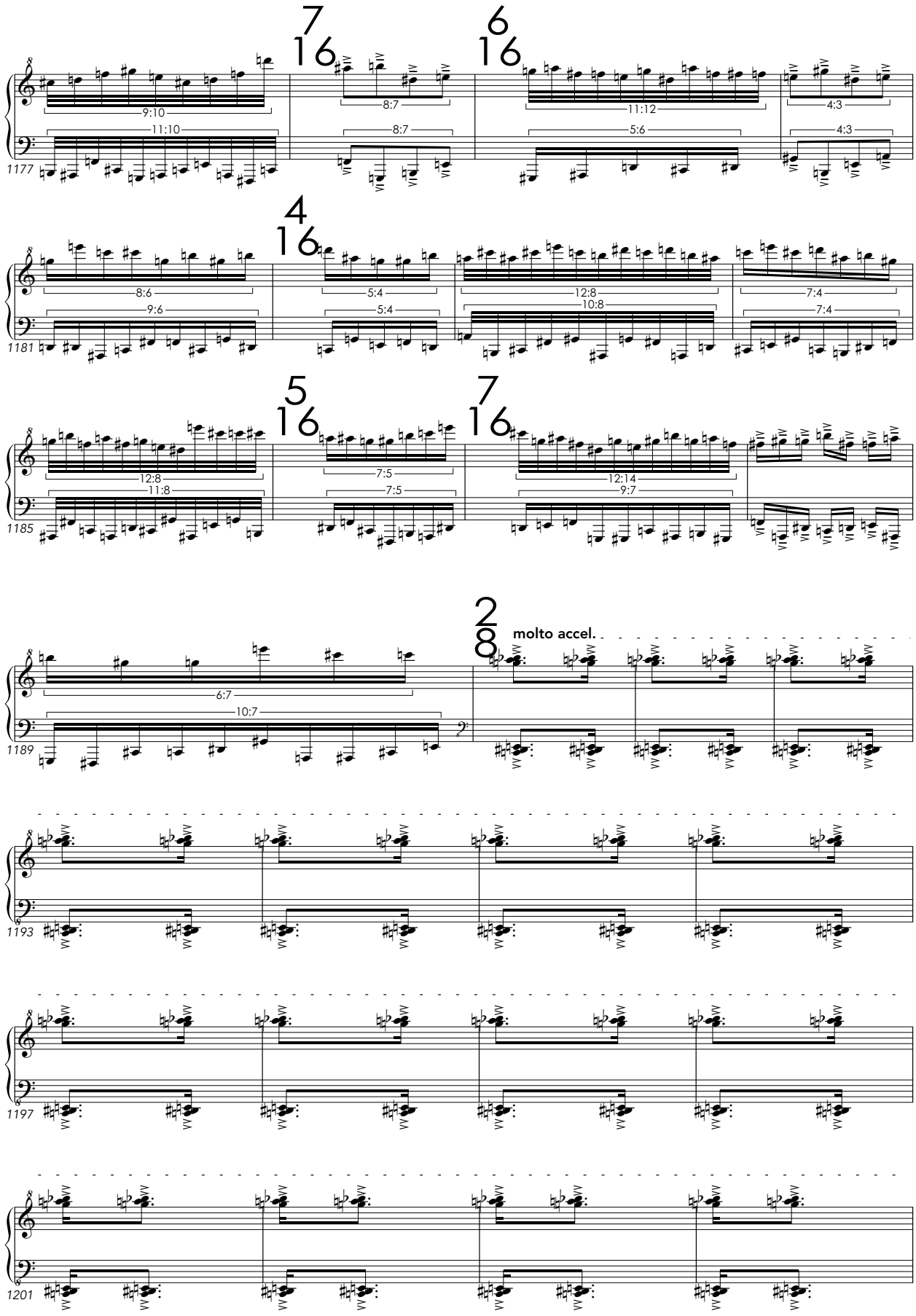

1040
1041
1045
1049
1053
1057
1061
♪ = 220
fff
pp
p

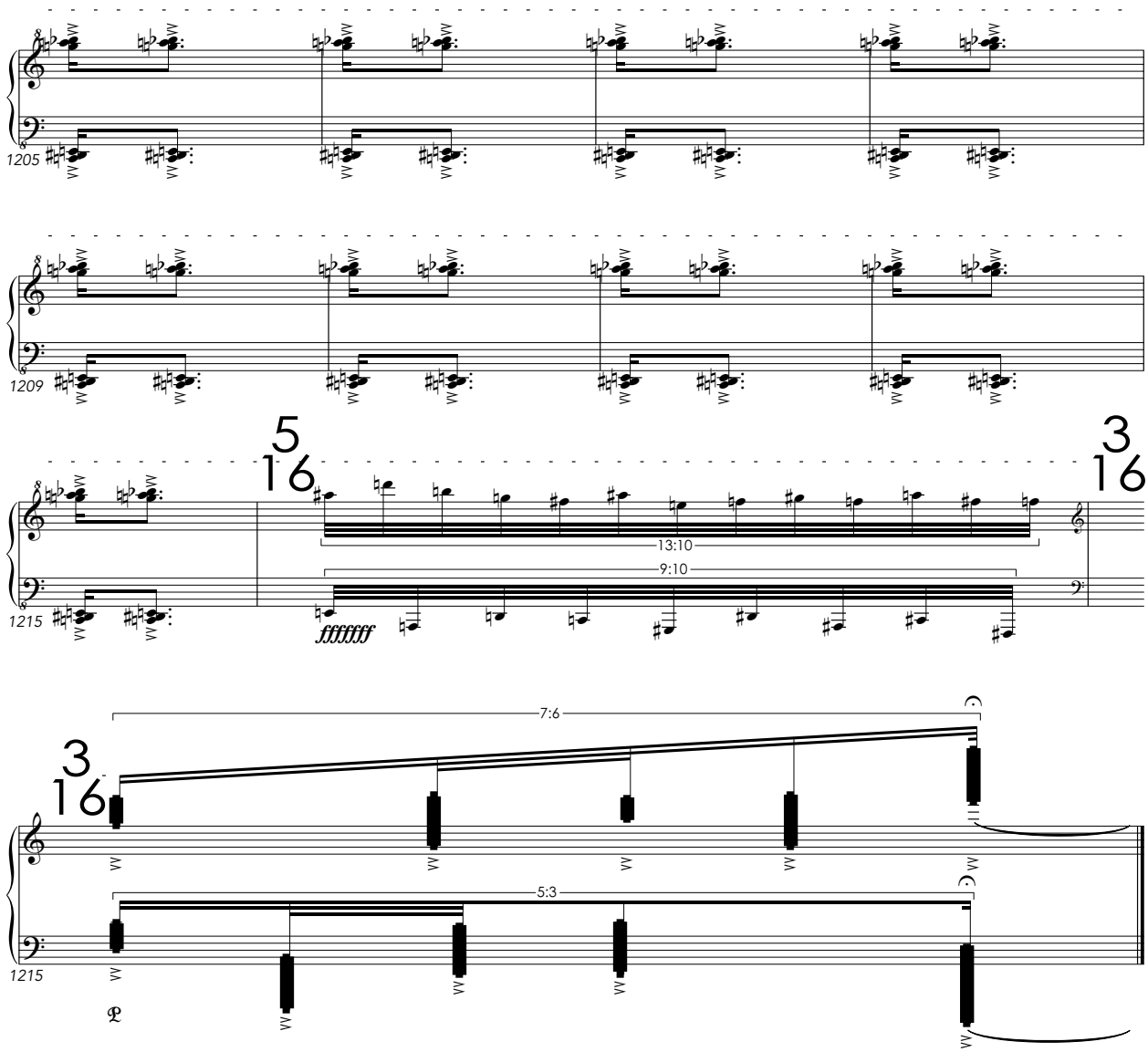

1065
1069
1073
1077
1081
1085
1089


1093
8:10
4:5
6:5
6:5
7/16
6:7
6:7
1096
6/16
2:3
2:3
4/16
6:4
7:4
5/16
4:5
4:5
9:10
7:5
3/16
1101
4/16
4:3
7:6
3:2
3:2
2/16
6:4
3/16
4:3
4:3
1105
5/16
10:12
4:5
4:5
6/16
8:6
9:6
5/16
4:5
4:5
1109
7/16
8:7
10:7
6/16
8:6
9:6
5:6
5:6
1113
5/16
10:12
4:3
6:5
6:5
4/16
9:8
6:4
2/16
3:2
3:2
1117
3/16
6:4
5:6
5:6
2/16
3:2
3:2

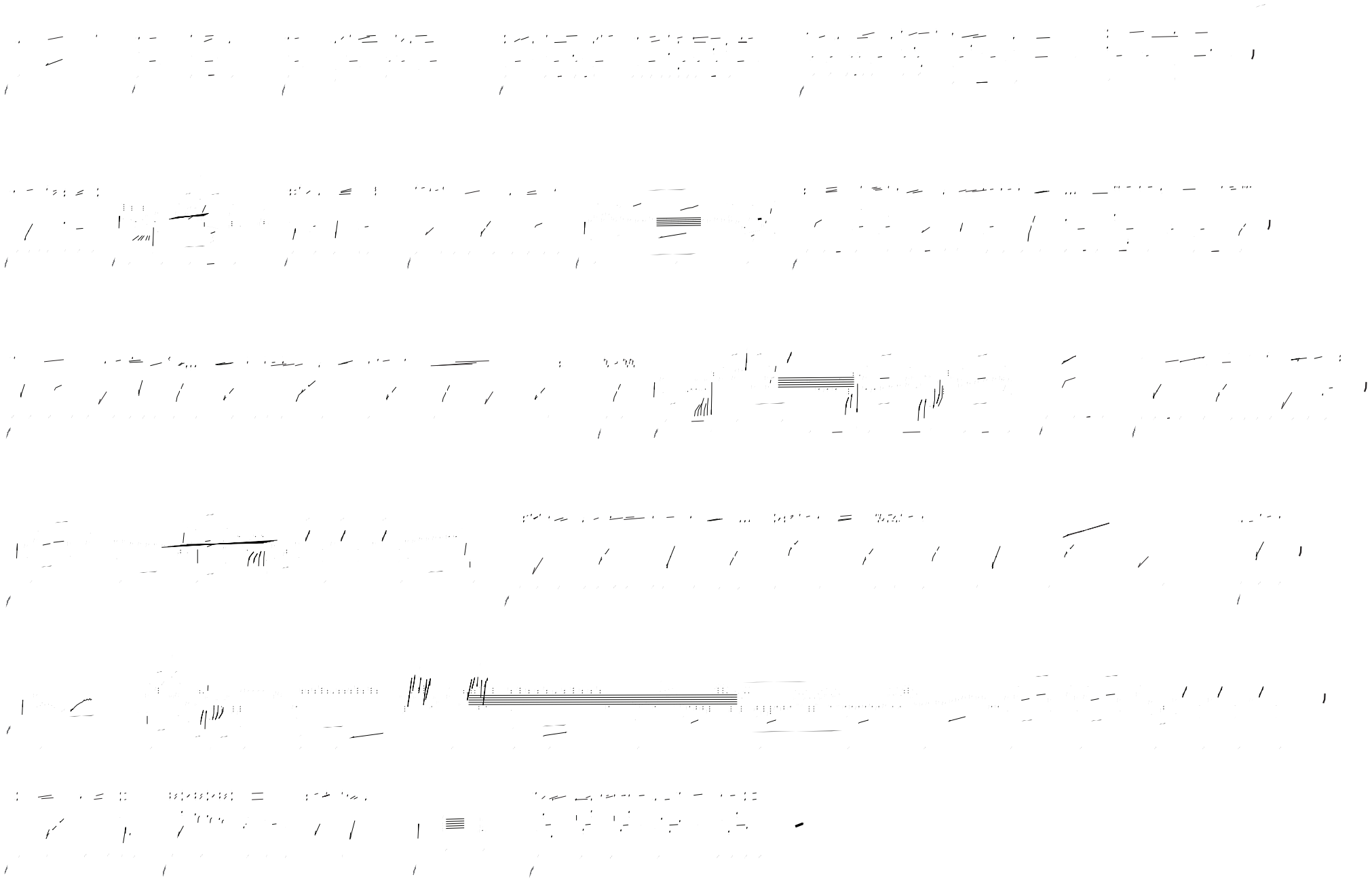

1121
1125
1129
1133
1137
1141
1145

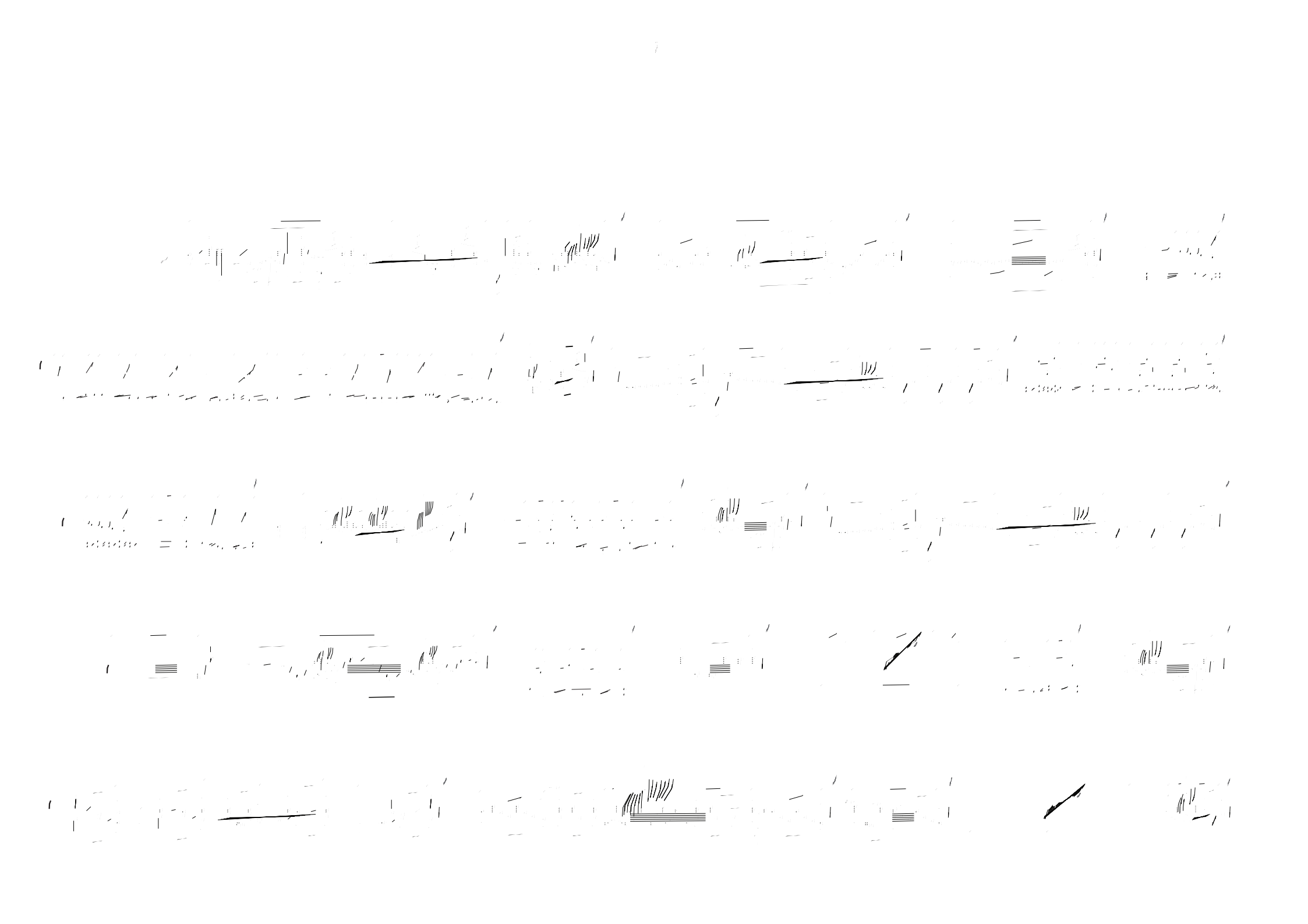

2/16
3/16
5/16
3/16
10:8
13:8
7:6
7:6
12:10
7:5
5:6
5:6
1149
4:3
9:6
9:6
5:6
2/16
3:2
3:2
1153
4/16
6/16
4/16
5/16
6:4
6:4
7:4
6:5
6:5
1157
7/16
6/16
4/16
9:10
10:7
10:7
8:6
8:6
5:4
5:4
1161
5/16
3/16
10:8
12:8
7:5
7:5
9:10
11:10
1165
5/16
7/16
5/16
3/16
11:10
12:10
6:7
6:7
13:10
9:10
1169
5/16
5:6
7:6
4:3
4:3
11:12
9:6
4:5
4:5
1173


7/16
6/16
4/16
5/16
7/16
2/8
molto accel.
1177
1181
1185
1189
1193
1197
1201


1205
1209
5
16
3
16
13:10
9:10
fffffff
1215
7:6
3
16
5:3
1215

Come, from nothing





uncompromisingness with which dogma is held

For Microtonal Oboe

Nigel McBride

For Christopher Redgate.
Dedicated with admiration to my friend, George E. Lewis.

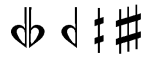
Instrumentation
Redgate-Howarth Microtonal Oboe[1]

Duration of the work
c.45 minutes

[1] See http://21stcenturyoboe.com/Howarth-Redgate-Oboe.php for an overview of this new oboe system.

Accidentals

Accidentals apply only to the pitch they immediately precede.



indicate three-quartertones flat, one quartertone flat, one quartertone sharp, and three quartertones sharp.

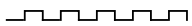


indicate a thirdtone sharp, and two thirdtones sharp.

Timbral modifications

Duration of modifications are indicated with a line emerging from the marking, or until cancelled by another marking, or ord.

ord. : normal playing tone, usual amounts of vibrato.
nv : non-vibrato.
mv : molto vibrato.
rt : rolling tone.[2]
fk : flick-key on for the duration of the note it is above, or for the length of the durational line that accompanies the instruction 'fk'.[3]
flz : flutter-tounge. Sometimes notated as headless stems with a **Z** attached, also accompanied by a precise duration, and an intensity marking (*low, med., high, max.).*
bis. : bisbigliando, to be achieved by whichever method the performer chooses. If a 'true' bisbigliando is not possible, then colour trills in their place are acceptable.
ct. : colour trill.



: fast vibrato produced by forcing air up from the tensed diaphragm in a trembling action of the muscles.[4]



: Smorzando. Embouchure fluctuates with flexible rhythm, following the density of the stems.[5] Some smorzandi are metrically strict, and are annotated with 'r. smorz.' as can be seen on pg. 5-7.



: sing pitch (indicated either on a conventional stave, or with a textual indication) while playing.

: breathe through the instrument without producing a playing tone. Observe the indicated pitch fingering. Vibrato may apply to these pitches (usually to be executed via the wavering of lip pressure, but any method is acceptable).

[2] Cleve, Libby Van. *Oboe Unbound: Contemporary Techniques.* Lanham, MD: Scarecrow, 2004. Print. 71.
[3] See http://21stcenturyoboe.com/Howarth-Redgate-Oboe.php for a description of the flick-key.
[4] Ferneyhough, Brian. *Carceri d'Invenzione IIb.* London: Peters Edition, 1984. i.
[5] Dimpker, Christian. *Extended Notation: The Depiction of the Unconventional.* Berlin: Lit Verlag, 2013. Print. Berlin: Lit Verlag, 2013. Print. 60

All trills are to be executed microtonally, as fast as possible with the nearest quartertone above.

Durational indications

Headless stems are used to provide durational clarity in conjunction with another progress, e.g. to denote the positions of beats in specific passages when accompanying timbral modifications.

: 'short' notehead. This notation is employed to ensure complete distinction between metrical notes with durations, and non-metrical notes. The exact duration of these notes are at the discretion of the performer, but should not usually be shorter than one second.

: 'long' notehead. The exact duration of these notes are at the discretion of the performer, but should not usually be shorter than three seconds.

Tempo indications

Tempo primo refers to a starting tempo that must factor in several considerations:

1. the initial speed must be slow enough to allow for the structural accelerando;
2. the initial speed must not be so slow as to lose the sense of momentum inherent in the material;
3. the accelerando may allow for the material, and the performance, to go 'out of control'.

*As fast as possible** is an indication to the performer to play the section *as fast as they can*. The faster the better, but the articulation of the material is the foremost concern in these passages.

Other notations

: denotes the very highest pitch possible on the instrument. If the pitch is impossible to sustain, then choose the highest sustainable pitch. It does not need to have a traditionally clear or 'beautiful' tone.

: squareheaded grace notes indicate an extreme but momentary tightening of the embouchure around the reed.

x : noteheads denote a key click of the indicated pitch.

M : under or part of a note's stem indicates a multiphonic of the performer's choice, featuring prominently the pitch of the corresponding note.

In contrapuntal passages, the performer must navigate each of the voices as quickly as possible. When one an attack occurs in a new voice then the performer takes up that note, abandoning the previous one. In instances where there is a main voice featuring stems both pointing up and down, this is to act as a reference pitch that is to be returned to in-between onsets in other voices.

When indicated to breathe with a hairpin in the score, the length is indeterminate and at the discretion of the performer. The breaths should be audible, but not affected, i.e not a sigh.

Other considerations

The printed performance score is comprised of pages of different orientations. They must be produced at a minimum size of A3. A page-turner is required. The 'analytic' is bound together, and is not suitable for performance.

Compositional notes

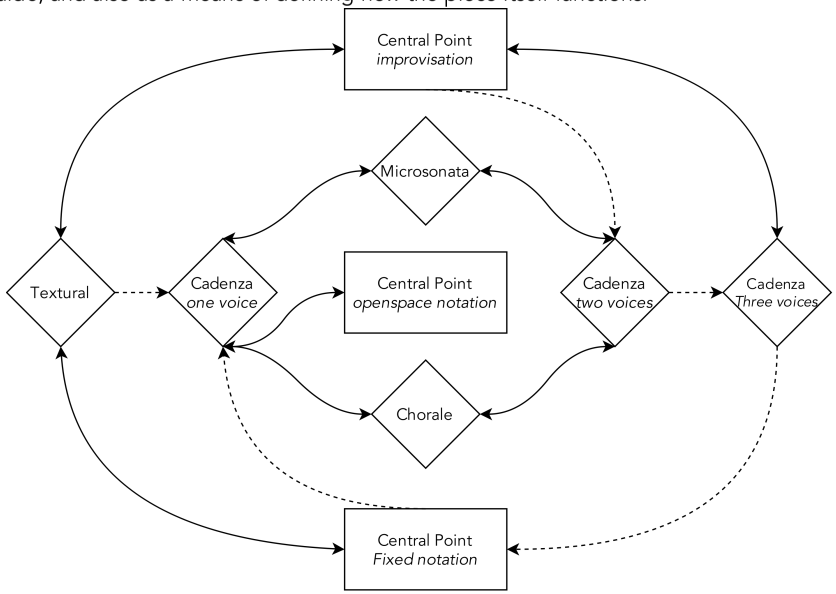
uncompromisingness with which dogma is held is a continuation of earlier work that investigates some primary research questions:

1. What strategies are available and practical in the articulation of highly abstract or novel melodic and harmonic materials;[6]
2. To what extent can material function as a conduit for re-hierarchising the composer-performer dynamic; and
3. How the psychology of notation can both serve as a means of defining material, as well as being a compositional force in itself.

What strategies are available and practical in the articulation of highly abstract or novel melodic and harmonic materials?

This work, as is characteristic of my other outputs, situates itself as an antagonistic 'other' against various kinds of mainstream concert works. This has been achieved previously by situating highly semantically loaded materials from the Canon, and particularly JS Bach – the emblematic shorthand for the musical sublime - against my own material, which in turn is, somewhat unfortunately, itself hopelessly referential of another Canon. In doing so, the two forces in opposition create a narrative of known and unknown, where the historical content's context is subverted by its reframing in the context of a modernist narrative, and the original content is delineated and demarked by the presence of the Canon. In this example, the perception of structure is achieved by contrasting material that is familiar and thus remarkable, with material that is unfamiliar, chaotic, and thusly takes on the guise of 'anonymous'.

However, in *uncompromisingness with which dogma is held* a radically different approach is taken. This work establishes a network of behaviors (to call them sections is overly simplistic), which serve a dual purpose as a compositional aide, and also as a means of defining how the piece itself functions.



[6] My earlier work, *The Perception of Form and Time in the Music of Brian Ferneyhough* (2011), explores many of the issues associated with highly dense and complex music, examining critically which elements of modern compositional technique support and undermine the perception of form and structure in the music of Ferneyhough and others.

In this example, the network is both a model of movement, but also a kind of topological space, in which movement from one kind of behavior to another is constrained, demonstrated in the network by a solid line being traversable in both directions, and a dashed line being traversable in one direction, indicated by the arrow. So it is therefore possible to go to a one voice cadenza from Central Point [fixed notation], but not in reverse. Each of the nodes are proportional in terms of their length. The Central Point node, and its variants are the single most expansive forms, with each of these sections lasting c. 2minutes. The shortest of these behaviors are the cadenza's, lasting 15-30 seconds each. The microsonatas are micro, in so far as they are short, but are sonatas in the later Cageian sense of functioning like 'a piece', as opposed to a historical form. As this network is naturally weighted by its construction, it was possible, and ultimately most natural, to allow the form to be generated automatically.[7] In doing so, the natural proportions and the topology of the network can be allowed to emerge by unbiased means.[8]

By viewing each node as a kind of behavior, as opposed to a distinct material itself, it allows for the emphasis to be removed from the material and to be placed on what the material does. As one might expect, cadenzas are short florid passages, in one, two, or three voices; microsonatas have highly individualistic characteristics, and so on. This form is designed to aid in the perception of how the material behaves as a means of understanding the structure, without relying on more traditional or historical modes of interpretation to perceive the content.

To what extent can material function as a conduit for re-hierarchising the composer-performer dynamic?

This work is the fruit of an intense period of collaboration with a specific individual. As such, the notation is a response to the abilities and creativity of the performer for whom it is written. Much of the material is characterised by exisiting to invite the performer into the creative process – acting not as a stand-in composer, but as a co-arbiter of how the material is projected. Consequently, much of the work's tension arises from the palpable dialectic of control between the performer and the composer. This is achieved in a number of ways:

As in the *openspace* portions of the work, the tempo and pacing are chosen and defined by the performer.

In the sections where multiple layers of activity are colliding with each other, or even simultaneously, the performer is required to exercise creative control as to how those technical and musical challenges are to be resolved.

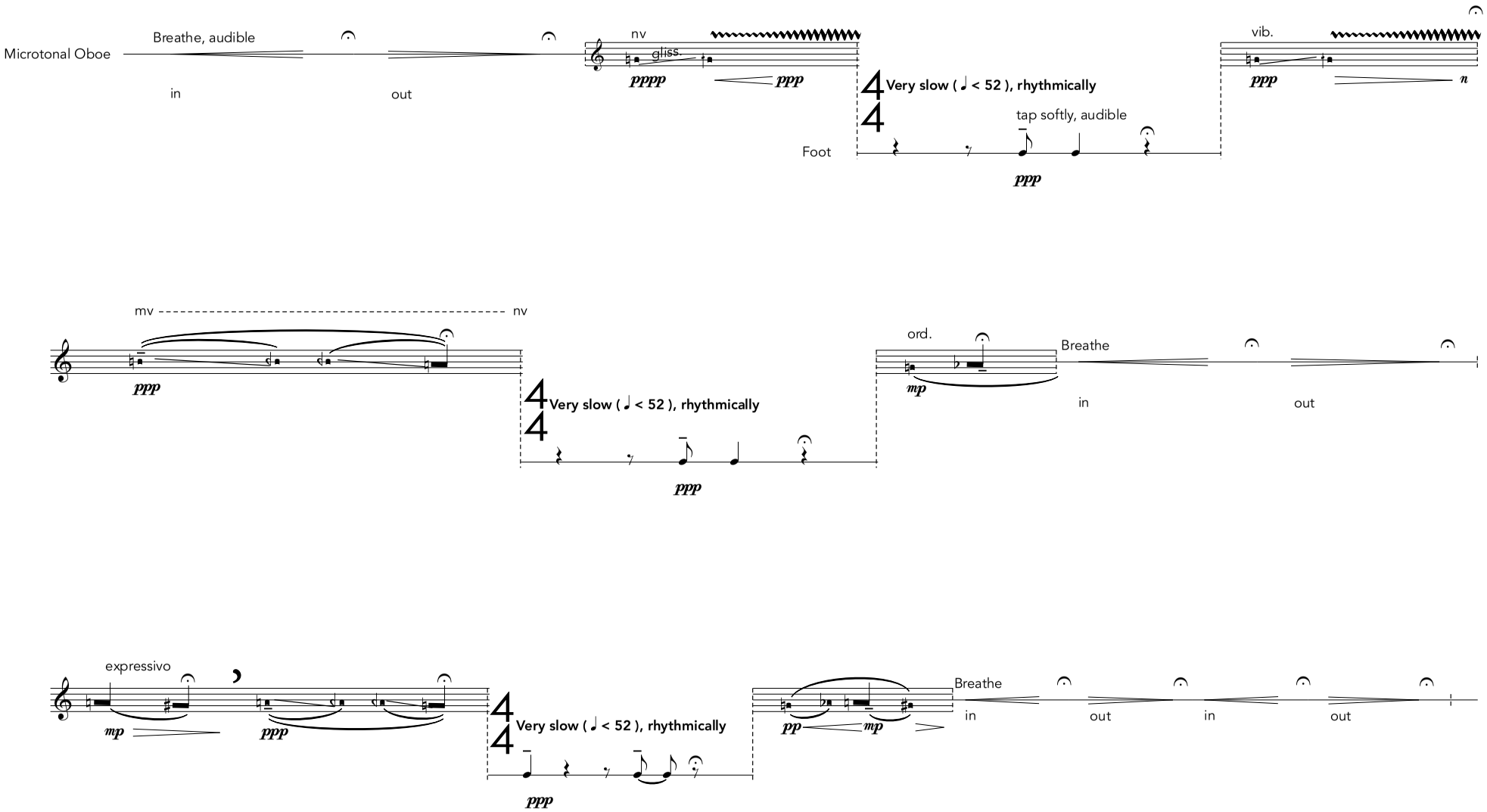
In the section marked *improvisation*, the performer is given a musical skeleton in which they are able to populate quite freely with ornamentations and figurations.

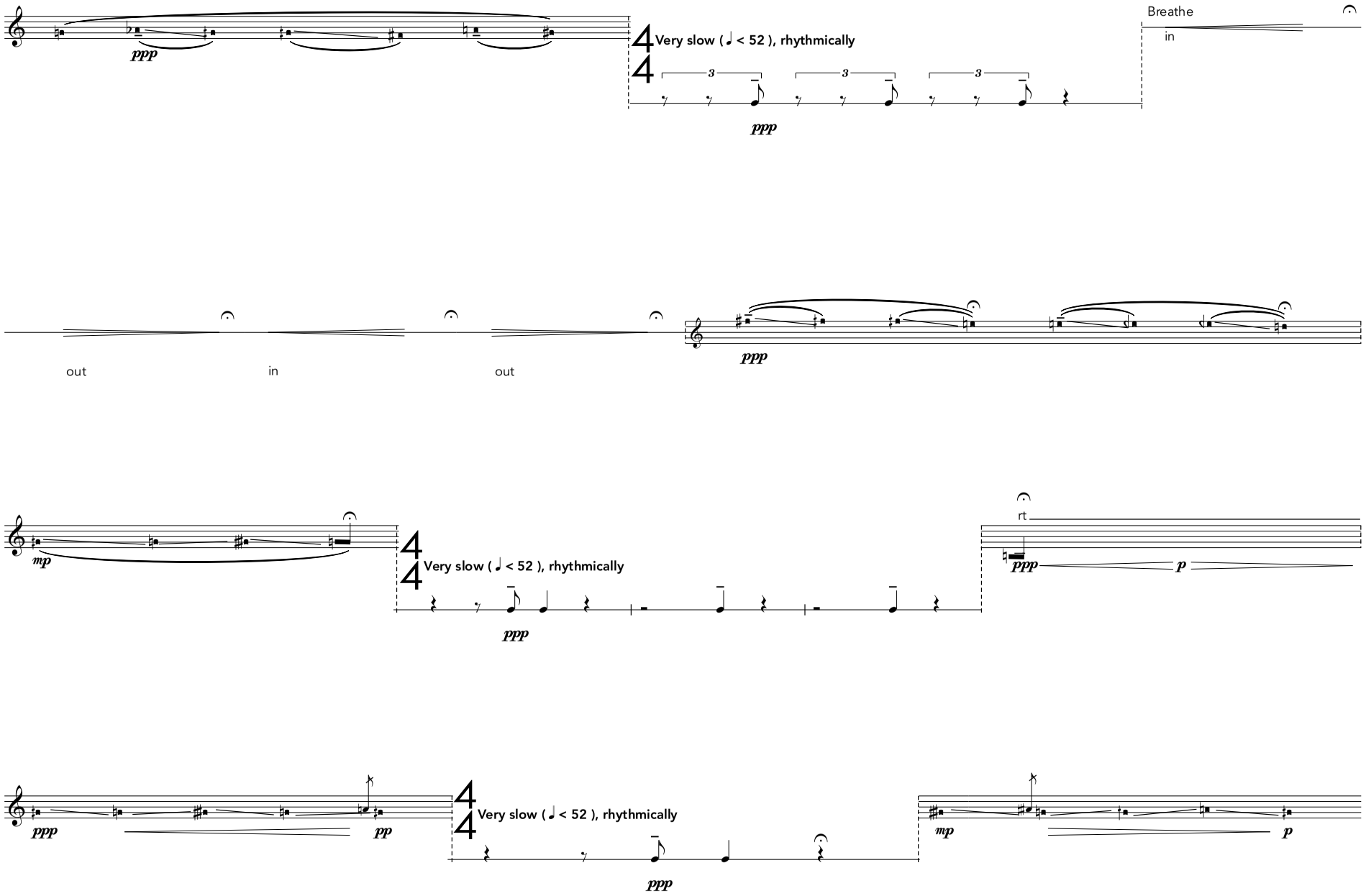
How the psychology of notation can both serve as a means of defining material, as well as being a compositional force in itself?

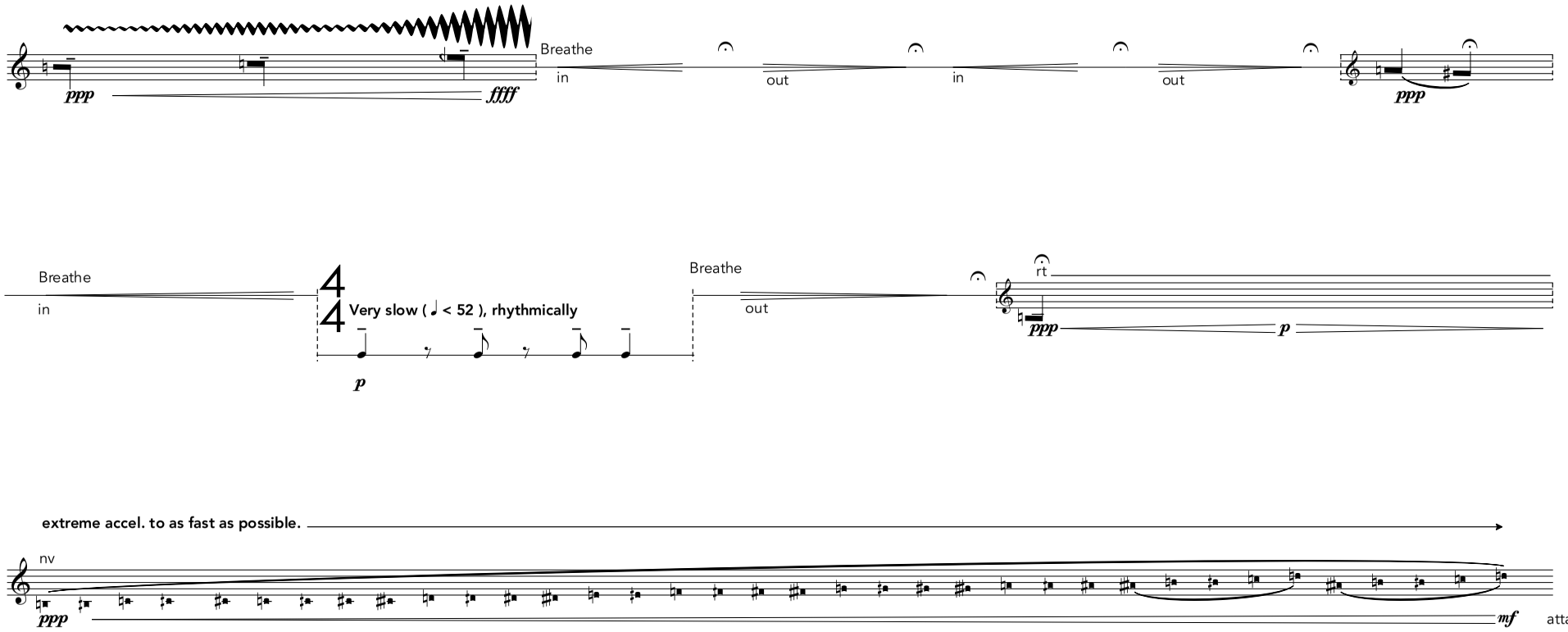
It is widely understood in practice today that the notation and presentation of material can itself be an active force in interpretation, and thus the resulting musical performance is defined and coloured by these characteristics. This work seeks to capitalise on this practice by making use of multiple kinds of notation as a means of altering the timbre of the performance itself. This is demonstrated most clearly in the Central Point [fixed notation] portion of the work, which seeks to emulate the expansiveness implied by the notation of the other Central Point sections through strict and detailed metric notation. The ensuing performance of such moments will be both audibly and musically distinct.

[7] By virtue of the network, each node has a weighted probability of being randomly selected by a constraint system. Cadenza [one voice] is reachable from five discreet nodes, as where the Choral node is only reached from two other nodes.

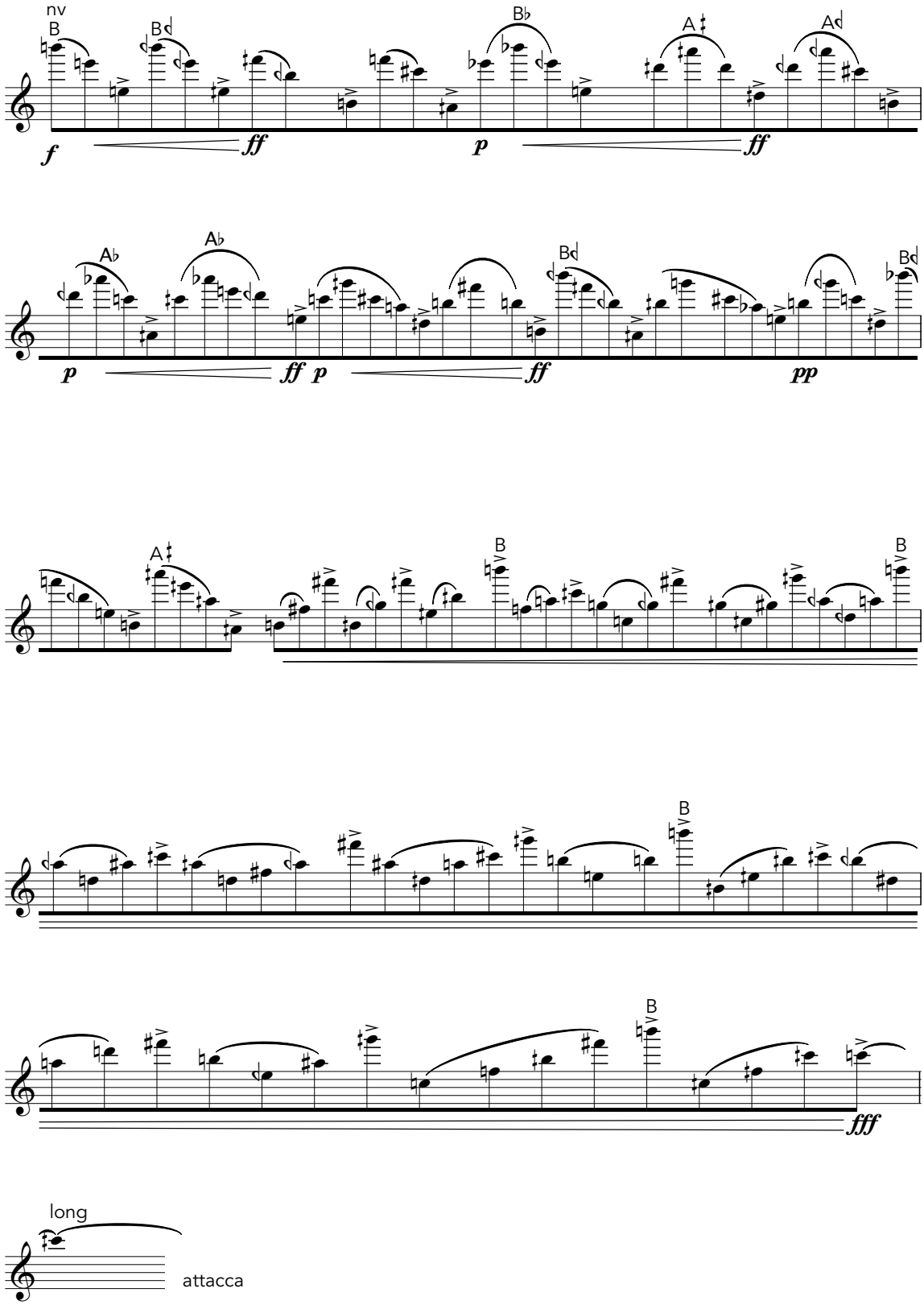
[8] The generation process was still auditioned to ensure that a satisfactory form, one that presents ample variety and interesting movement, was achieved.
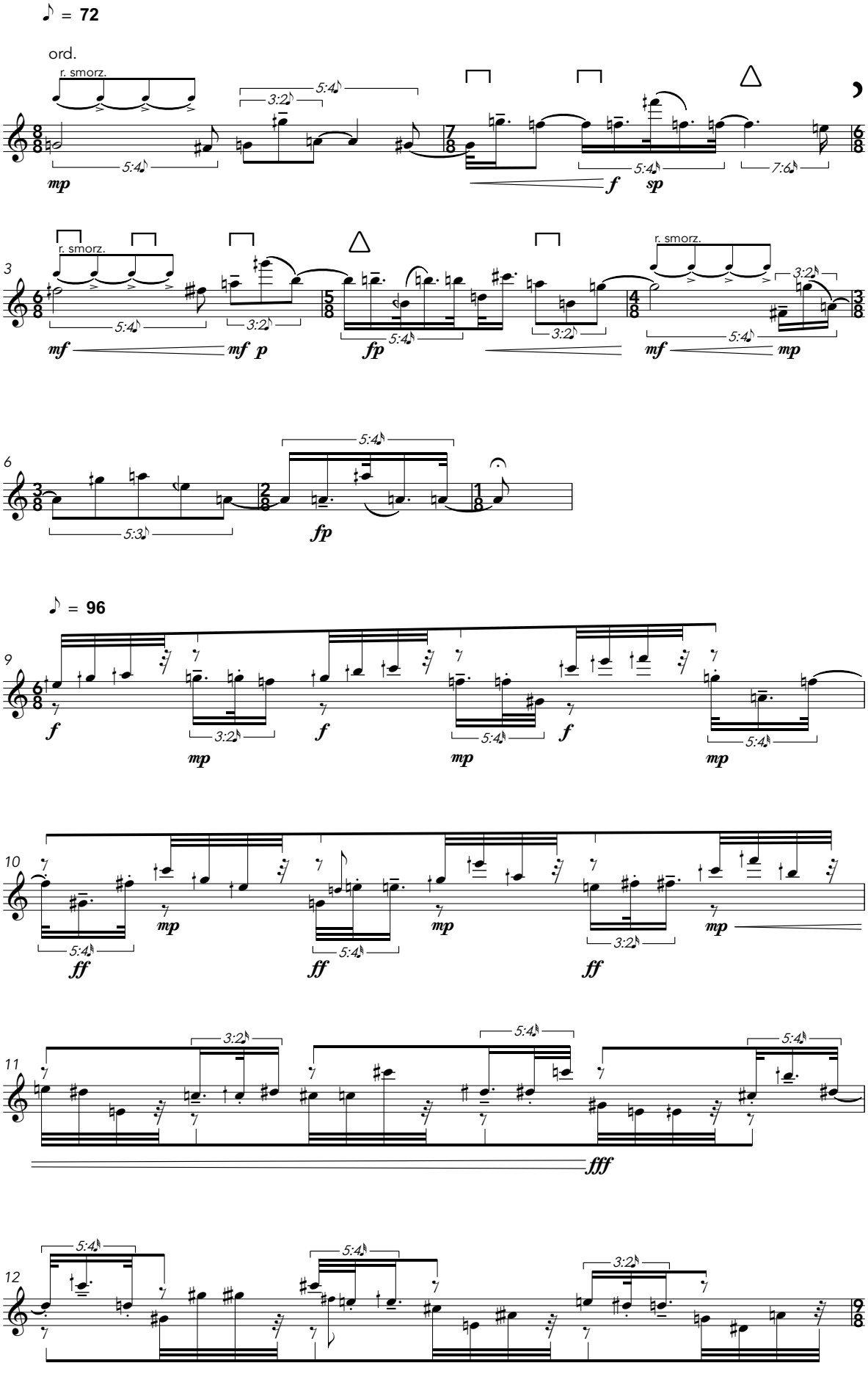

Microtonal Oboe
Breathe, audible
in
out
nv
gliss.
pppp
ppp
4
4
Very slow (♩ < 52), rhythmically
tap softly, audible
Foot
ppp
vib.
ppp
n
mv
nv
ppp
4
4
Very slow (♩ < 52), rhythmically
ppp
ord.
mp
Breathe
in
out
expressivo
mp
ppp
4
4
Very slow (♩ < 52), rhythmically
ppp
pp
mp
Breathe
in
out
in
out
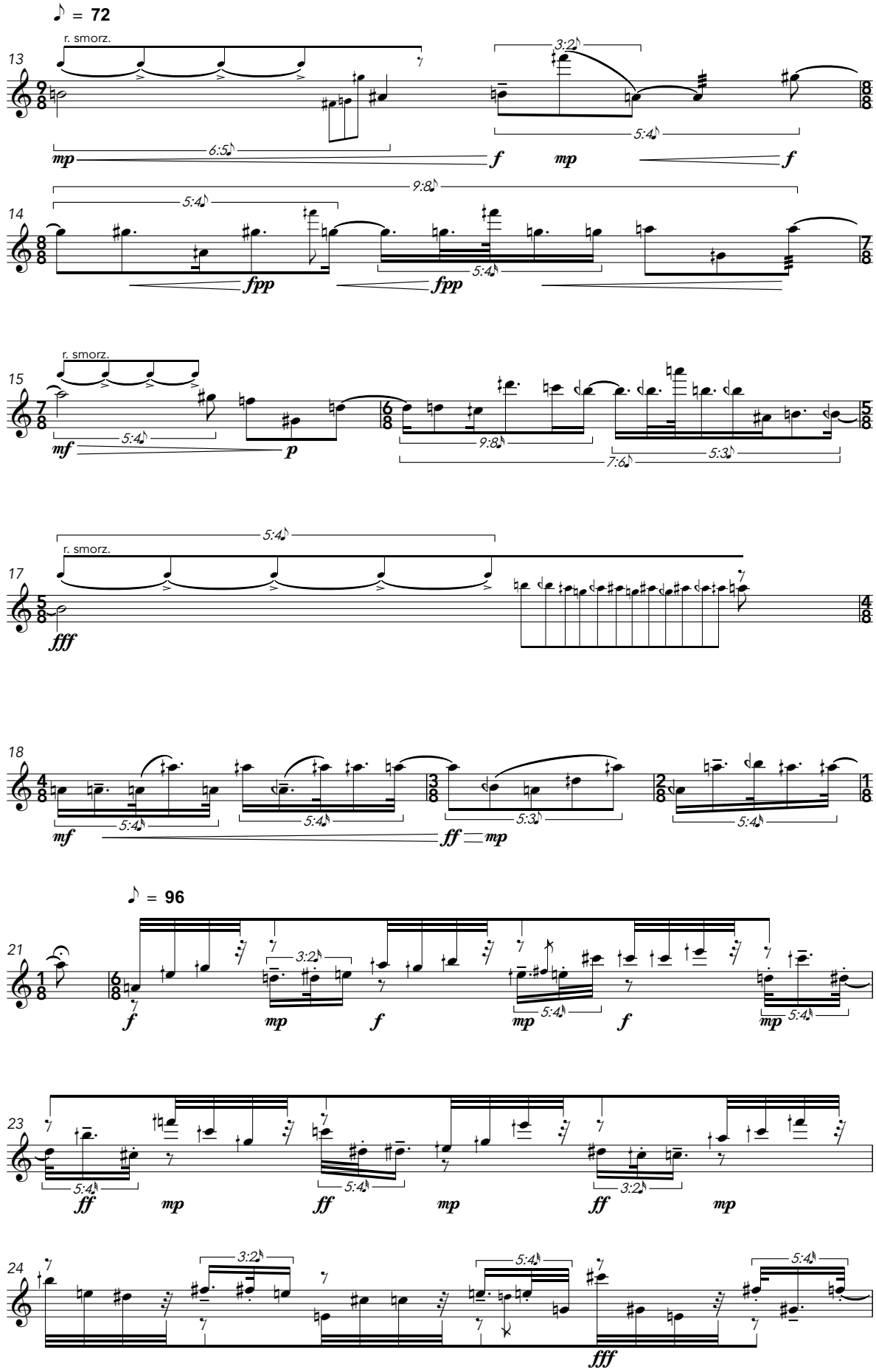

ppp
Very slow (♩ < 52), rhythmically
3
3
3
ppp
Breathe
in
out
in
out
ppp
mp
Very slow (♩ < 52), rhythmically
ppp
rt
ppp
p
ppp
pp
Very slow (♩ < 52), rhythmically
ppp
mp
p
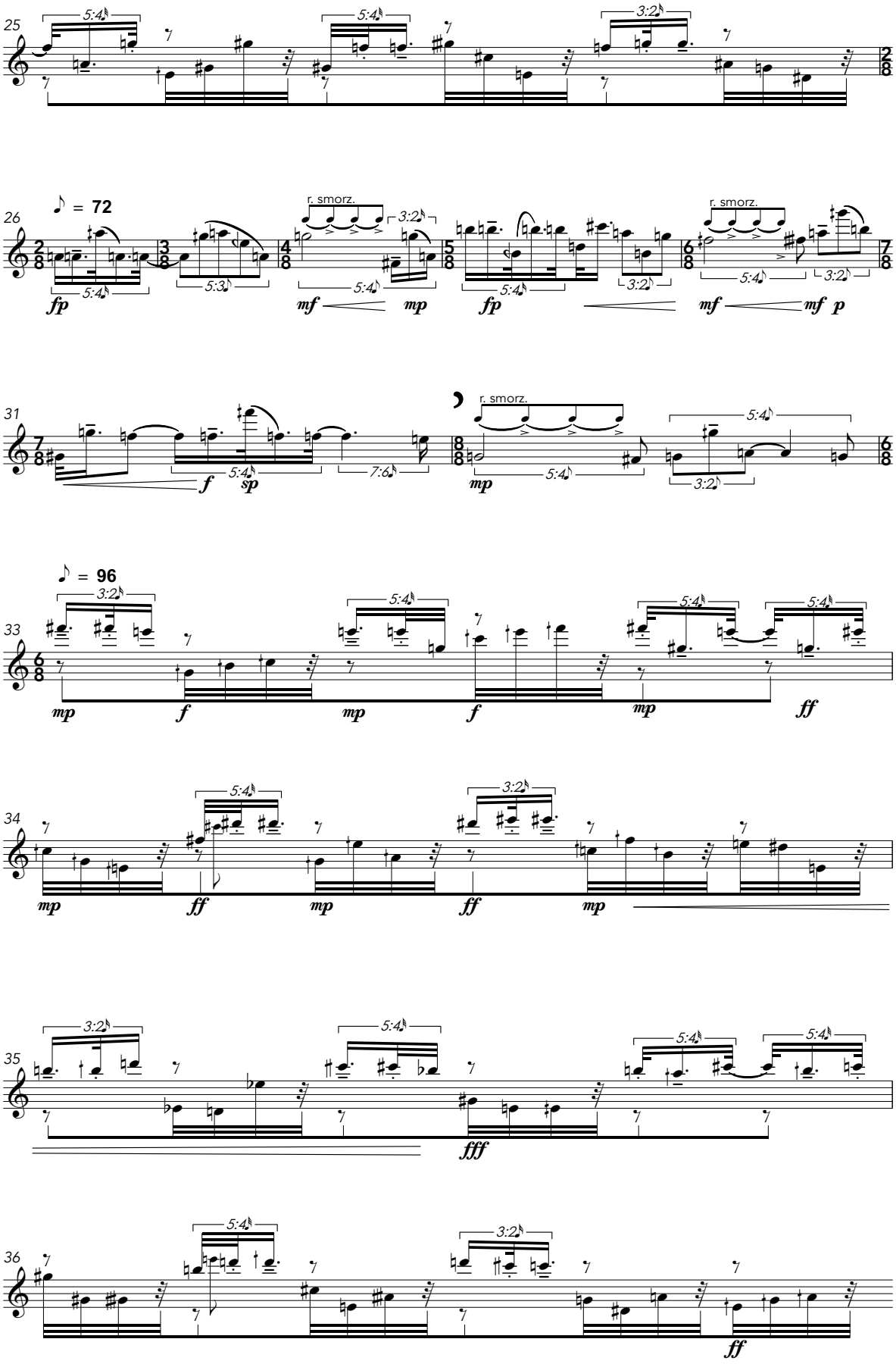

ppp
ffff
Breathe
in
out
in
out
ppp
Breathe
in
4
4
Very slow (♩ < 52), rhythmically
p
Breathe
out
rt
ppp
p
extreme accel. to as fast as possible.
nv
ppp
mf
attacca

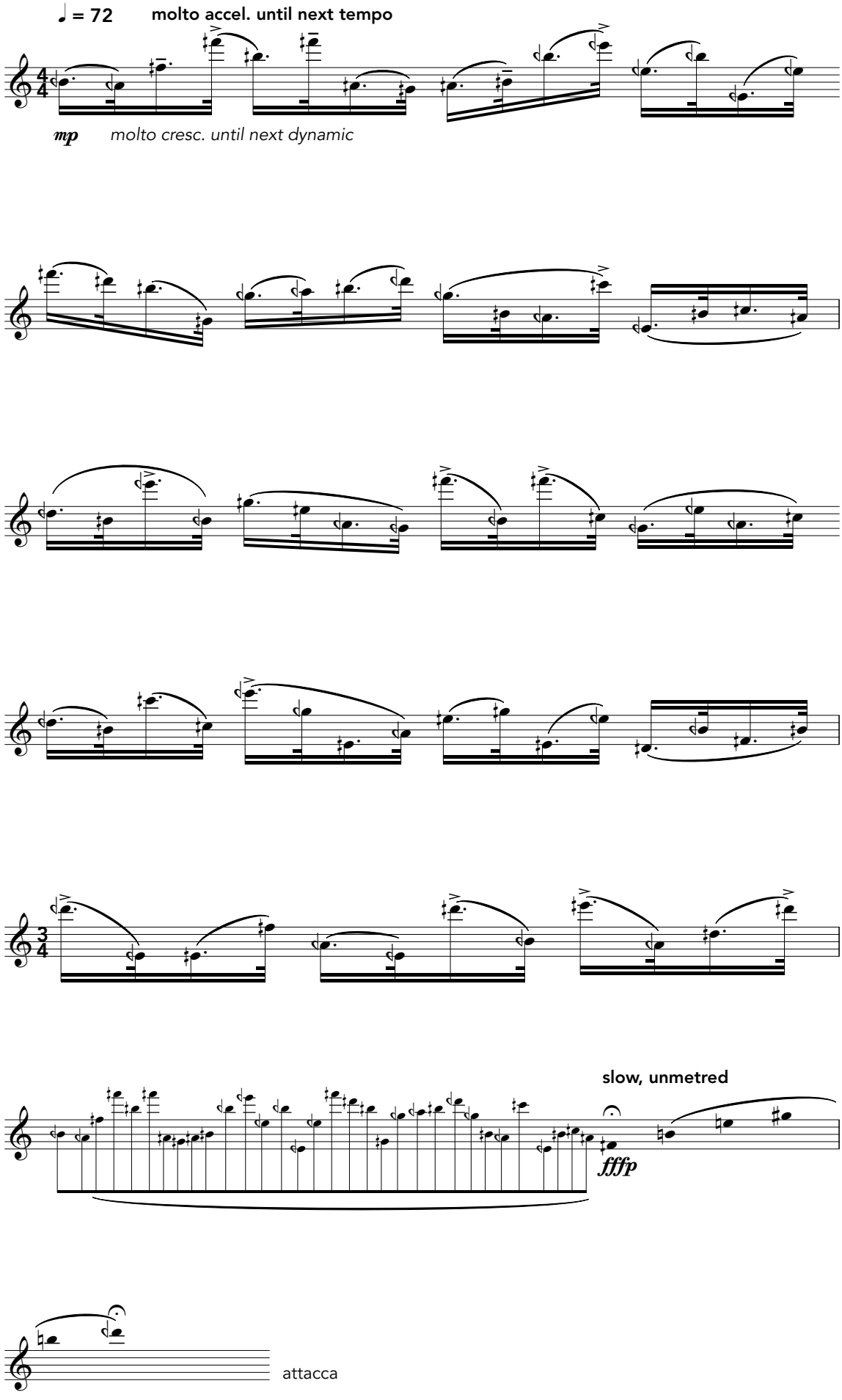
As fast as possible

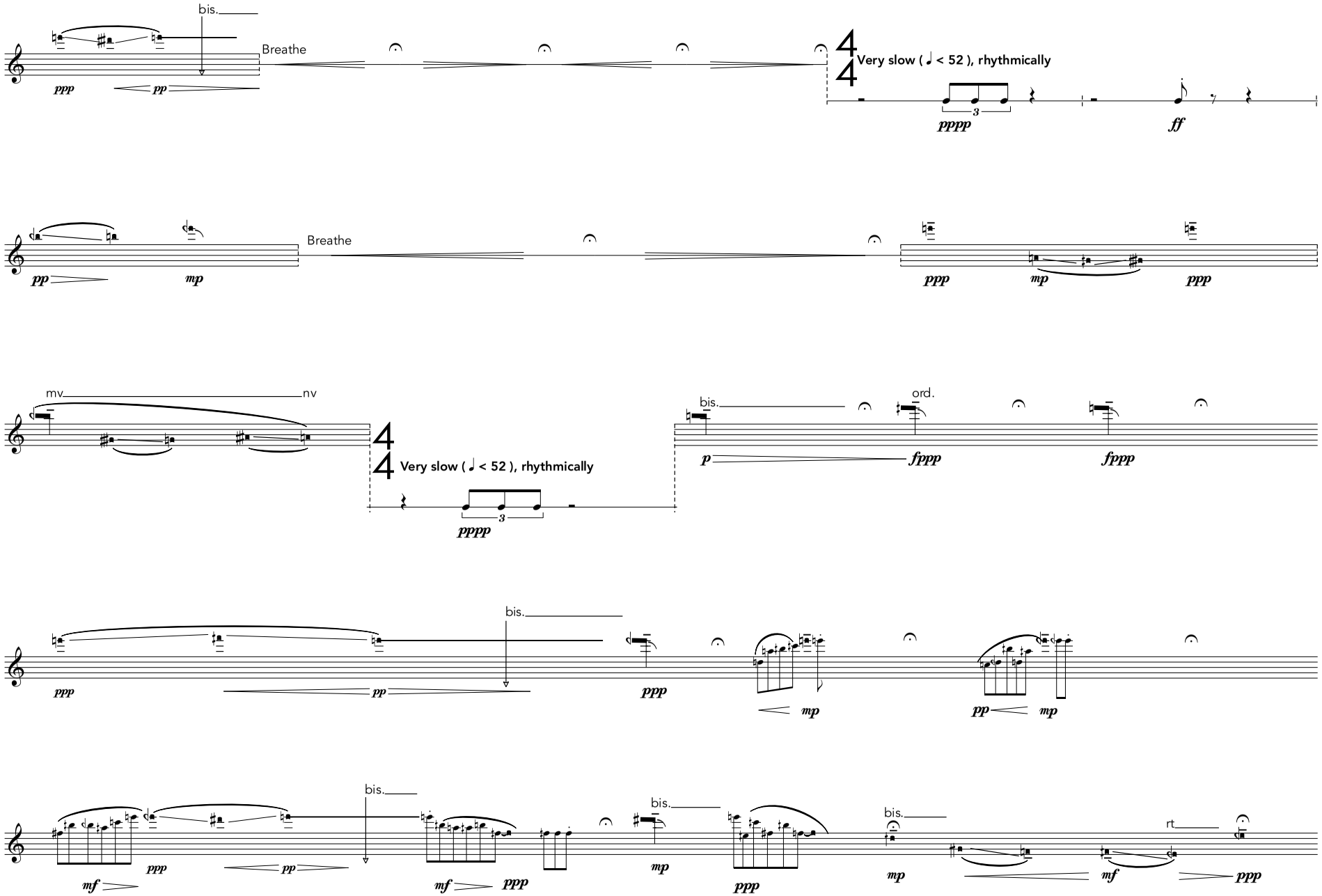


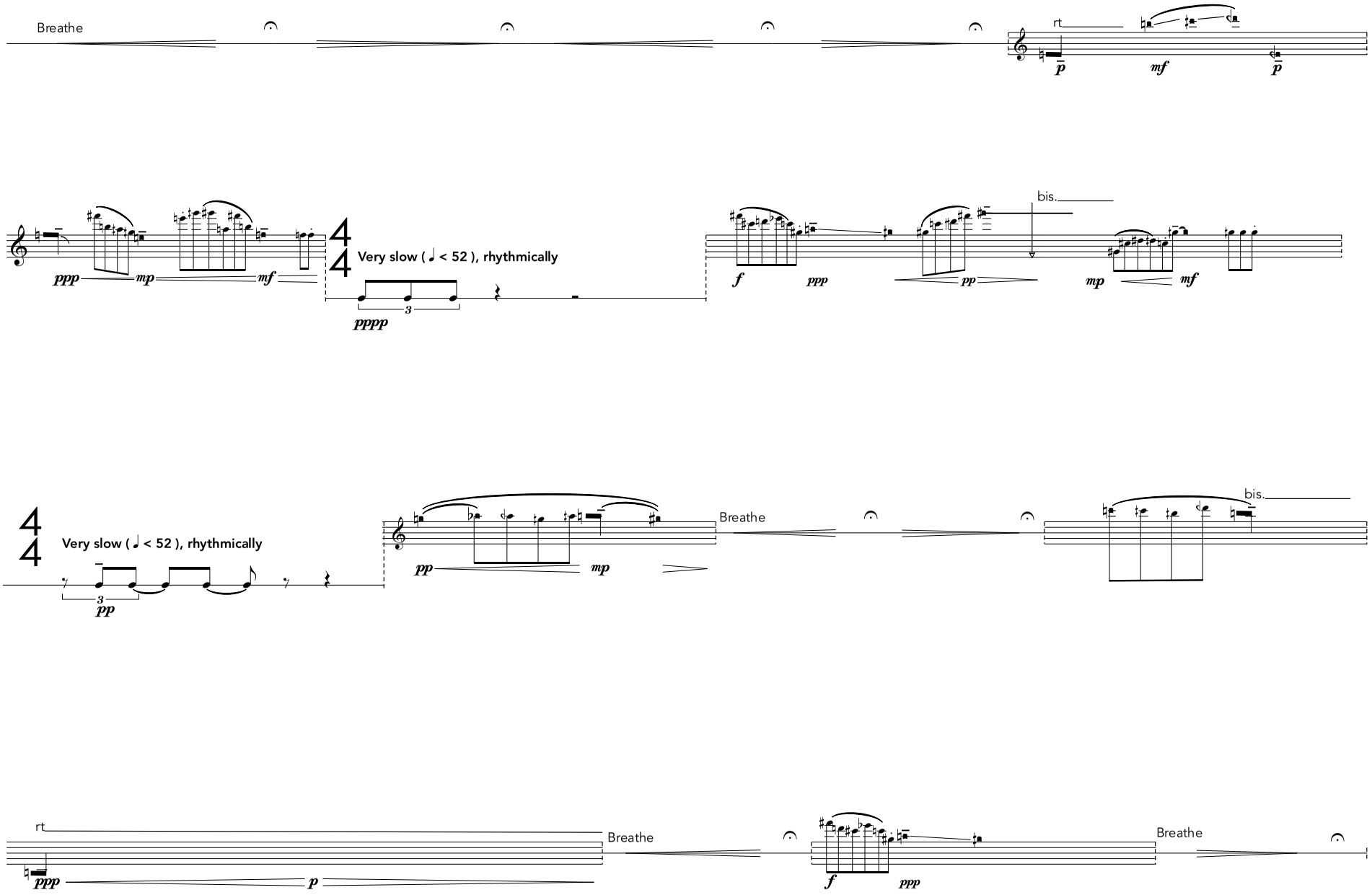

♪ = 72
ord.
r. smorz.
5:4
3:2
7:6
mp
f
sp
mf
p
fp
5:3
♪ = 96
ff
fff


♪ = 72
r. smorz.
13
3:2
6:5
5:4
mp
f
mp
f
9:8
14
5:4
fpp
fpp
5:4
r. smorz.
15
mf
5:4
p
9:8
7:6
5:3
5:4
r. smorz.
17
fff
18
mf
5:4
5:4
ff
mp
5:3
5:4
♪ = 96
21
f
3:2
mp
f
mp
5:4
f
mp
5:4
23
ff
5:4
mp
ff
5:4
mp
ff
3:2
mp
24
3:2
5:4
5:4
fff


25
5:4
5:4
3:2
26
♪ = 72
r. smorz.
fp
mf
mp
fp
mf
mf p
31
r. smorz.
f
sp
7:6
mp
33
♪ = 96
mp
f
mp
f
mp
ff
34
mp
ff
mp
ff
mp
35
fff
36
ff

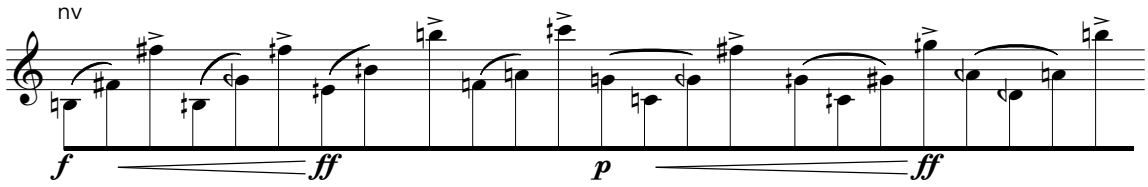

♩ = 72
molto accel. until next tempo
mp
molto cresc. until next dynamic
3
4
slow, unmetred
fffp
attacca
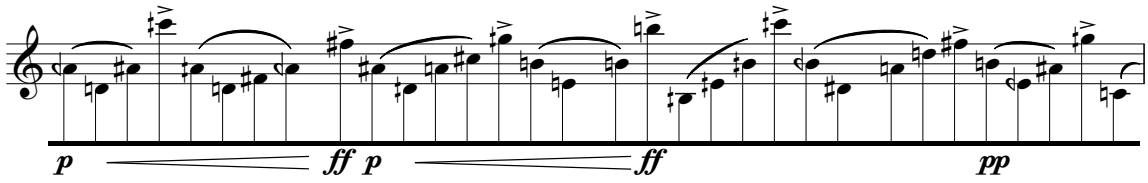

bis.
Breathe
ppp
pp
4
4
Very slow (♩ < 52), rhythmically
3
pppp
ff
Breathe
pp
mp
ppp
mp
ppp
mv.
nv
4
4
Very slow (♩ < 52), rhythmically
3
pppp
bis.
ord.
p
fppp
fppp
bis.
ppp
pp
ppp
mp
pp
mp
bis.
bis.
bis.
rt
mf
ppp
pp
mf
ppp
mp
ppp
mp
mf
ppp
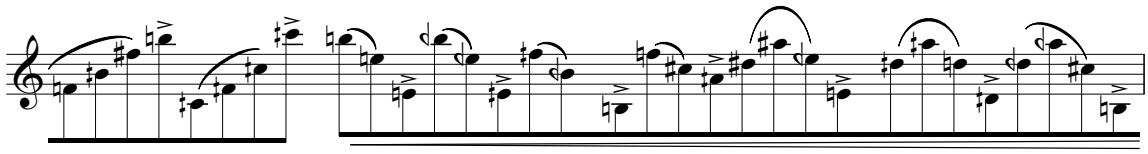

Breathe
rt
bis.
Very slow (♩ < 52), rhythmically
Very slow (♩ < 52), rhythmically
Breathe
bis.
rt
Breathe
Breathe
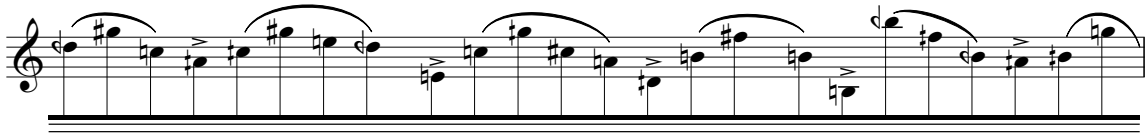
As fast as possible

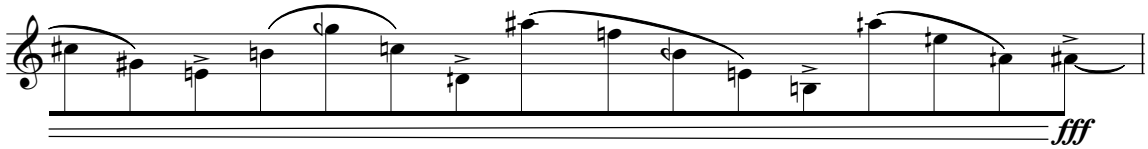
nv





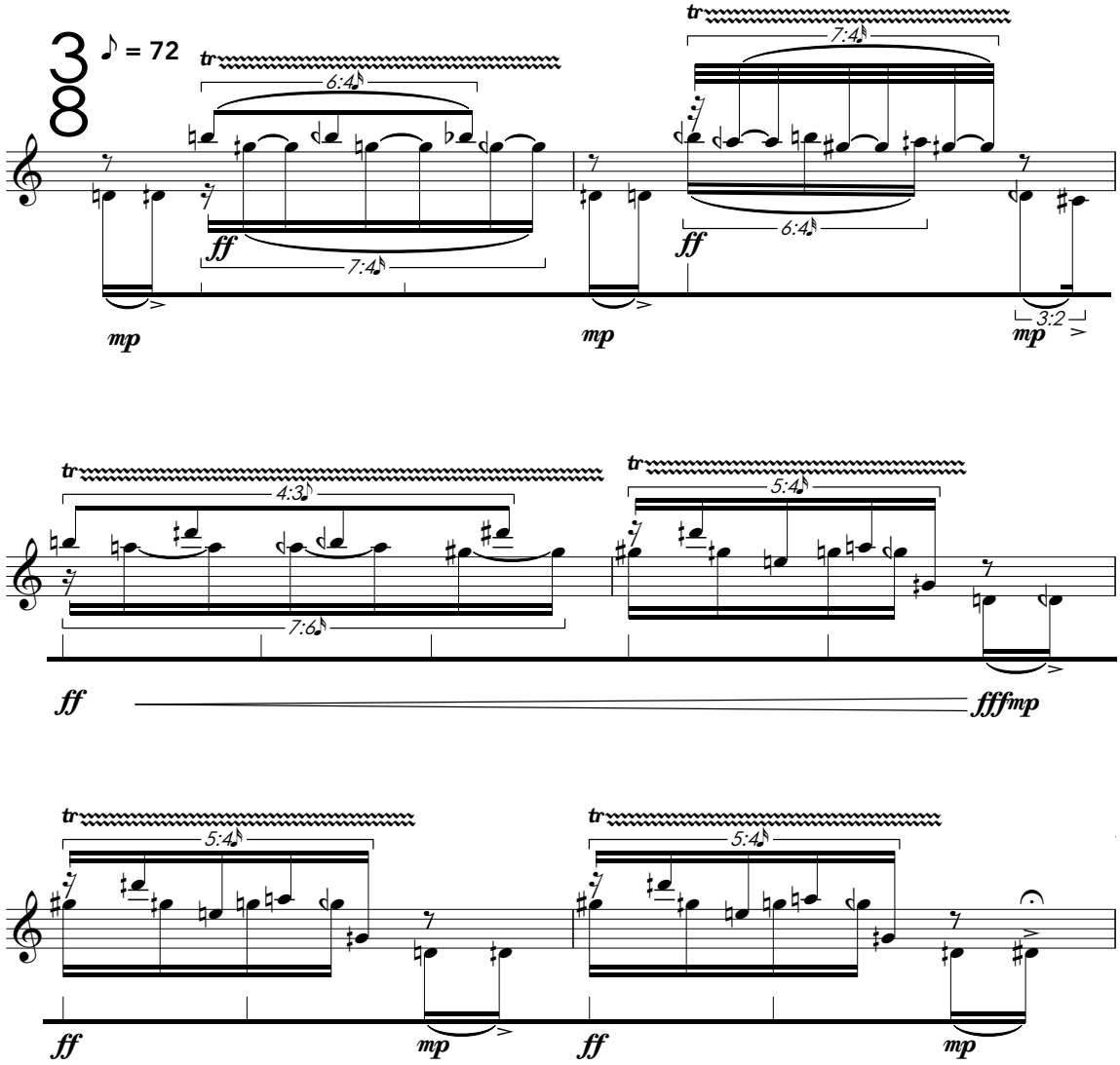


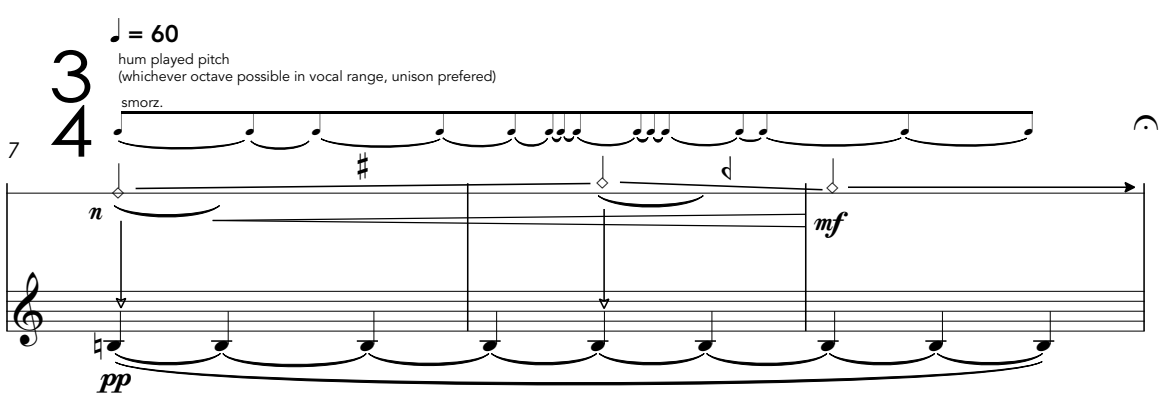


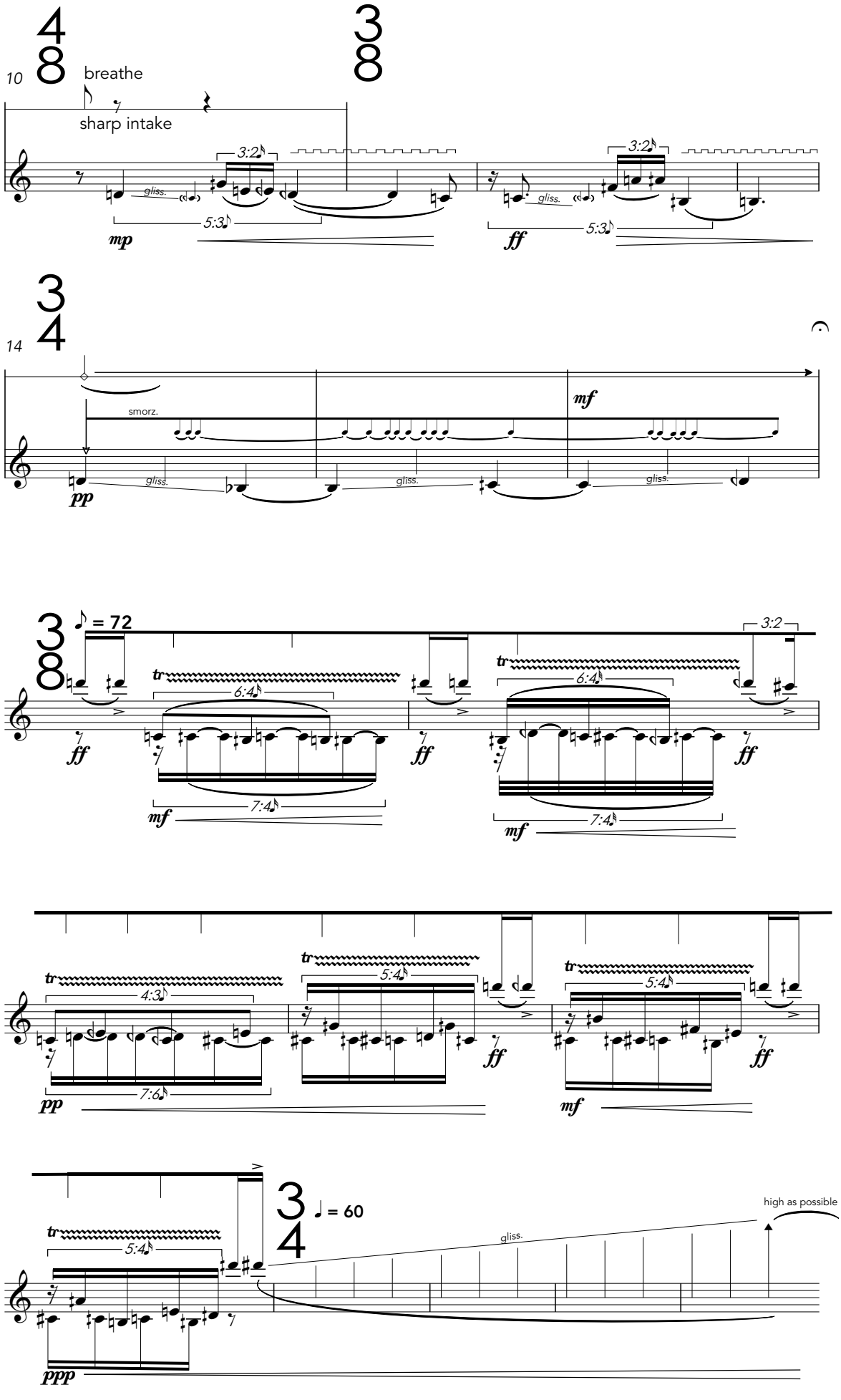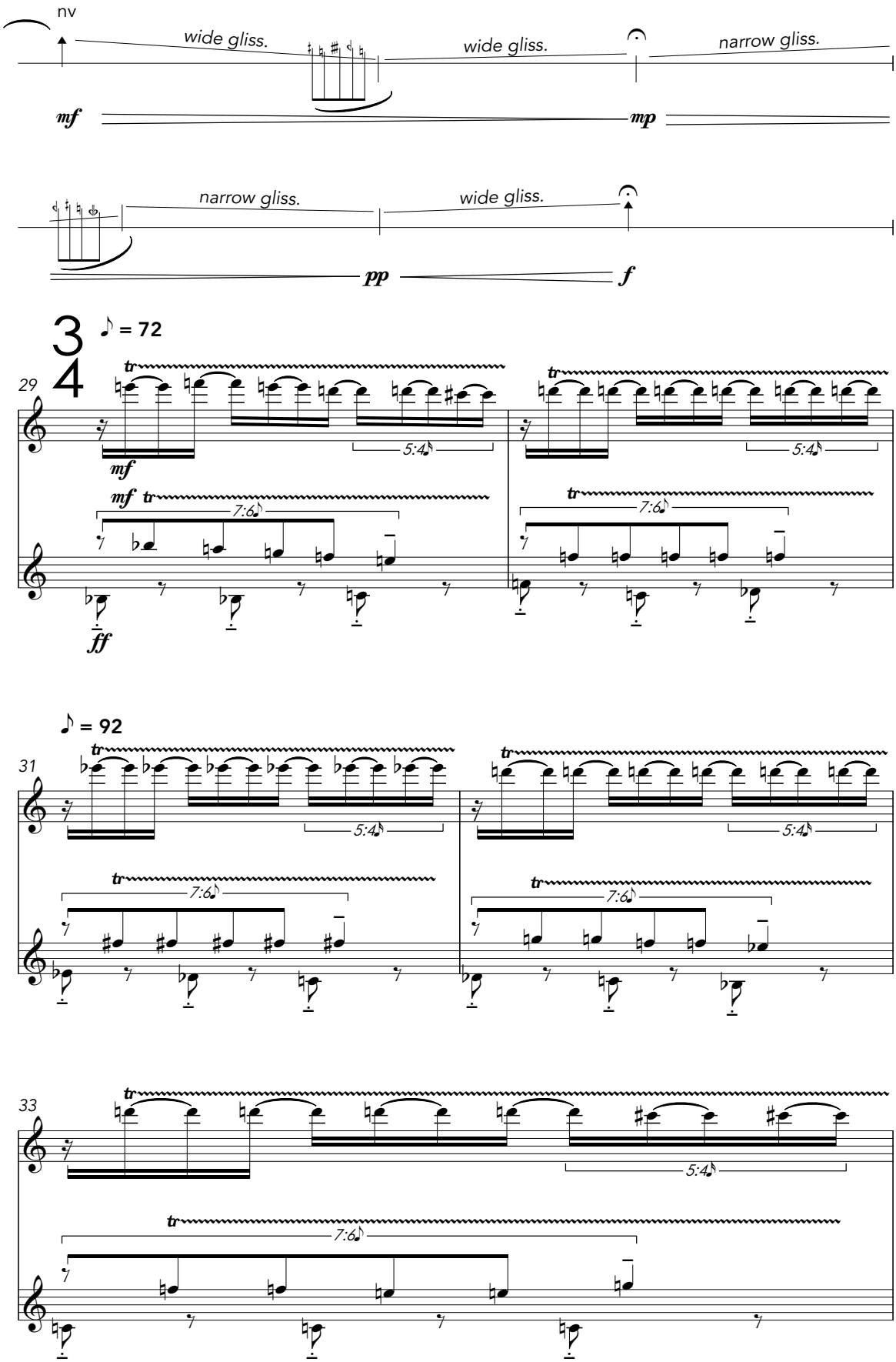


long

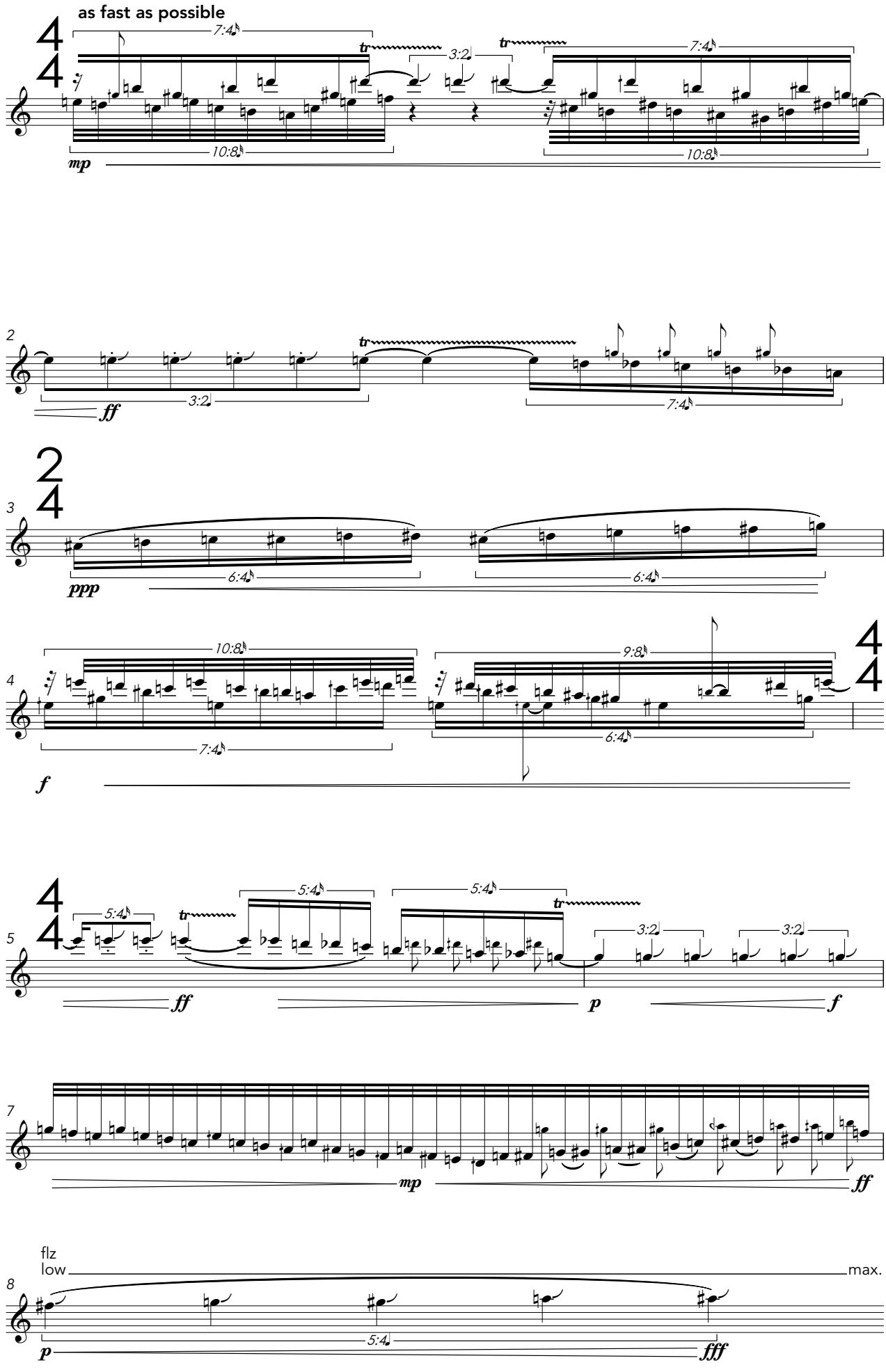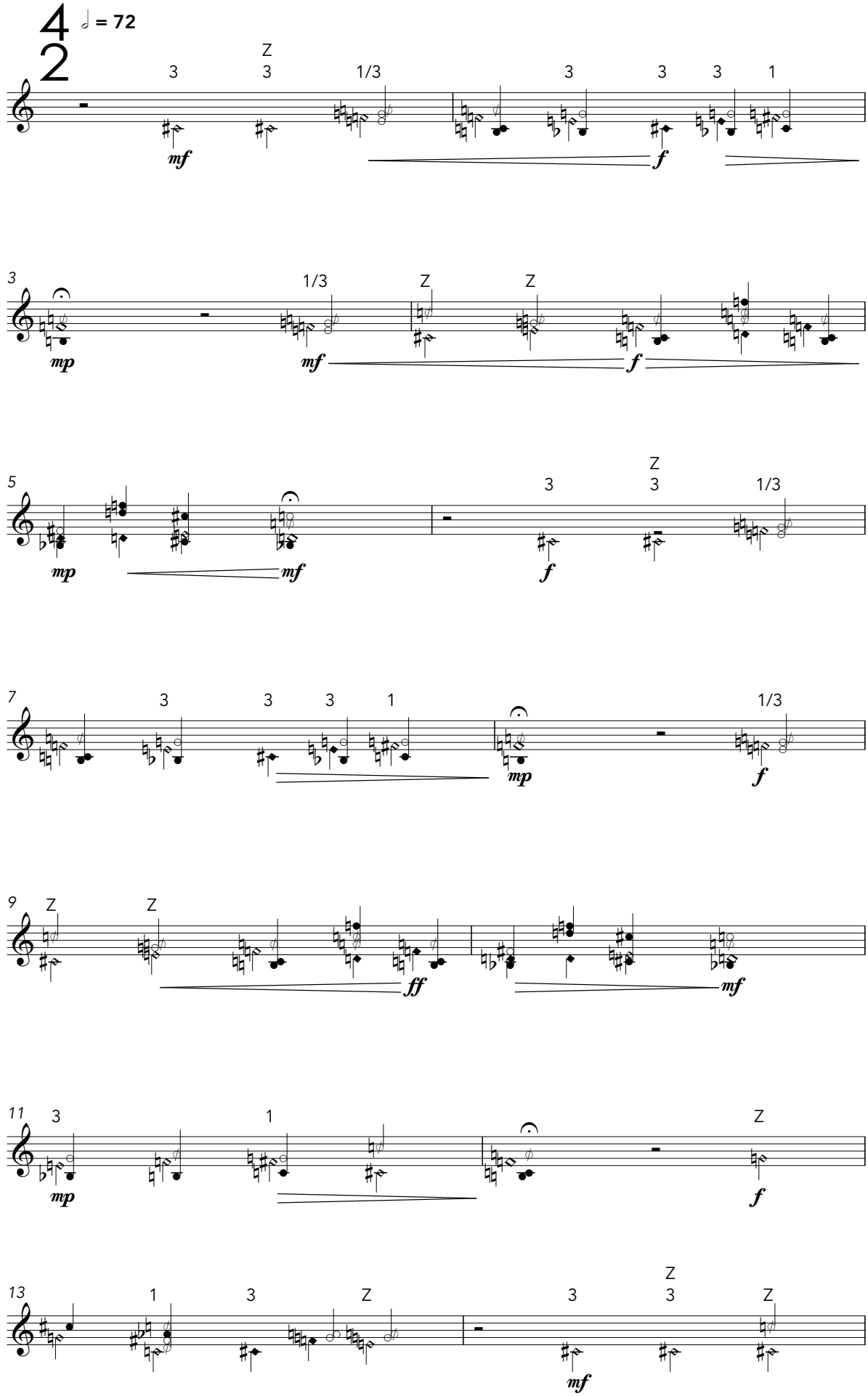



3
8
♪ = 72
tr
6:4
7:4
ff
mp
3:2
4:3
7:6
5:4
fff
mp
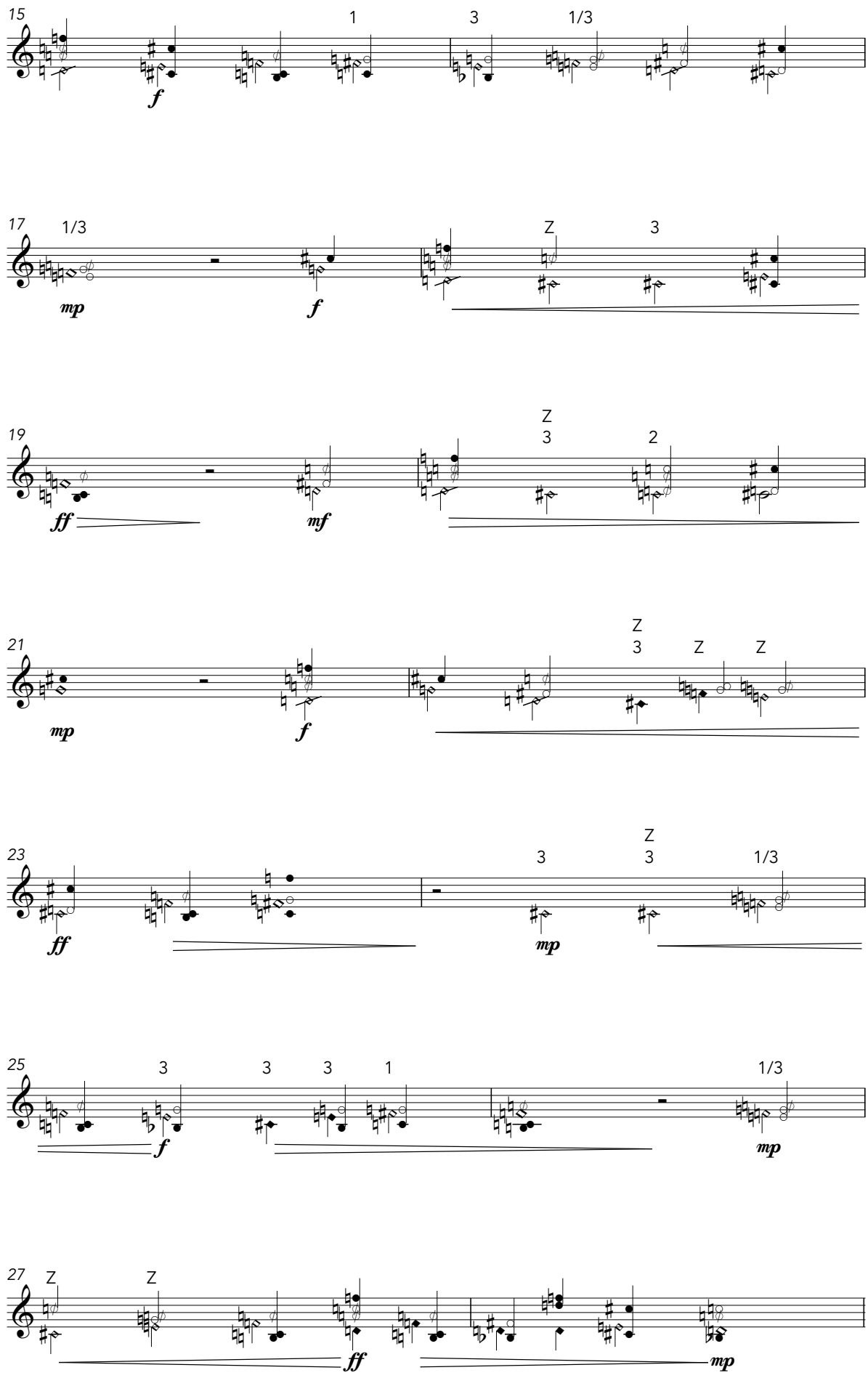

3
4
♩ = 60
hum played pitch
(whichever octave possible in vocal range, unison prefered)
smorz.
7
n
mf
pp


10
breathe
sharp intake
3:2
gliss.
5:3
mp
ff
14
smorz.
pp
mf
♪ = 72
6:4
7:4
tr
4:3
7:6
5:4
♩ = 60
high as possible
ppp


nv
wide gliss.
wide gliss.
narrow gliss.
mf
mp
narrow gliss.
wide gliss.
pp
f
3
4
♪ = 72
29
tr
5:4
mf
7:6
ff
♪ = 92
31
33

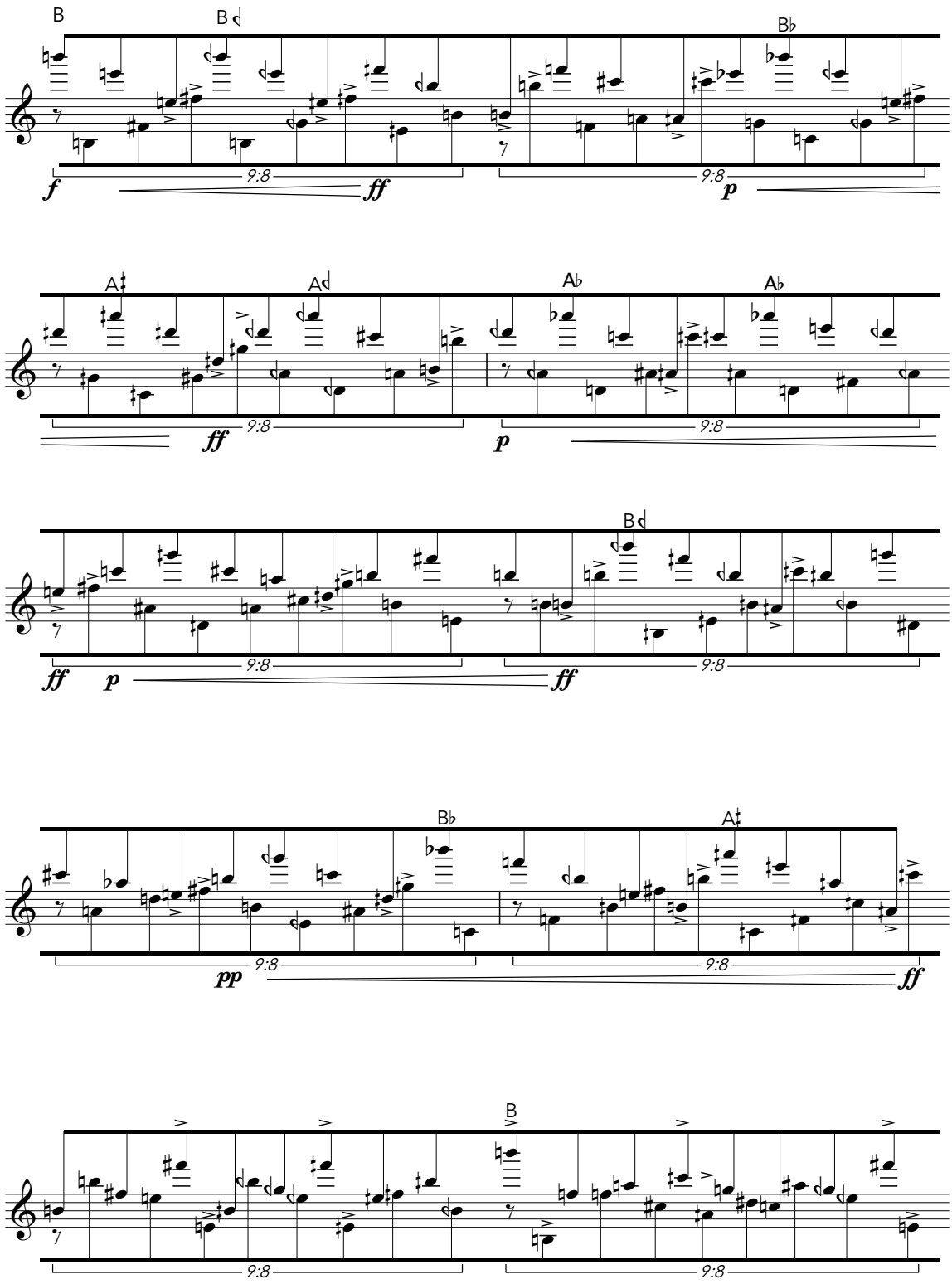

as fast as possible
7:4
3:2
10:8
mp
2
ff
3:2
7:4
3
ppp
6:4
4
10:8
9:8
7:4
6:4
f
5
5:4
ff
p
f
3:2
7
mp
ff
flz
low
max.
8
p
5:4
fff

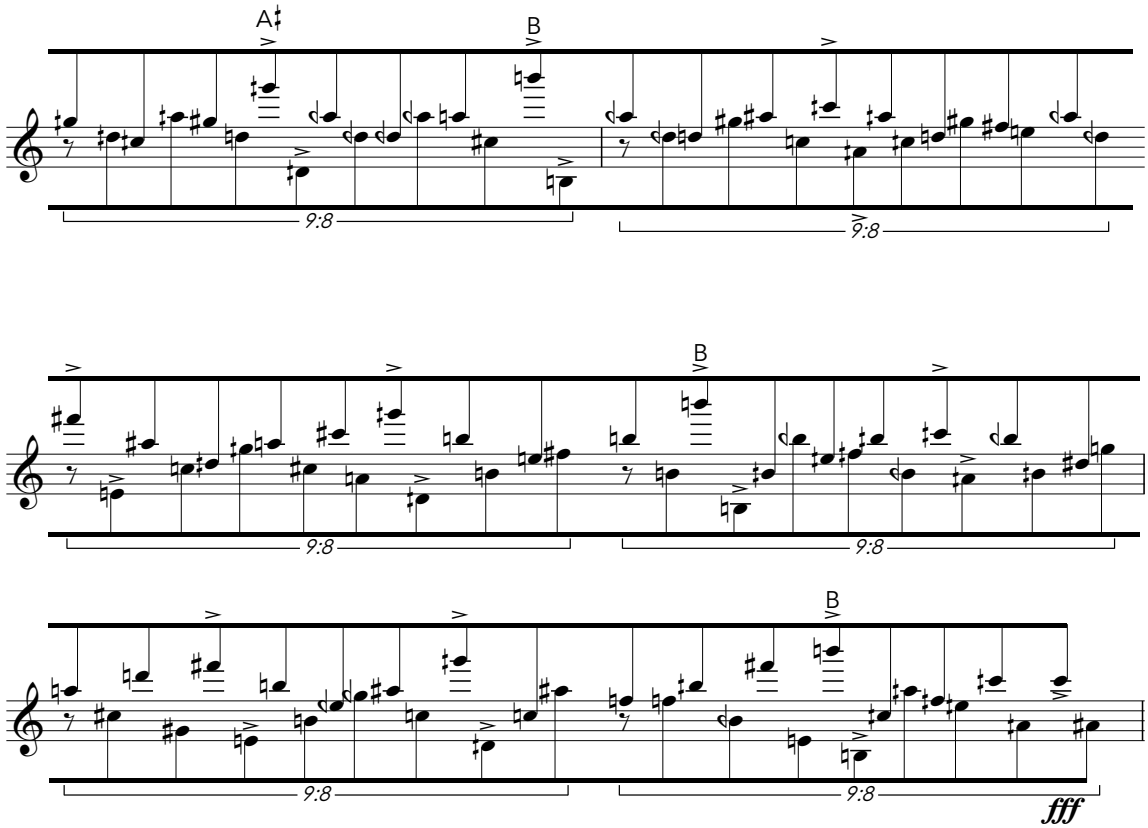

4/2
♩ = 72
mf
f
mp
mf
f
mp
mf
f
mp
f
ff
mf
mp
f
mf
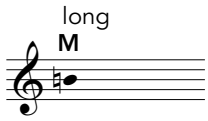

15
1
3
1/3
f
17
1/3
Z
3
mp
f
19
Z
3
2
ff
mf
21
Z
3
Z
Z
mp
f
23
3
Z
3
1/3
ff
mp
25
3
3
3
1
1/3
f
mp
27
Z
Z
ff
mp
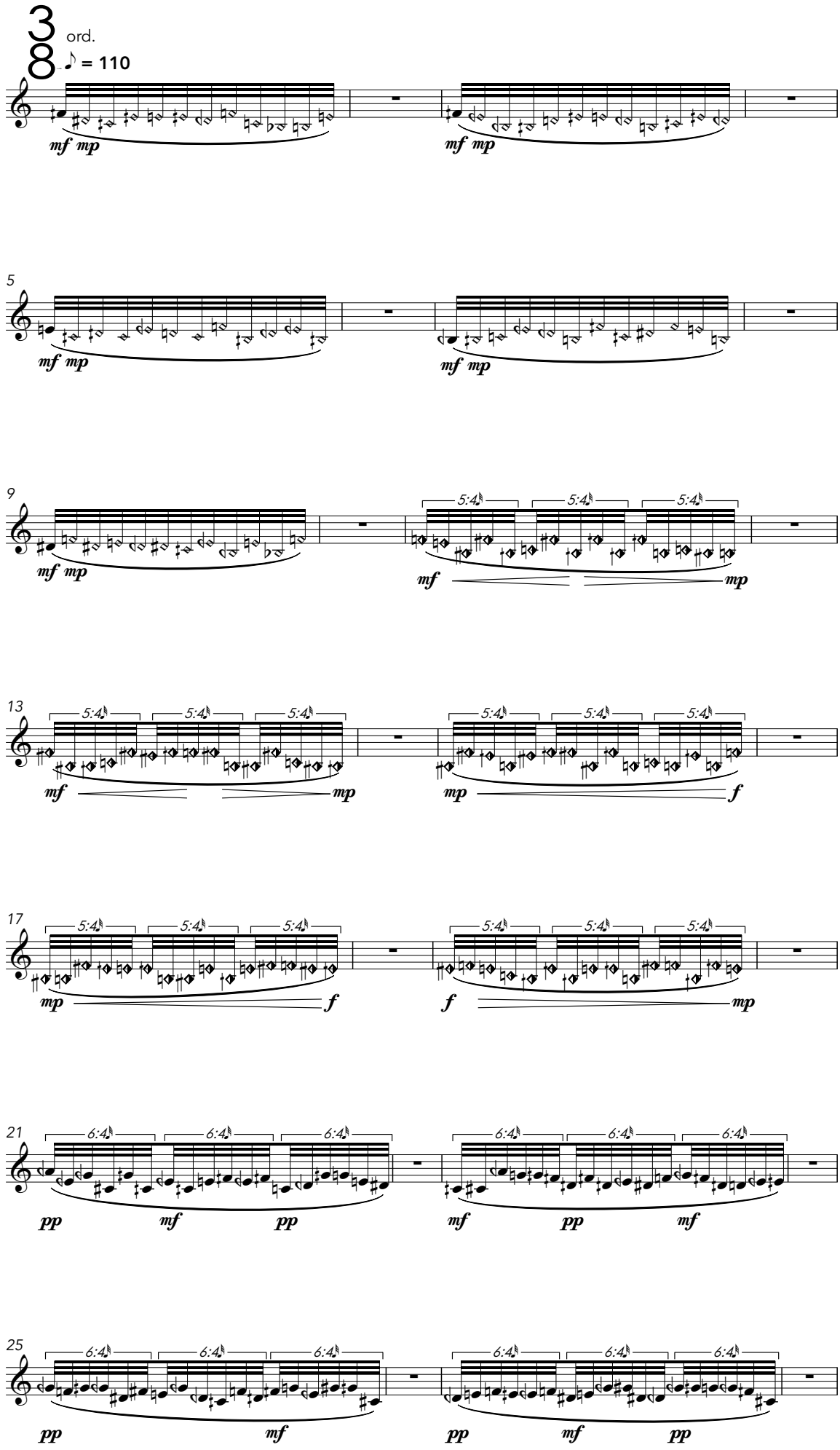
As fast as possible

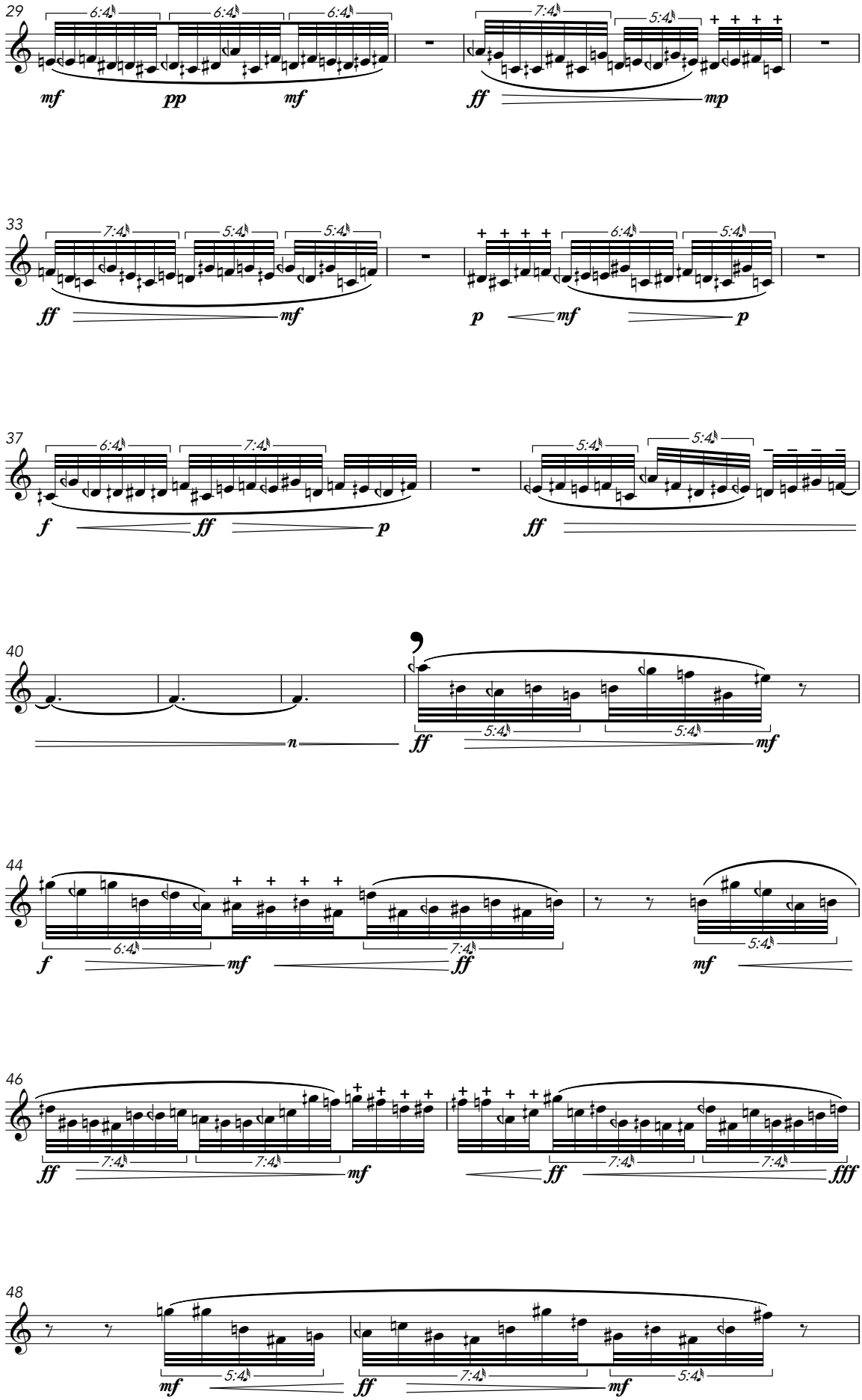
nv

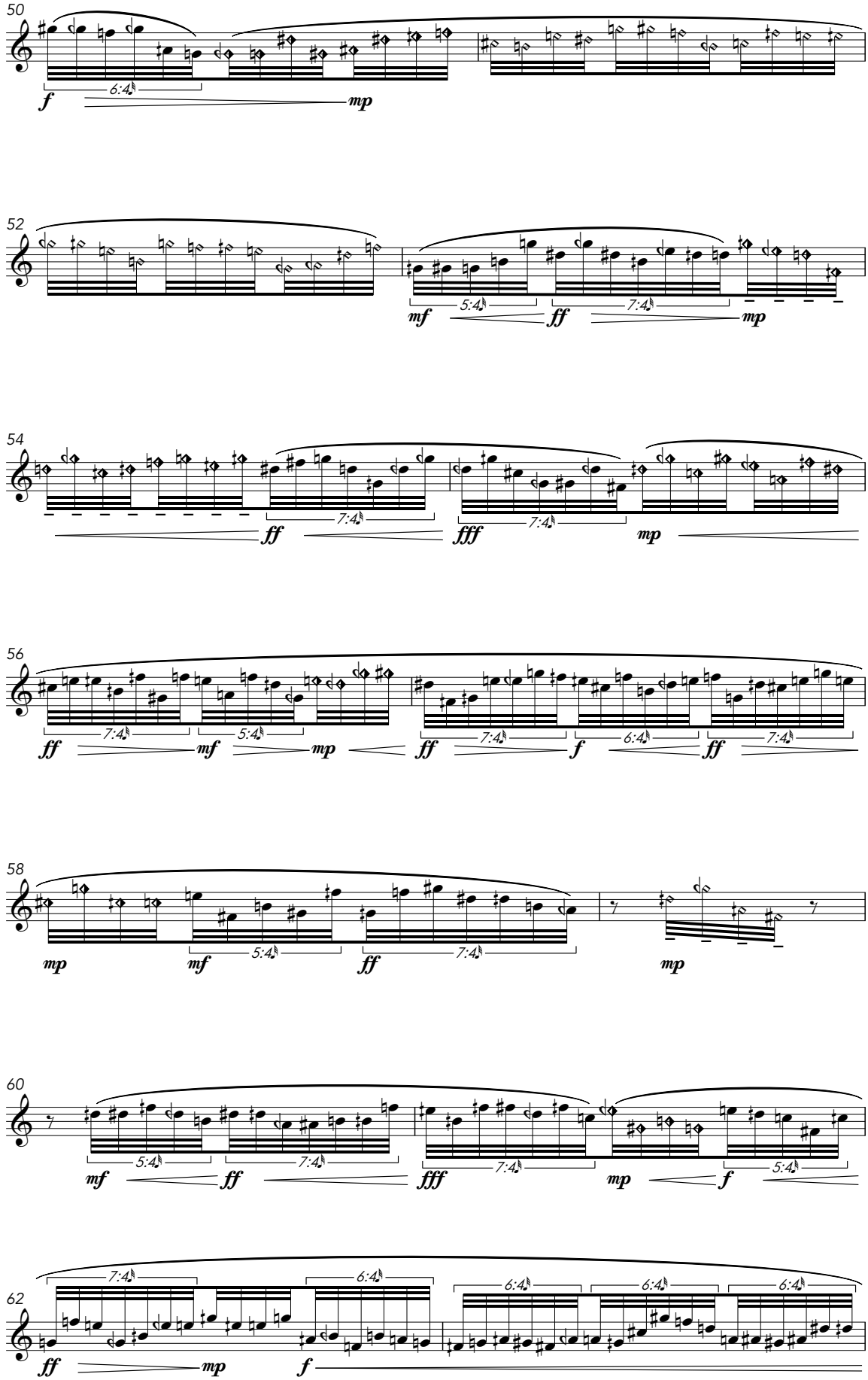


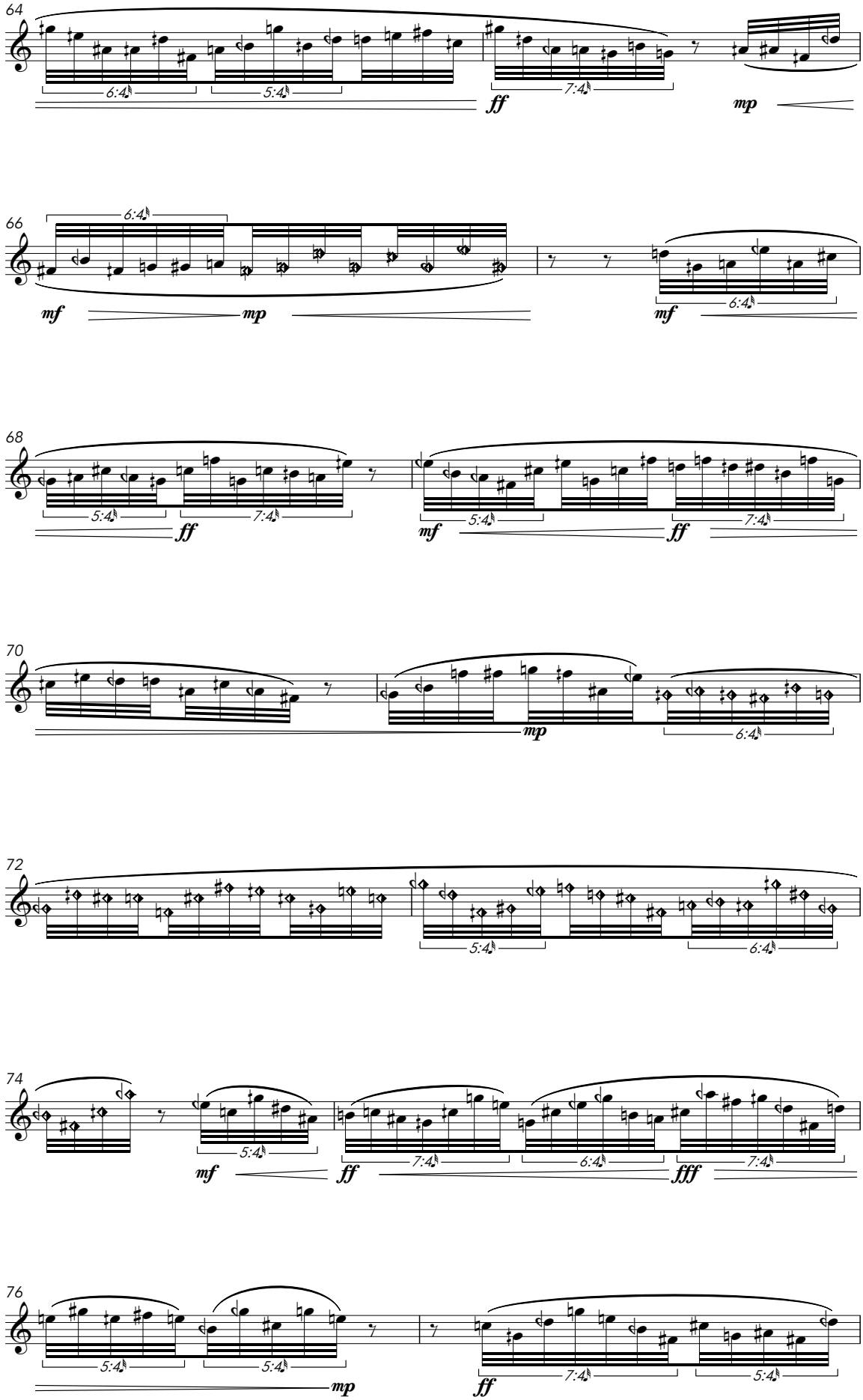

A♯
B
9:8
9:8
B
9:8
9:8
B
9:8
9:8
fff
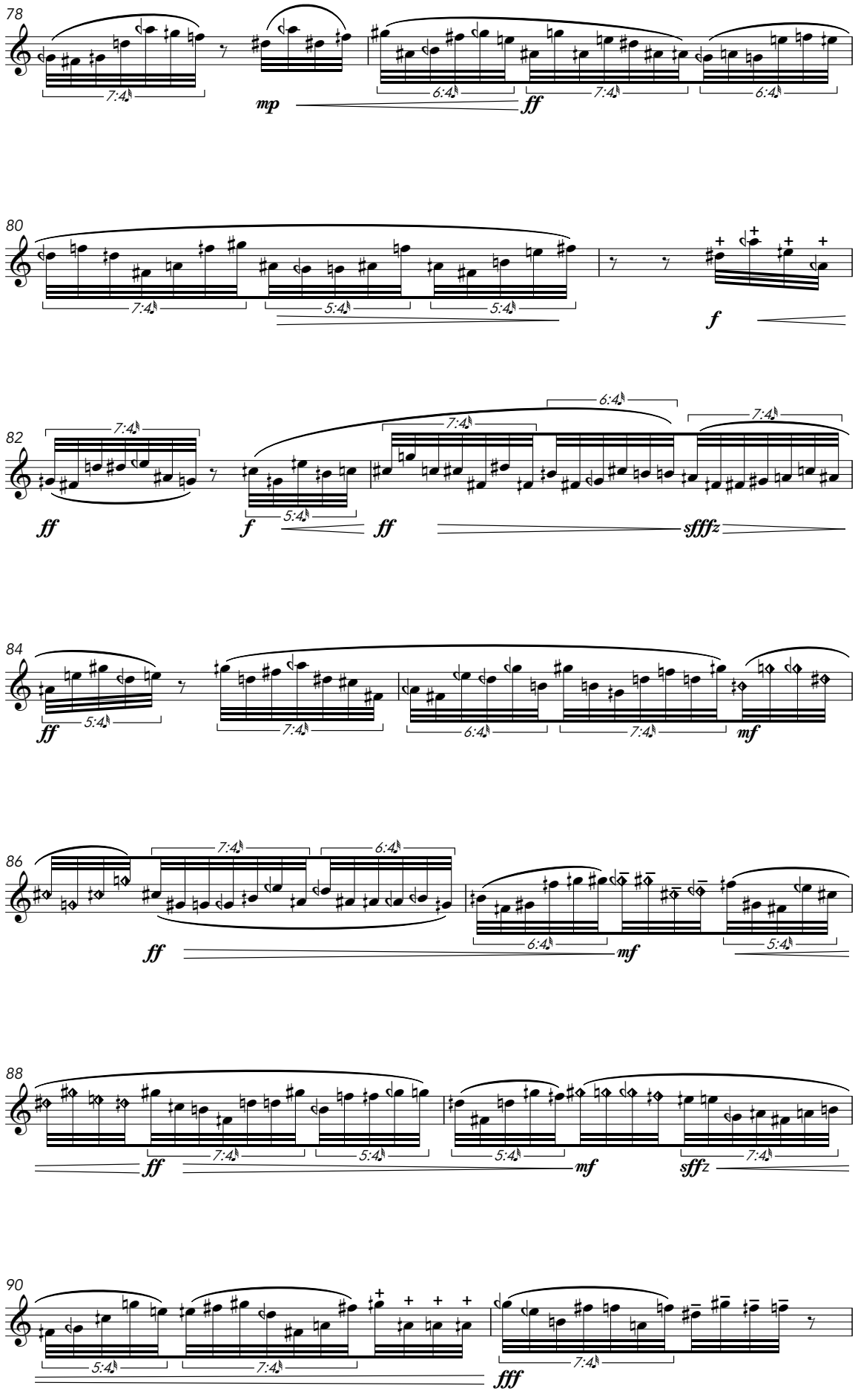

long
M

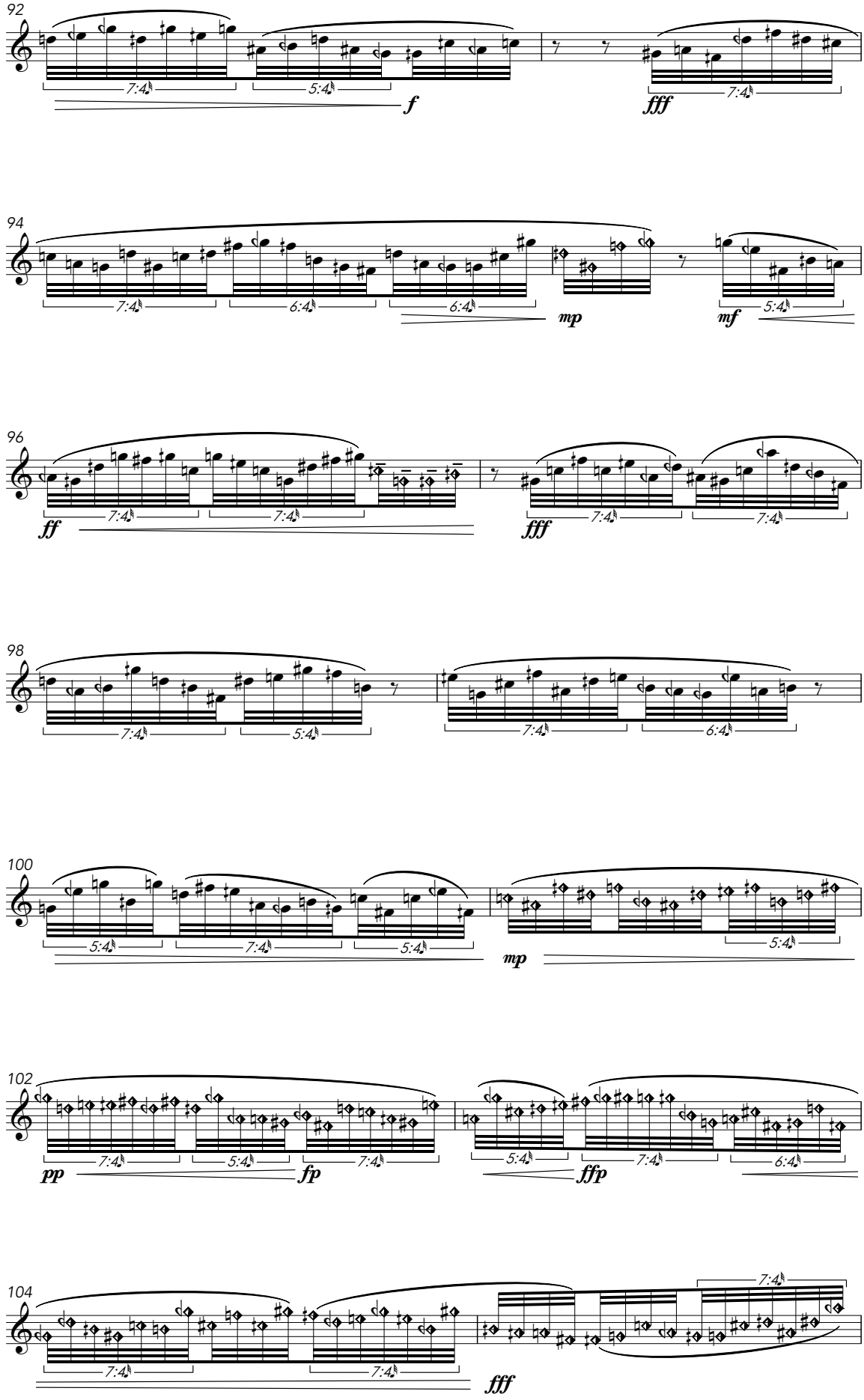

ord.
♪ = 110
mf mp
mf mp
5
mf mp
mf mp
9
mf mp
5:4
5:4
5:4
mf
mp
13
5:4
5:4
5:4
mf
mp
5:4
5:4
5:4
mp
f
17
5:4
5:4
5:4
mp
f
5:4
5:4
5:4
f
mp
21
6:4
6:4
6:4
pp
mf
pp
6:4
6:4
6:4
mf
pp
mf
25
6:4
6:4
6:4
pp
mf
6:4
6:4
6:4
pp
mf
pp

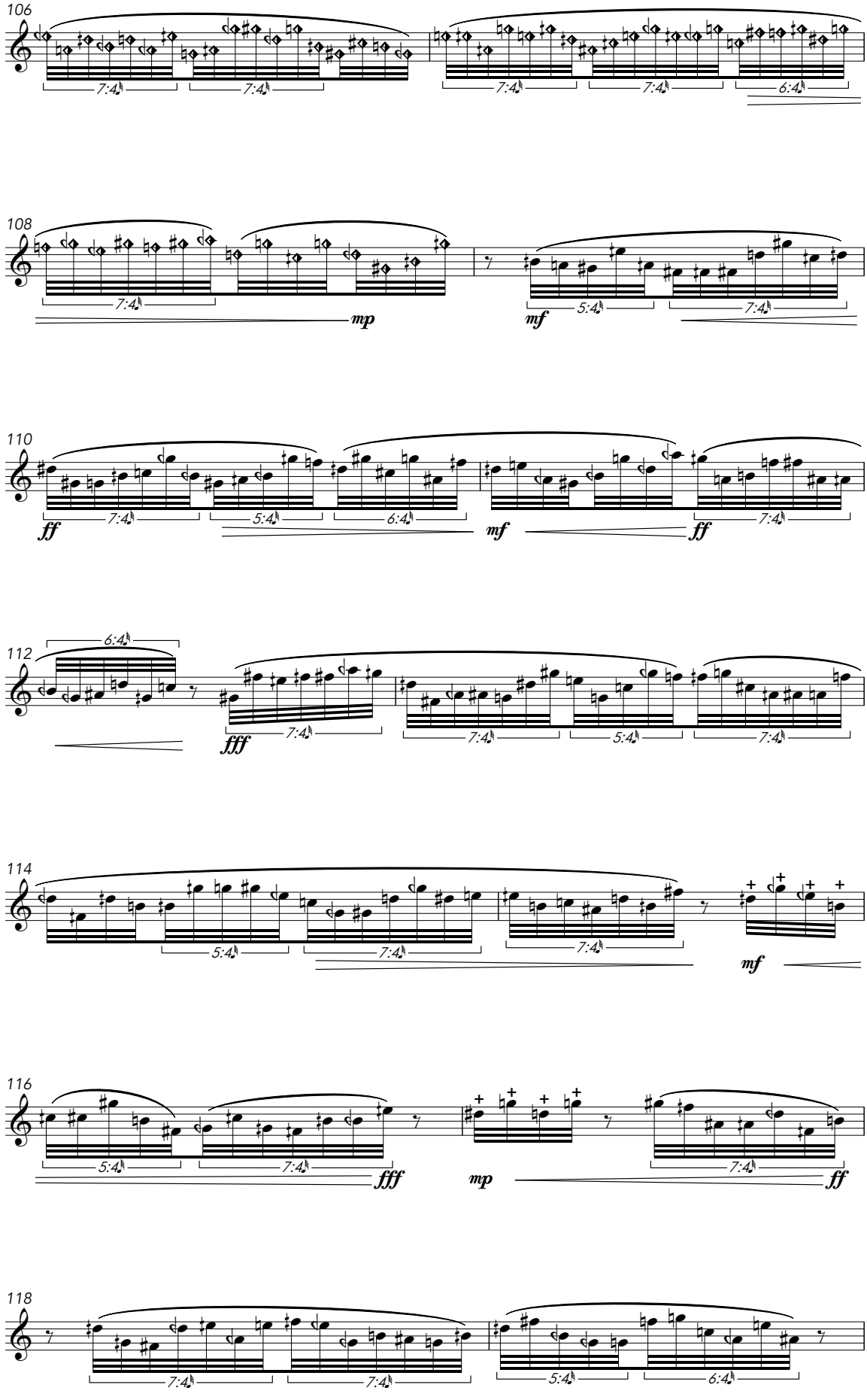

29
6:4
6:4
6:4
7:4
5:4
mf
pp
mf
ff
mp
33
7:4
5:4
5:4
6:4
5:4
ff
mf
p
mf
p
37
6:4
7:4
5:4
5:4
f
ff
p
ff
40
n
ff
5:4
5:4
mf
44
6:4
f
mf
7:4
ff
5:4
mf
46
7:4
7:4
ff
mf
ff
7:4
7:4
fff
48
5:4
mf
7:4
ff
5:4
mf

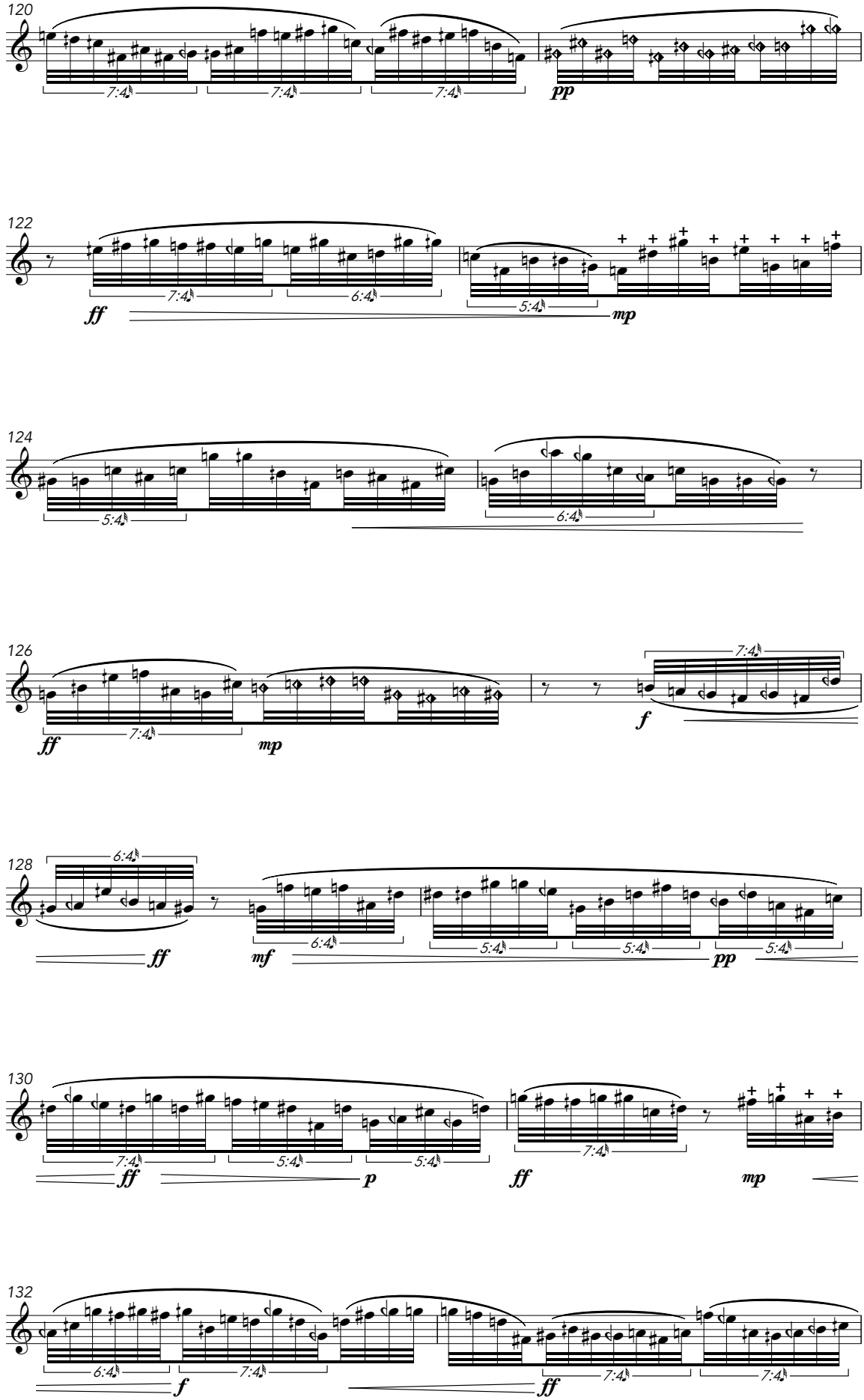

50
f
6:4
mp
52
mf
5:4
ff
7:4
mp
54
ff
7:4
fff
7:4
mp
56
ff
7:4
mf
5:4
mp
ff
7:4
f
6:4
ff
7:4
58
mp
mf
5:4
ff
7:4
mp
60
mf
5:4
ff
7:4
fff
7:4
mp
f
5:4
62
ff
7:4
mp
f
6:4
6:4
6:4
6:4

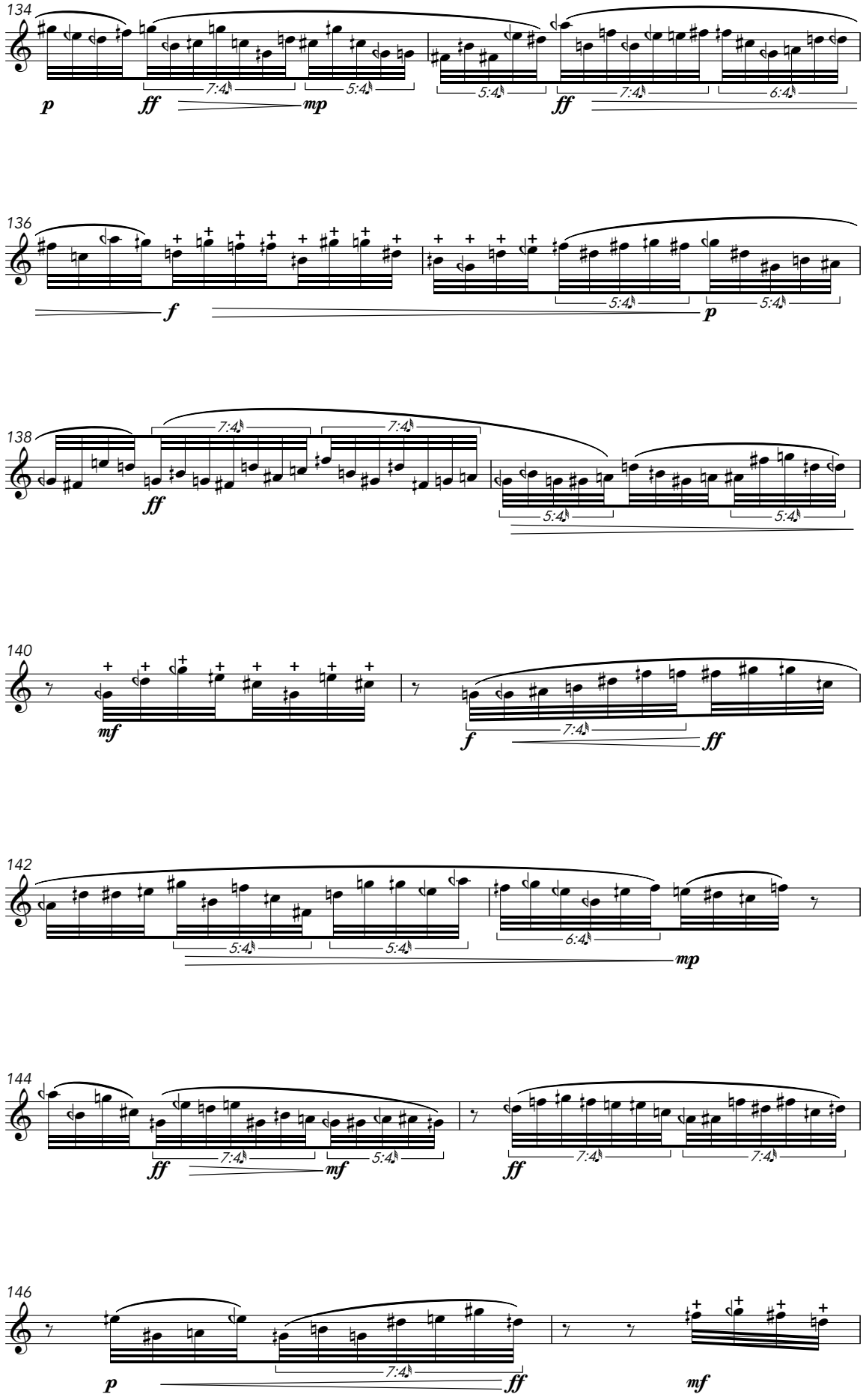

64
6:4
5:4
ff
7:4
mp
66
6:4
mf
mp
mf
6:4
68
5:4
ff
7:4
mf
5:4
ff
7:4
70
mp
6:4
72
5:4
6:4
74
5:4
mf
ff
7:4
6:4
fff
7:4
76
5:4
5:4
mp
ff
7:4
5:4

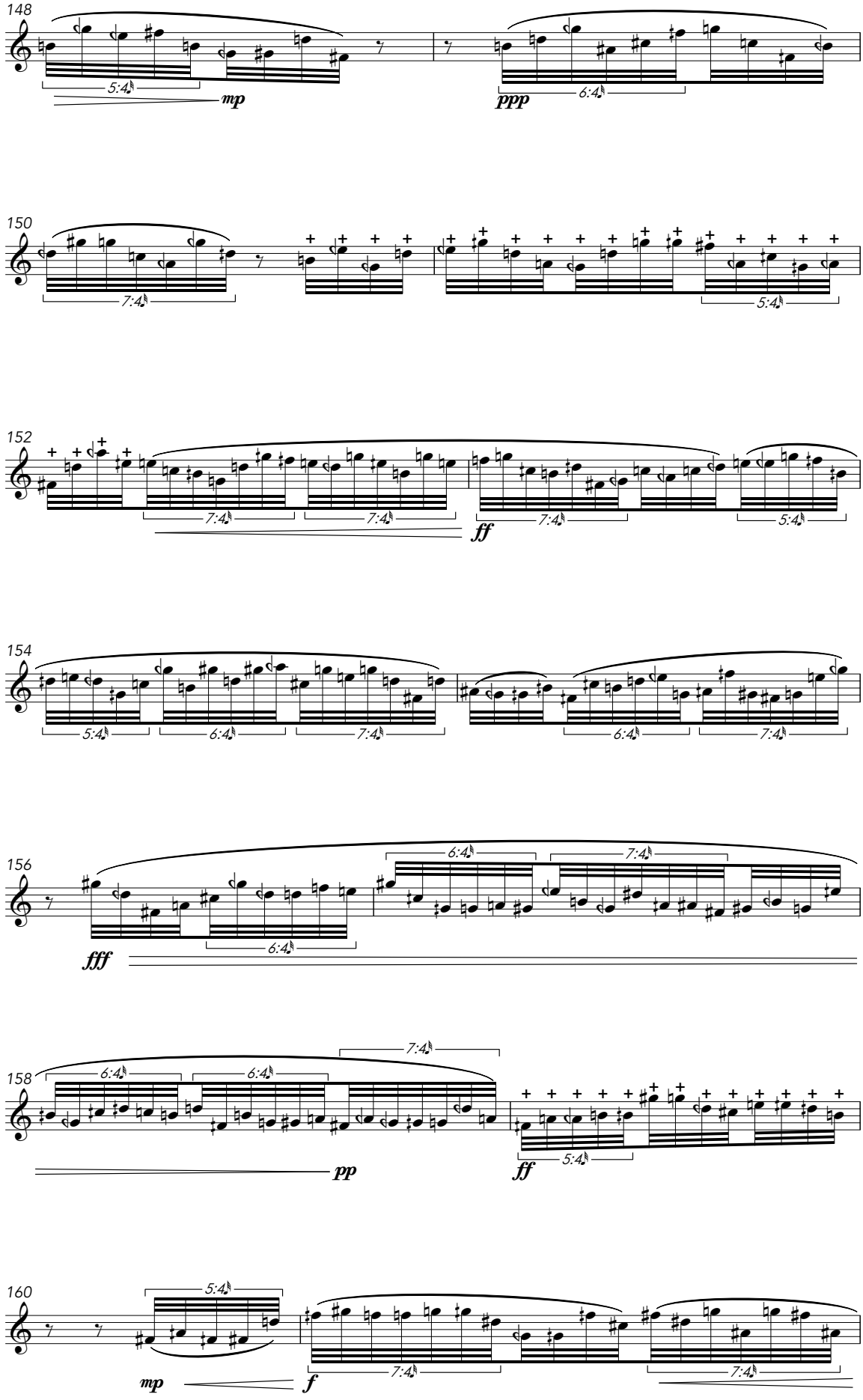

78
7:4
mp
6:4
ff
7:4
6:4
80
7:4
5:4
5:4
f
82
7:4
ff
5:4
f
6:4
7:4
ff
sfffz
84
ff
5:4
7:4
6:4
7:4
mf
86
7:4
6:4
ff
6:4
mf
5:4
88
ff
7:4
5:4
5:4
mf
sffz
7:4
90
5:4
7:4
fff
7:4

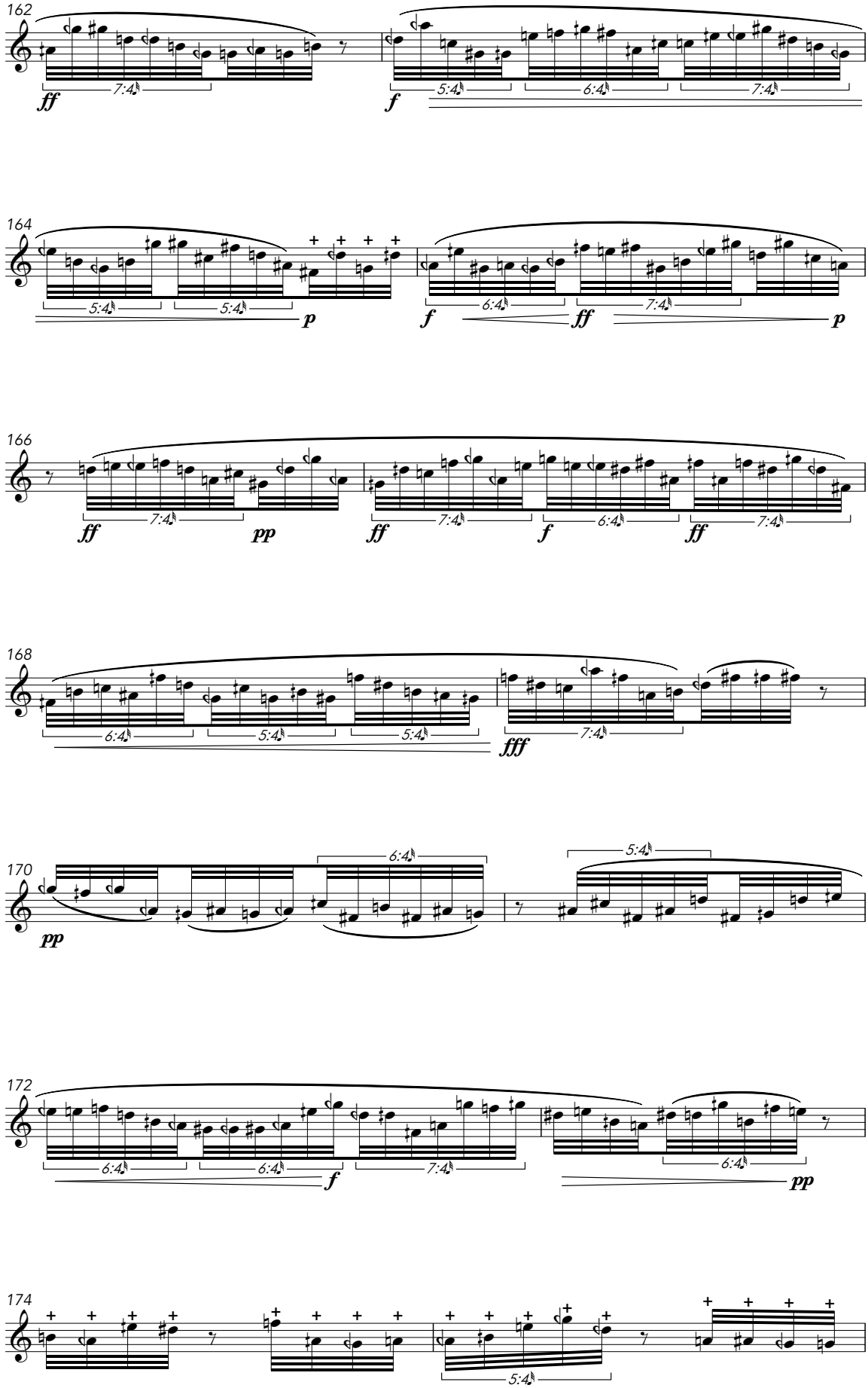

92
7:4
5:4
f
fff
7:4
94
7:4
6:4
6:4
mp
mf
5:4
96
ff
7:4
7:4
fff
7:4
7:4
98
7:4
5:4
7:4
6:4
100
5:4
7:4
5:4
mp
5:4
102
pp
7:4
5:4
fp
7:4
5:4
ffp
7:4
6:4
104
7:4
7:4
fff
7:4
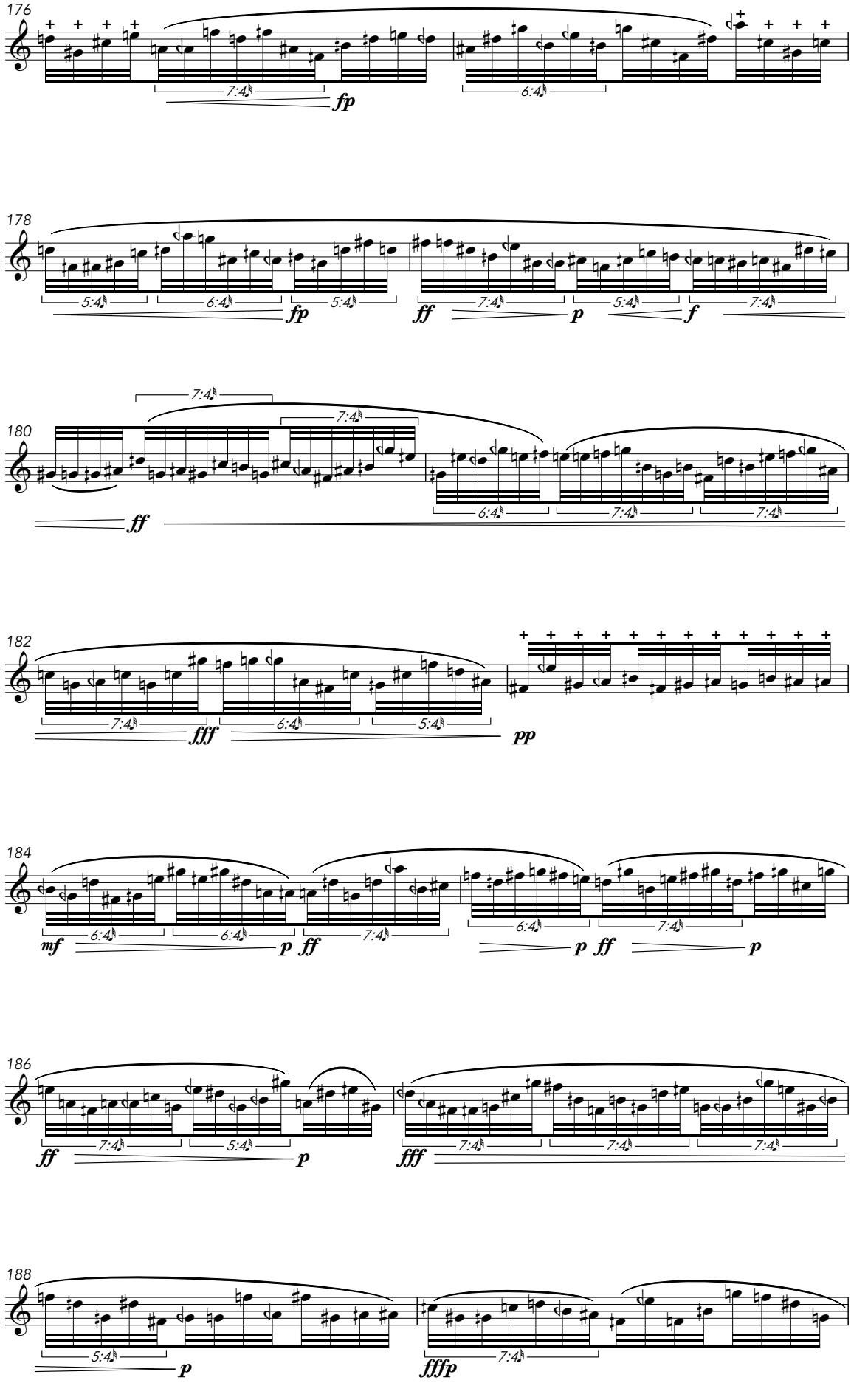

106
7:4
7:4
7:4
7:4
6:4
108
7:4
mp
mf
5:4
7:4
110
ff
7:4
5:4
6:4
mf
ff
7:4
112
6:4
fff
7:4
7:4
5:4
7:4
114
5:4
7:4
7:4
mf
116
5:4
7:4
fff
mp
7:4
ff
118
7:4
7:4
5:4
6:4

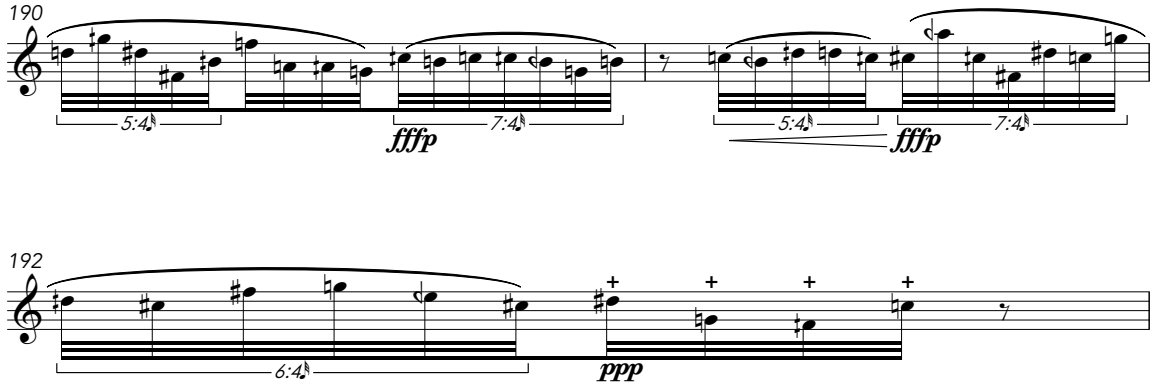

120
7:4
7:4
7:4
pp
122
7:4
6:4
5:4
ff
mp
124
5:4
6:4
126
7:4
ff
mp
7:4
f
128
6:4
ff
6:4
mf
5:4
5:4
5:4
pp
130
7:4
5:4
5:4
ff
p
7:4
ff
mp
132
6:4
7:4
f
7:4
7:4
ff


134
p
ff
7:4
mp
5:4
5:4
ff
7:4
6:4
136
f
5:4
p
5:4
138
7:4
7:4
ff
5:4
5:4
140
mf
f
7:4
ff
142
5:4
5:4
6:4
mp
144
ff
7:4
mf
5:4
ff
7:4
7:4
146
p
7:4
ff
mf

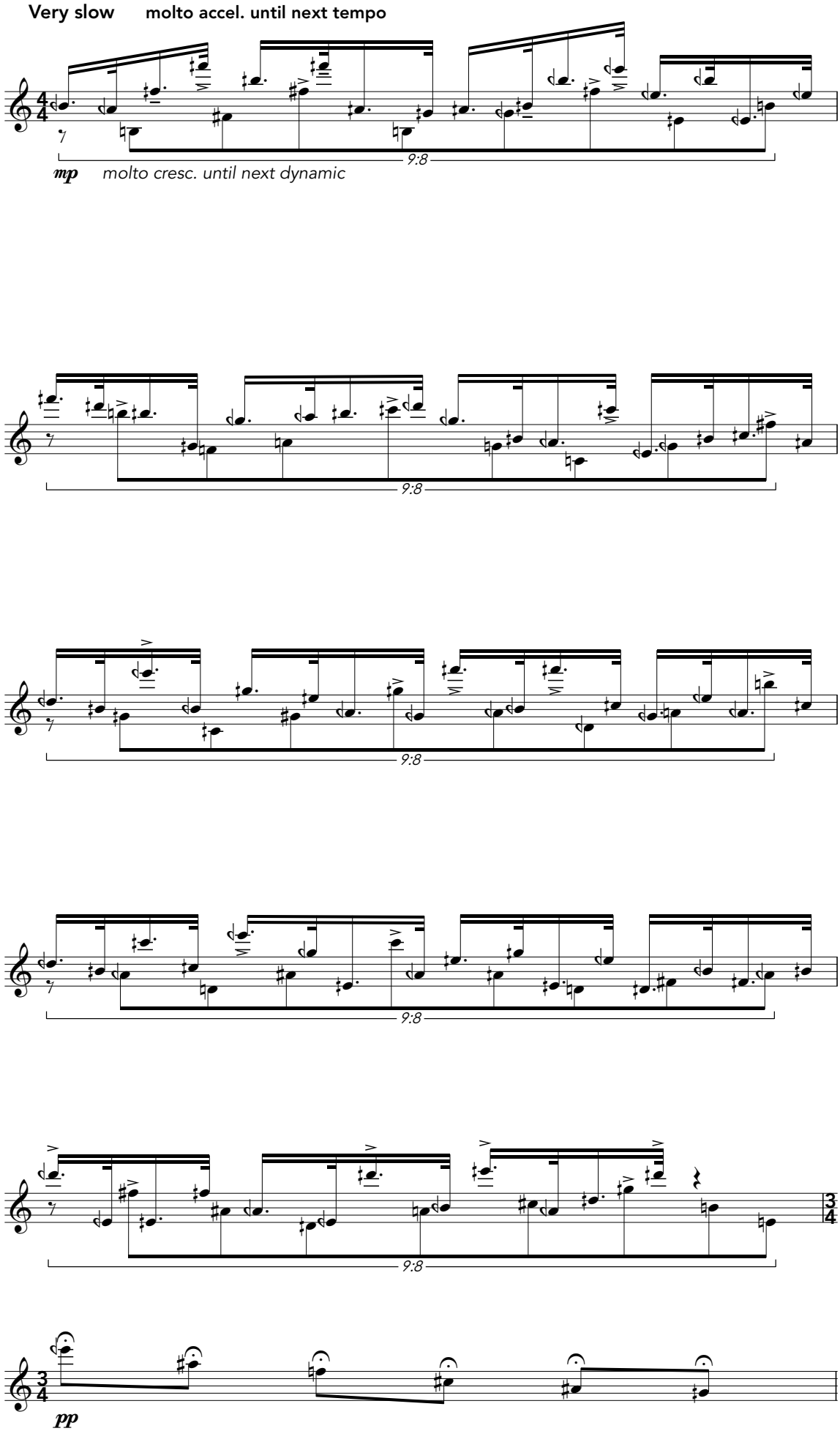

148
5:4
mp
ppp
6:4
150
7:4
5:4
152
7:4
7:4
ff
7:4
5:4
154
5:4
6:4
7:4
6:4
7:4
156
6:4
7:4
6:4
fff
158
6:4
6:4
7:4
pp
ff
5:4
160
5:4
mp
f
7:4
7:4

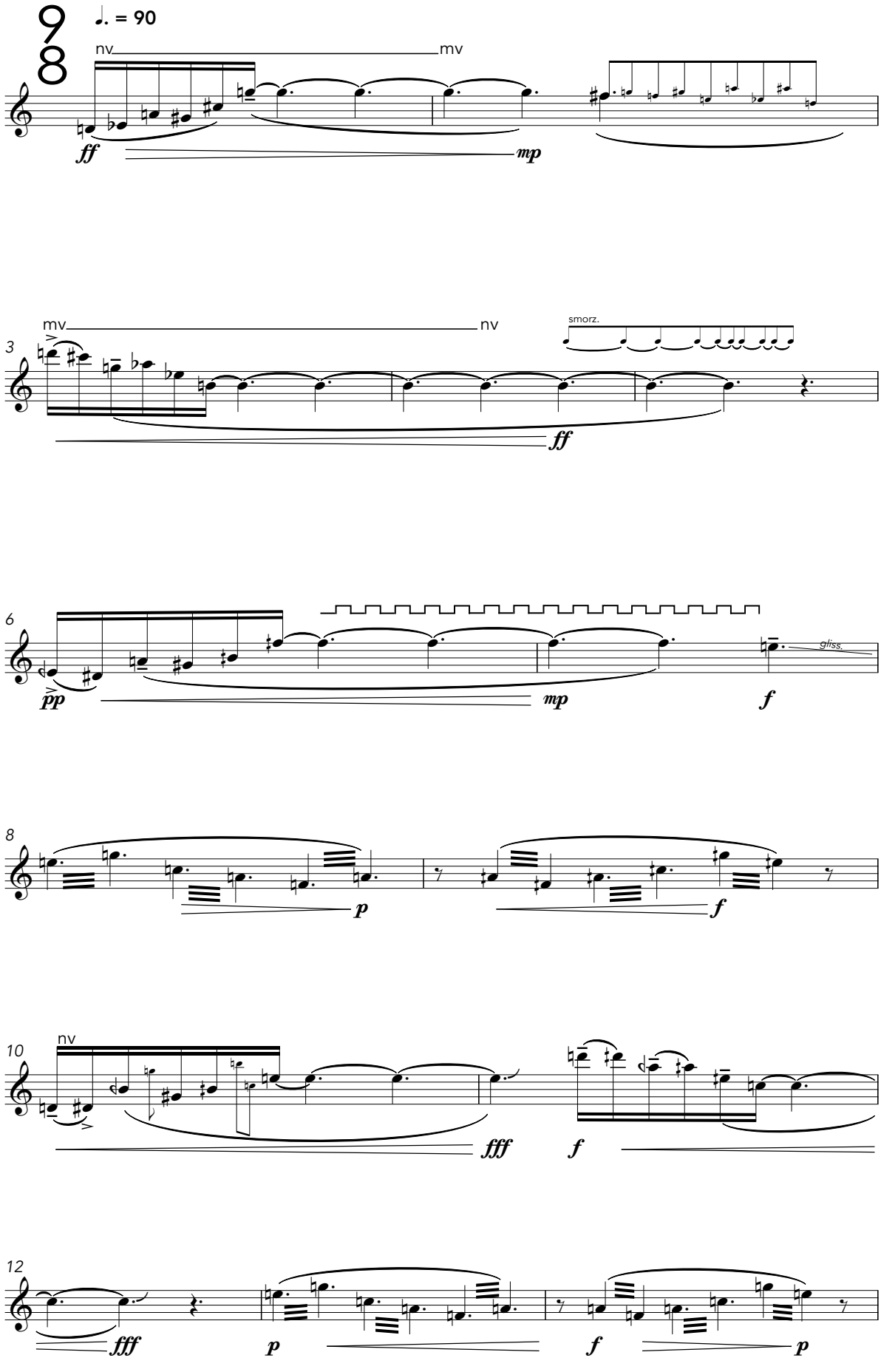

162
ff
7:4
f
5:4
6:4
7:4
164
5:4
5:4
p
f
6:4
ff
7:4
p
166
ff
7:4
pp
ff
7:4
f
6:4
ff
7:4
168
6:4
5:4
5:4
fff
7:4
170
pp
6:4
5:4
172
6:4
6:4
f
7:4
6:4
pp
174
5:4
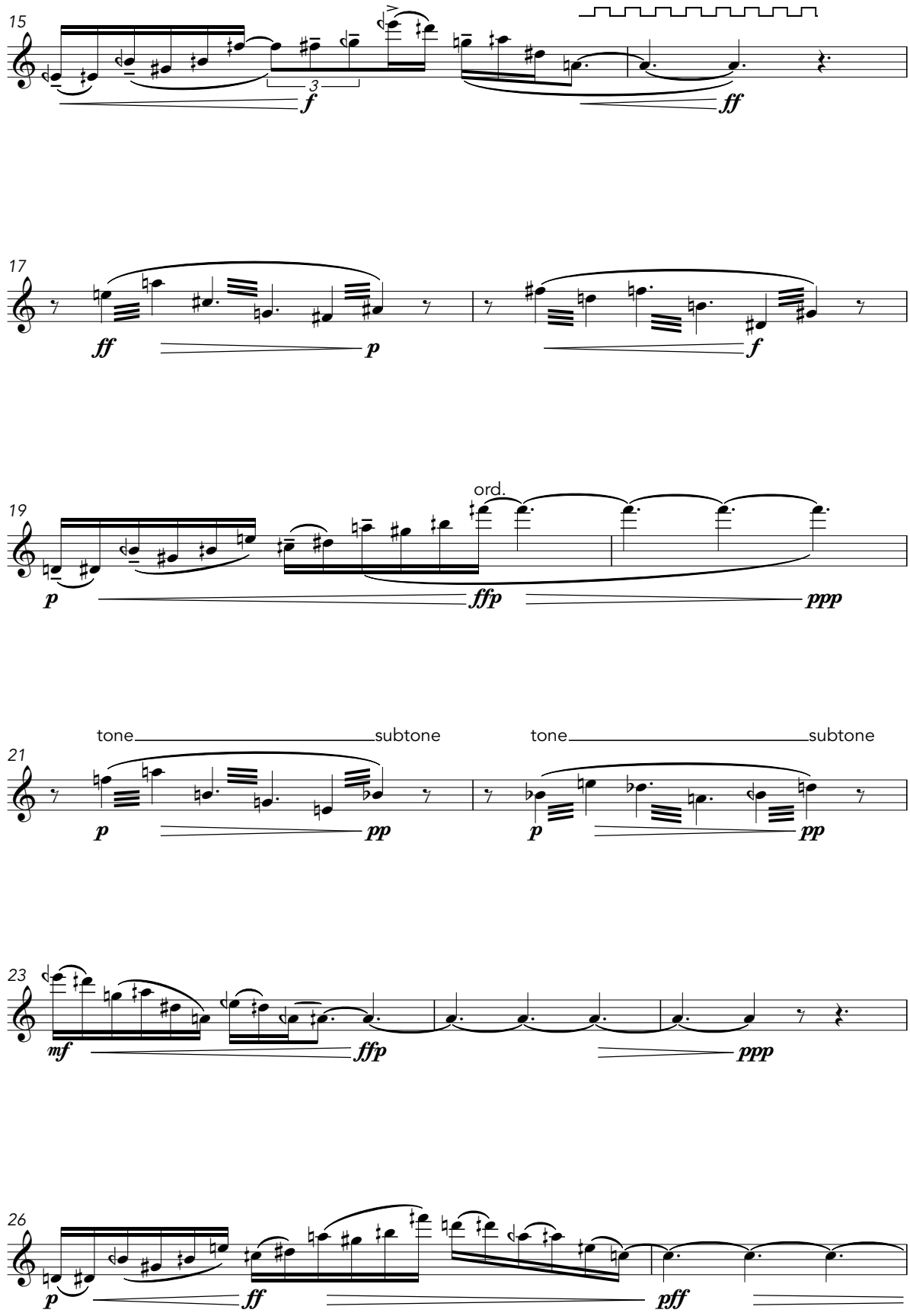

176
7:4
fp
6:4
178
5:4
6:4
fp
5:4
ff
7:4
p
5:4
f
7:4
180
7:4
7:4
ff
6:4
7:4
7:4
182
7:4
fff
6:4
5:4
pp
184
6:4
6:4
mf
p
ff
7:4
6:4
p
ff
7:4
p
186
7:4
5:4
ff
p
7:4
7:4
7:4
fff
188
5:4
p
7:4
fffp

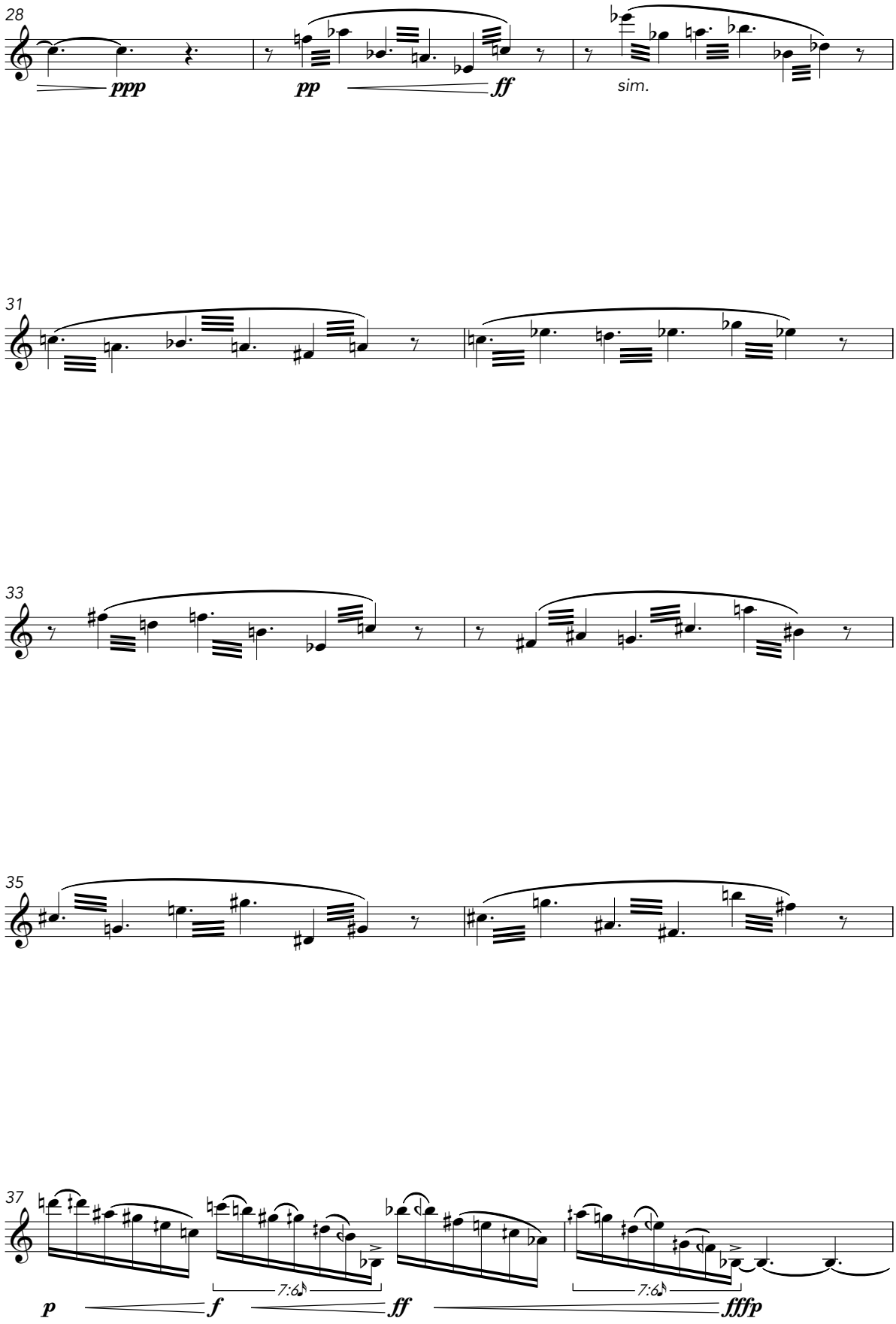

190
5:4
fffp
7:4
5:4
fffp
7:4

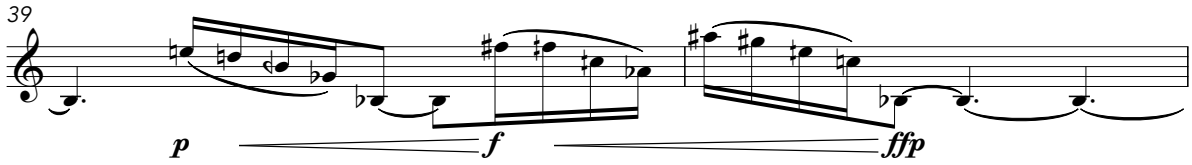
192
6:4
ppp
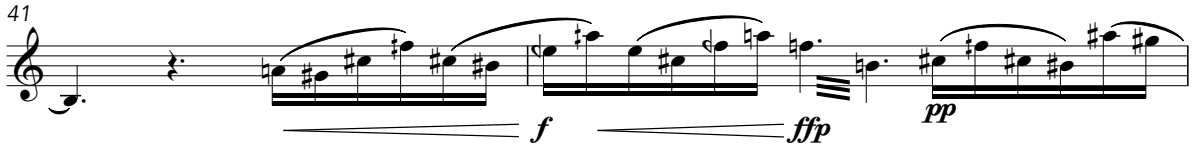

Very slow
molto accel. until next tempo
9:8
mp
molto cresc. until next dynamic
9:8
9:8
9:8
9:8
pp
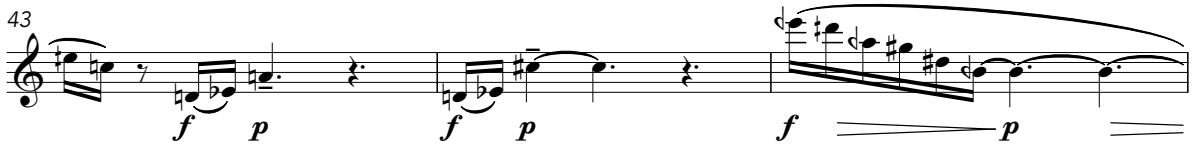

♩. = 90
nv
mv
ff
mp
3
mv
nv
smorz.
ff
6
pp
mp
f
gliss.
8
p
f
10
nv
fff
f
12
fff
p
f
p

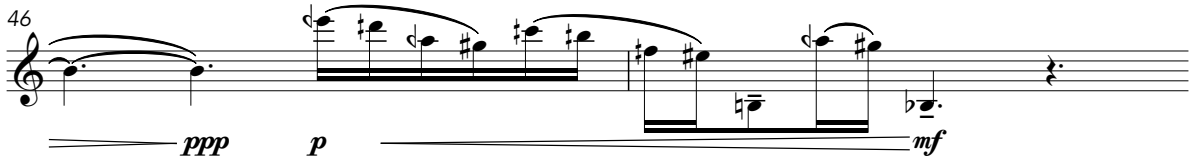

15
3
f
ff
17
ff
p
f
19
ord.
p
ffp
ppp
21
tone
subtone
p
pp
tone
subtone
p
pp
23
mf
ffp
ppp
26
p
ff
pff

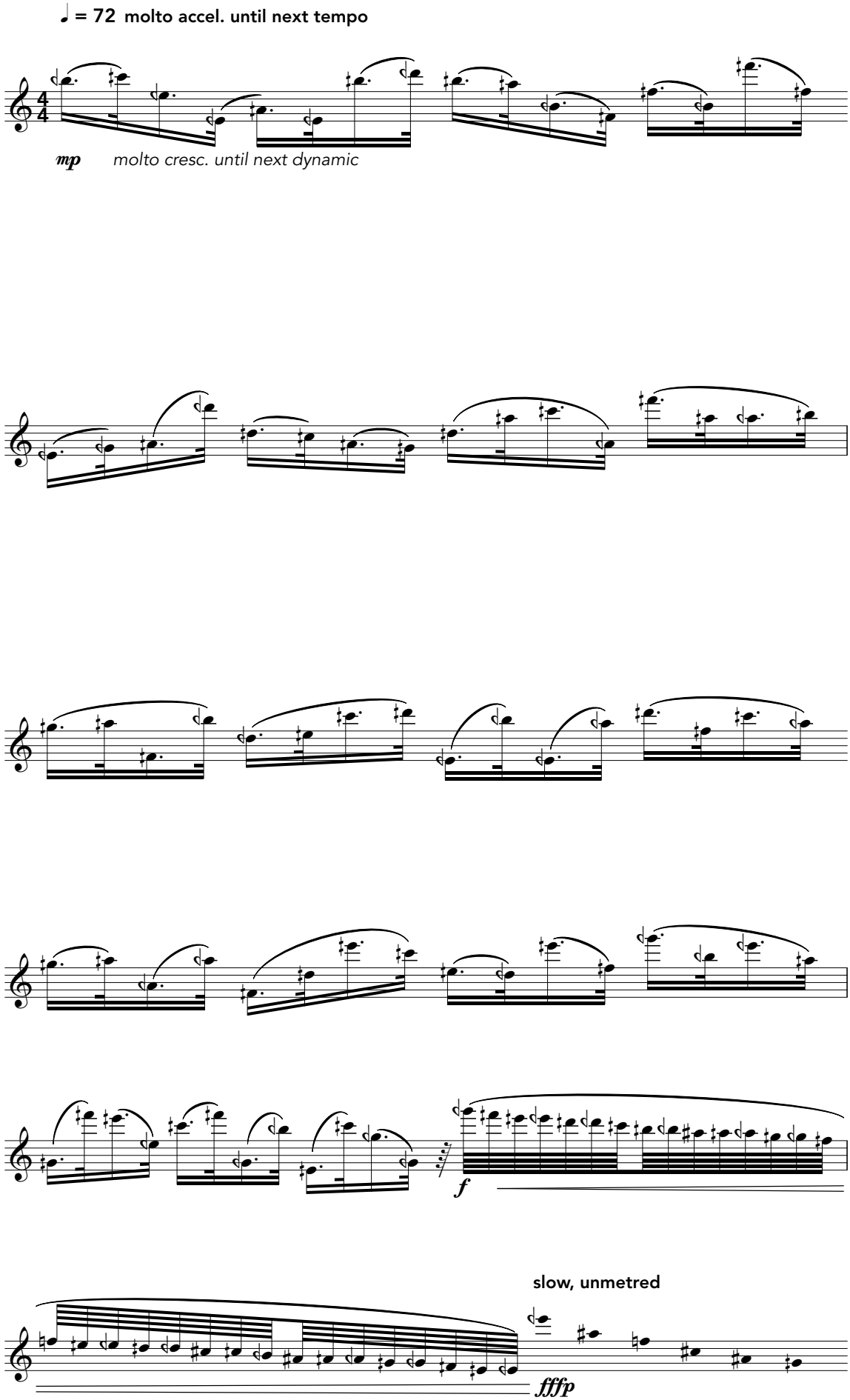

28
ppp
pp
ff
sim.
31
33
35
37
p
f
7:6
ff
7:6
fffp

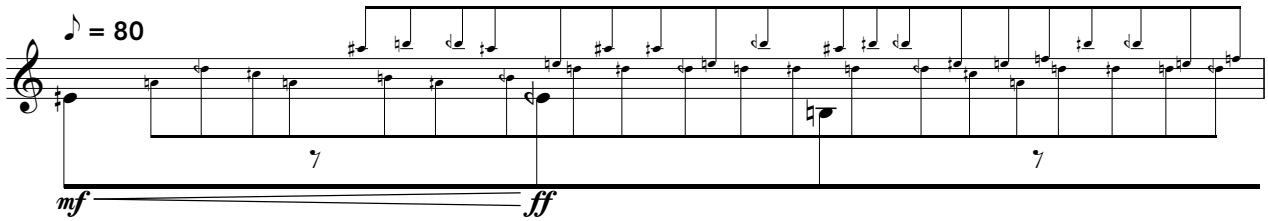

39
p
f
ffp

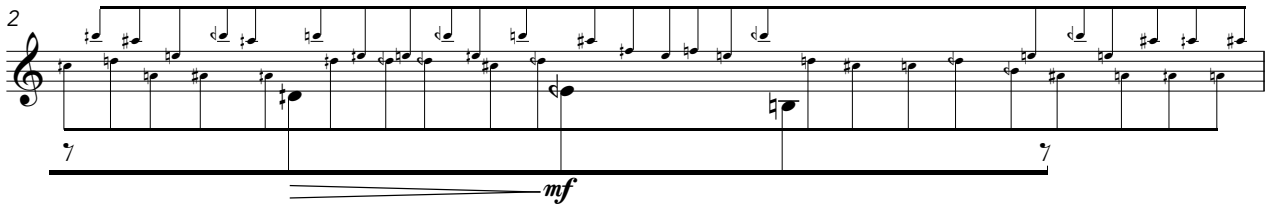

41
f
ffp
pp


43
f
p
f
p
f
p

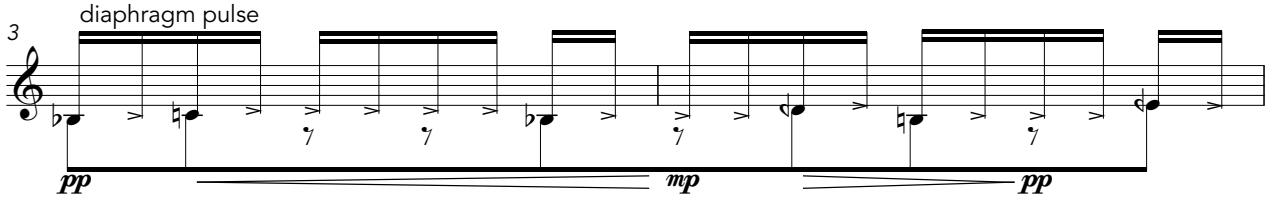

46
ppp
p
mf

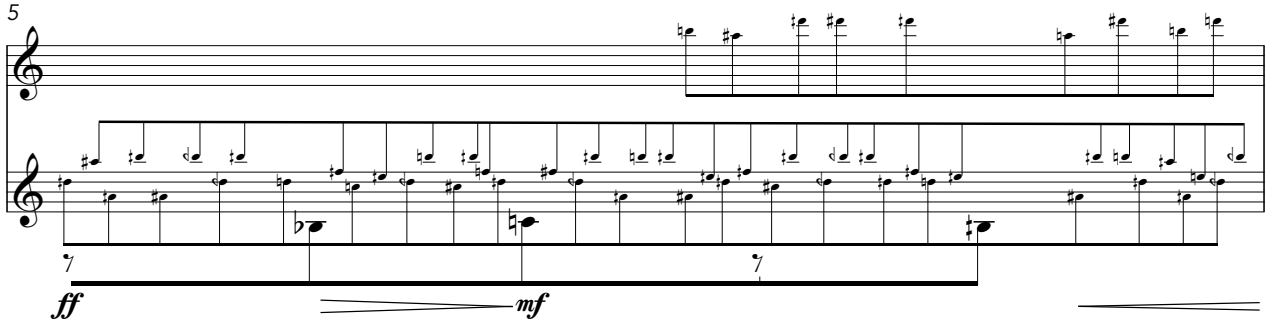

♩ = 72 molto accel. until next tempo
mp
molto cresc. until next dynamic
f
slow, unmetred
fffp

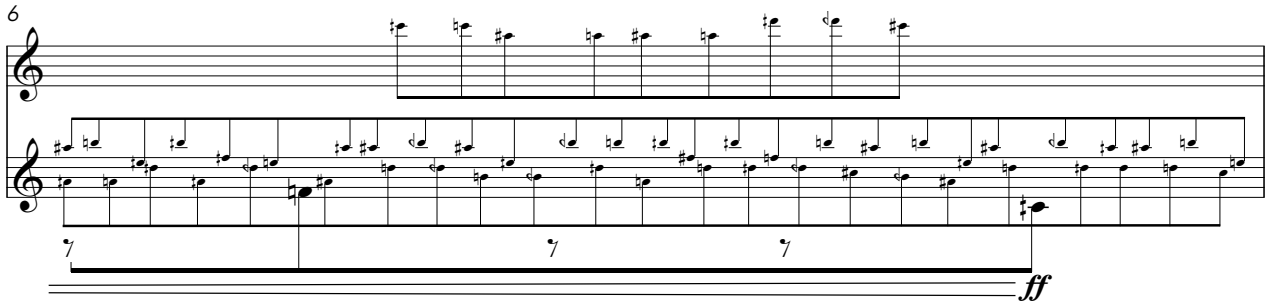


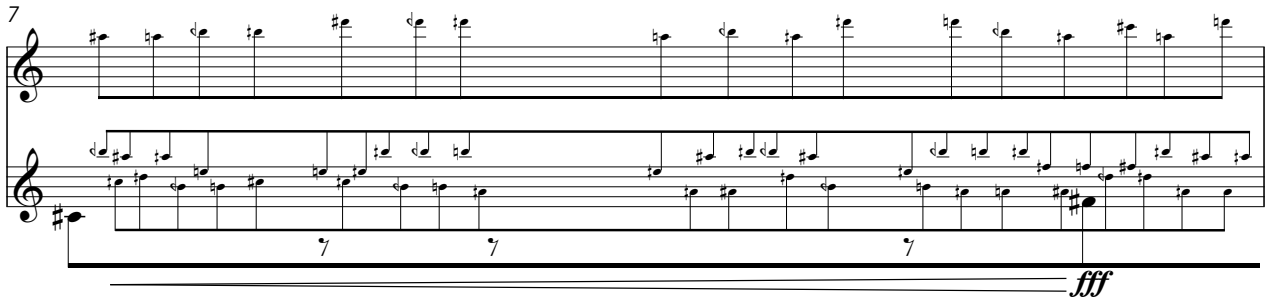


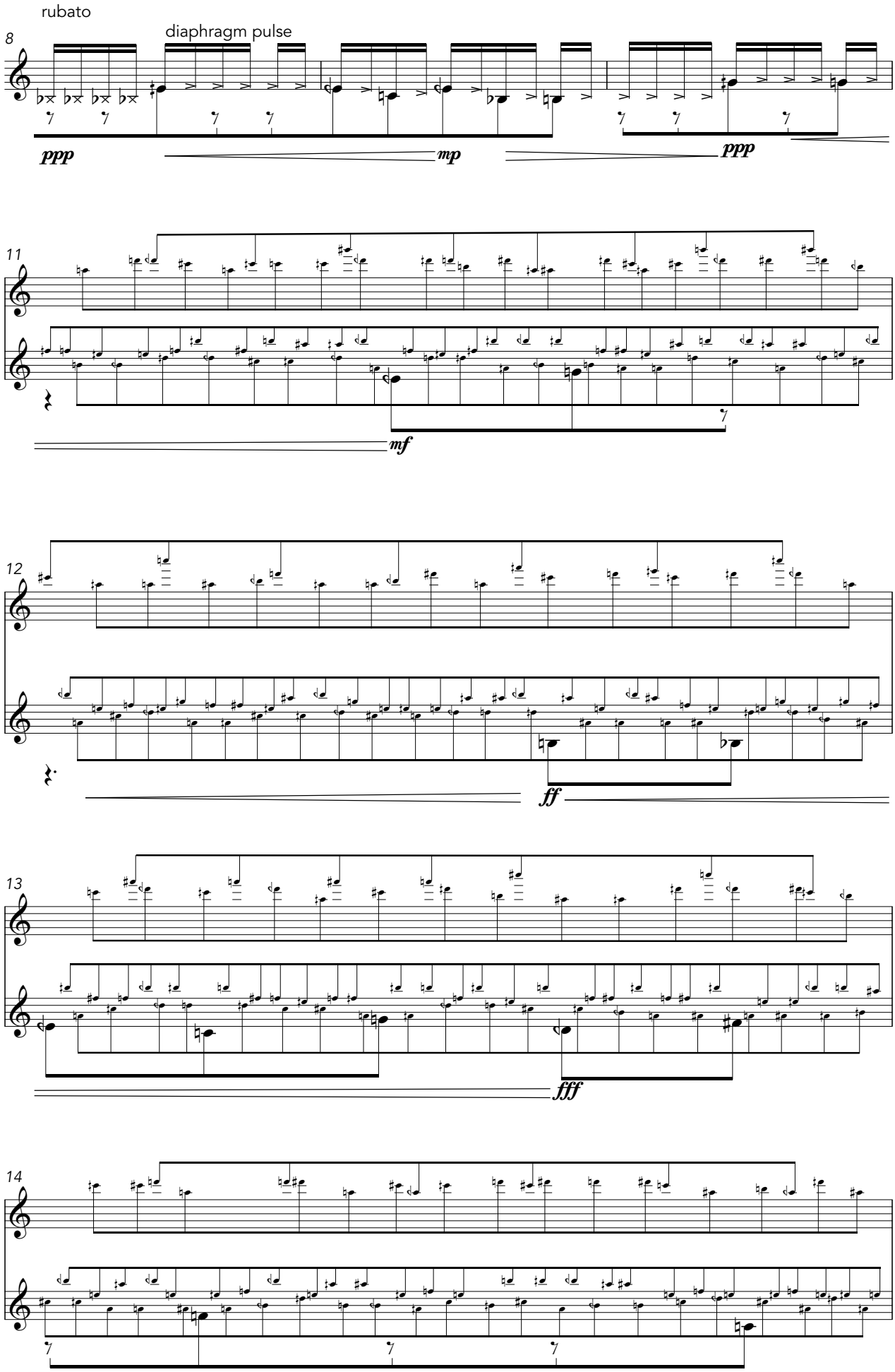
rubato

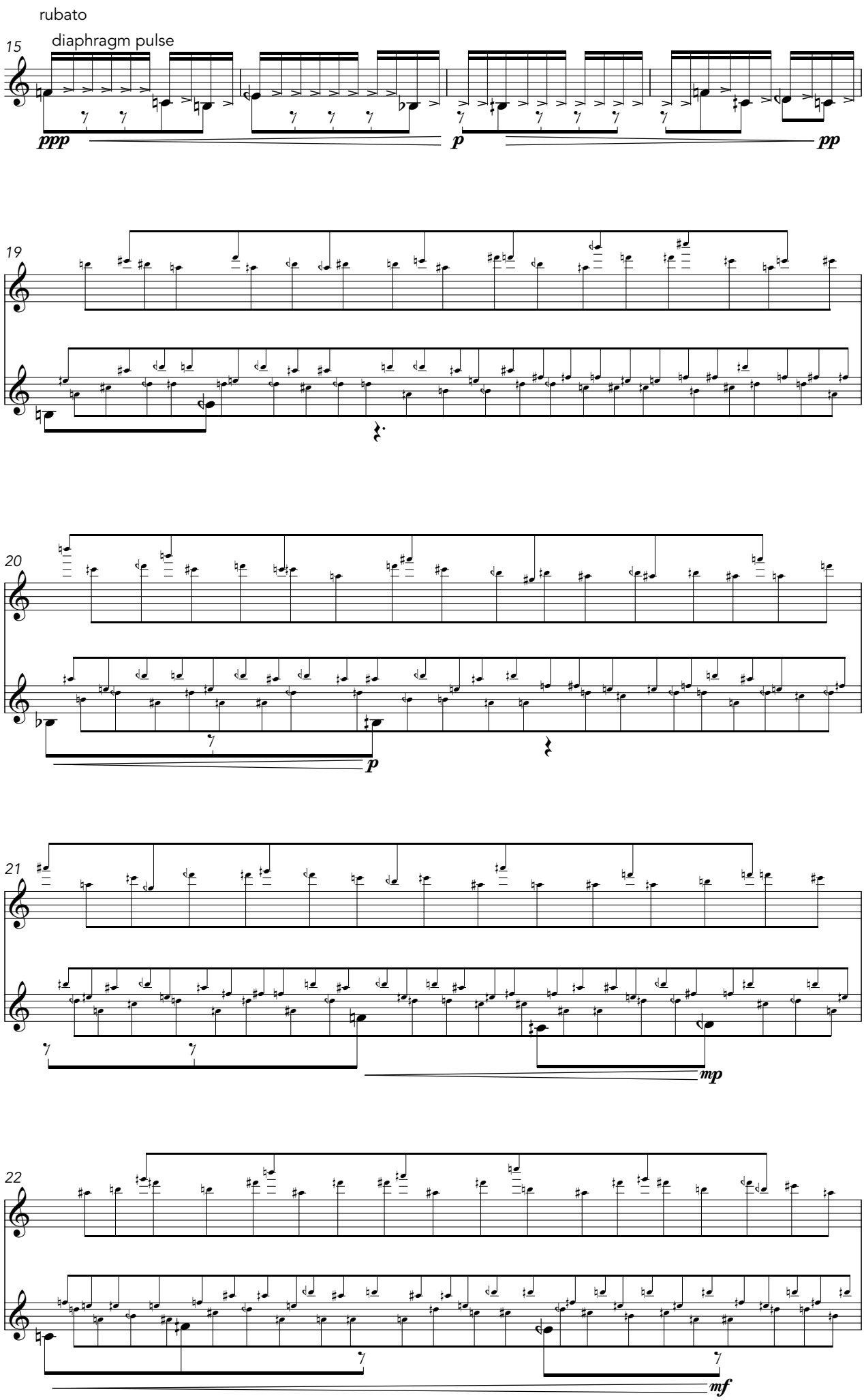


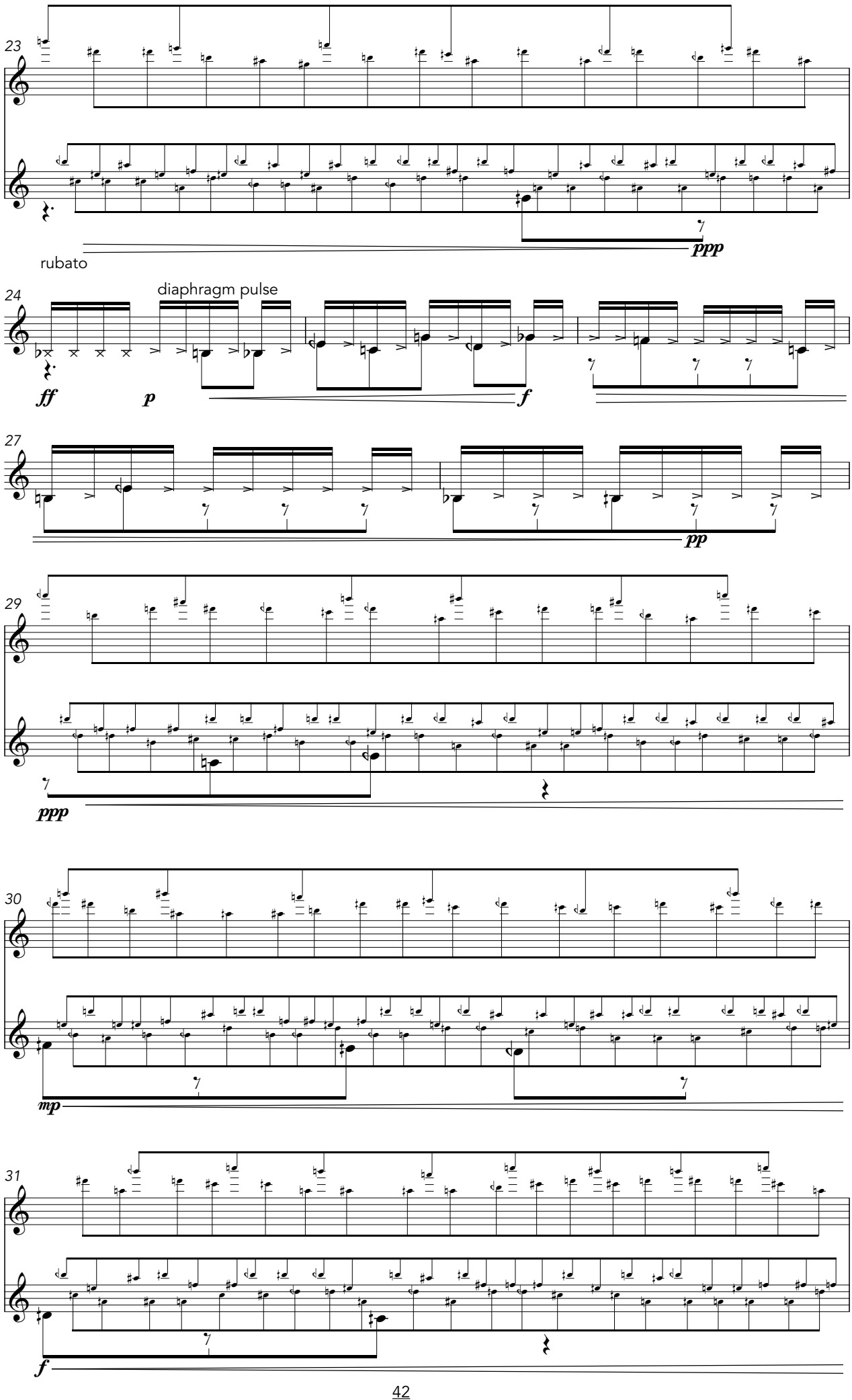


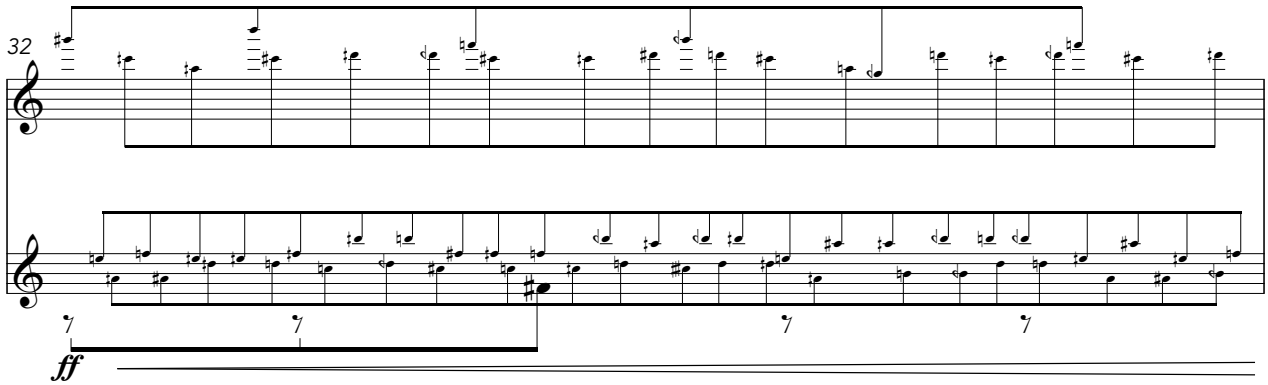


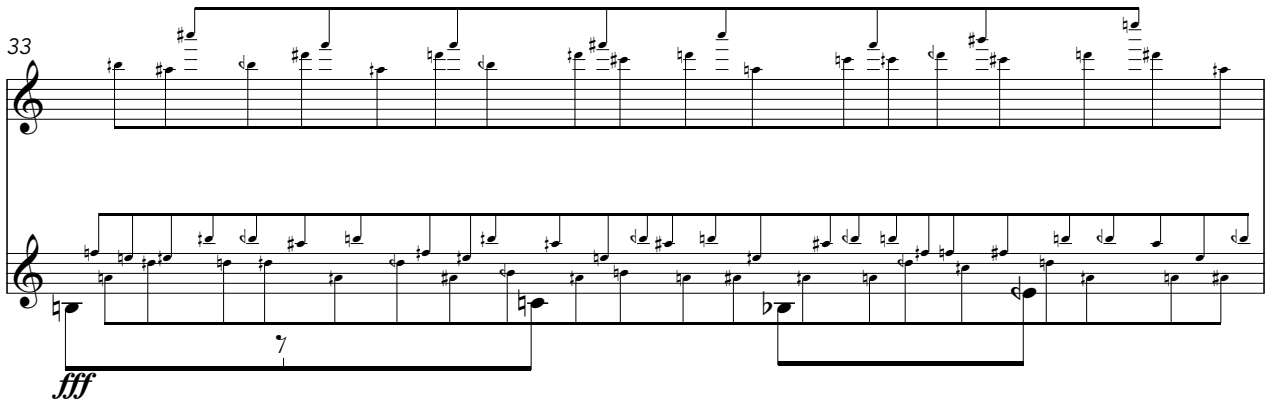


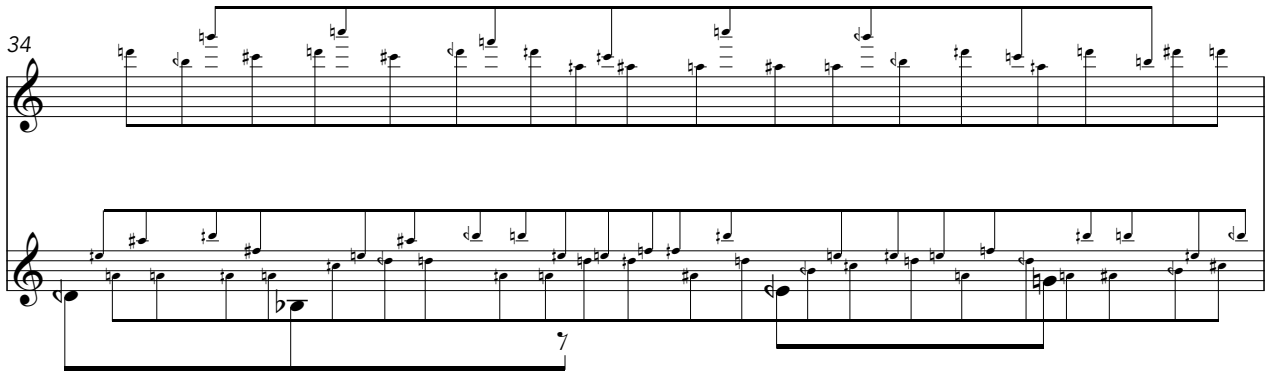

rubato
diaphragm pulse
8
ppp
mp
ppp
11
mf
12
ff
13
fff
14

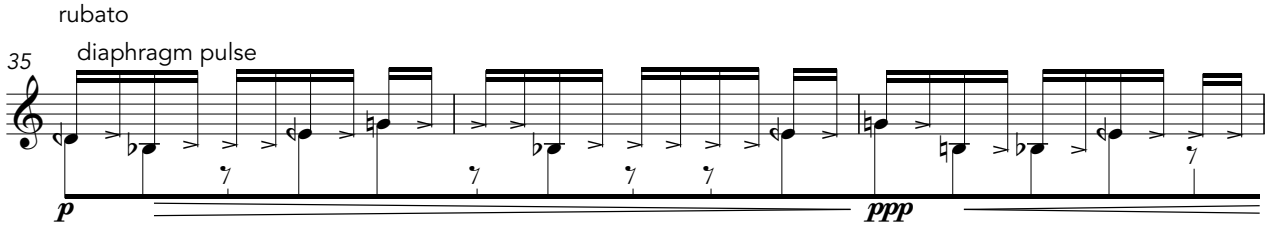

rubato
diaphragm pulse
15
ppp
p
pp
19
20
p
21
mp
22
mf

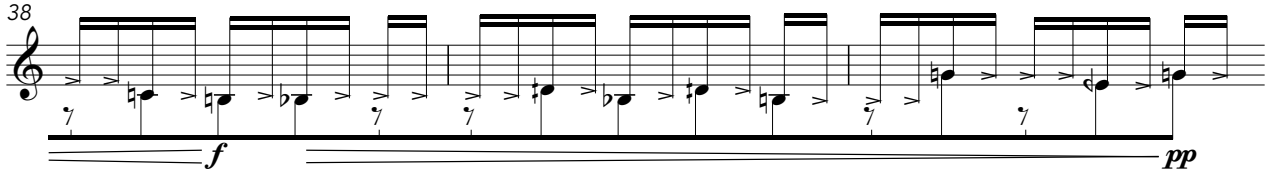

23
rubato
ppp
24
diaphragm pulse
ff
p
f
27
pp
29
ppp
30
mp
31
f

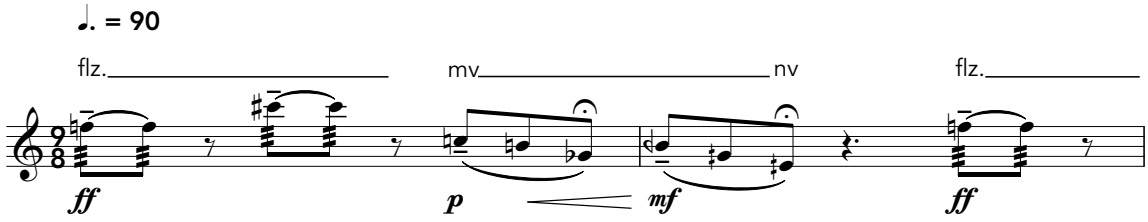

32
ff
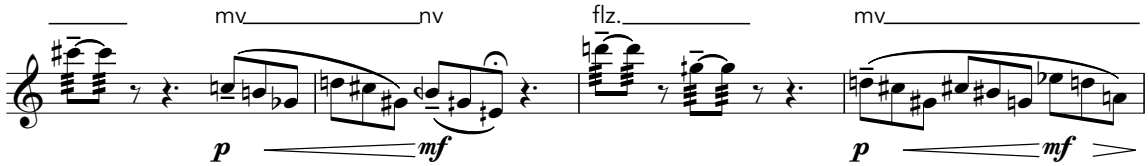

33
fff
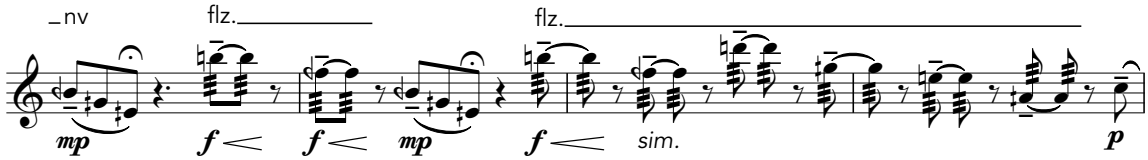

34

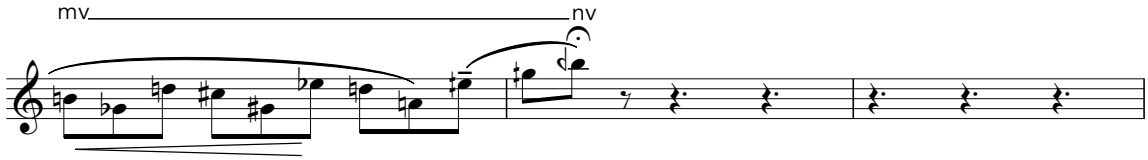

rubato
diaphragm pulse
35
p
ppp

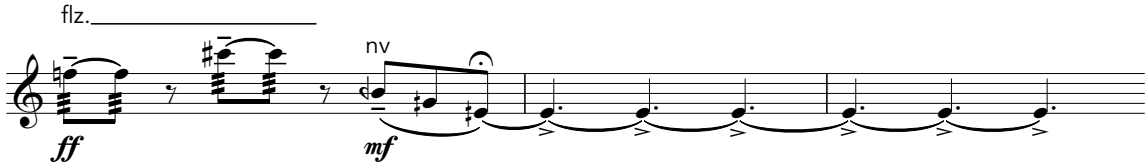

38
f
pp

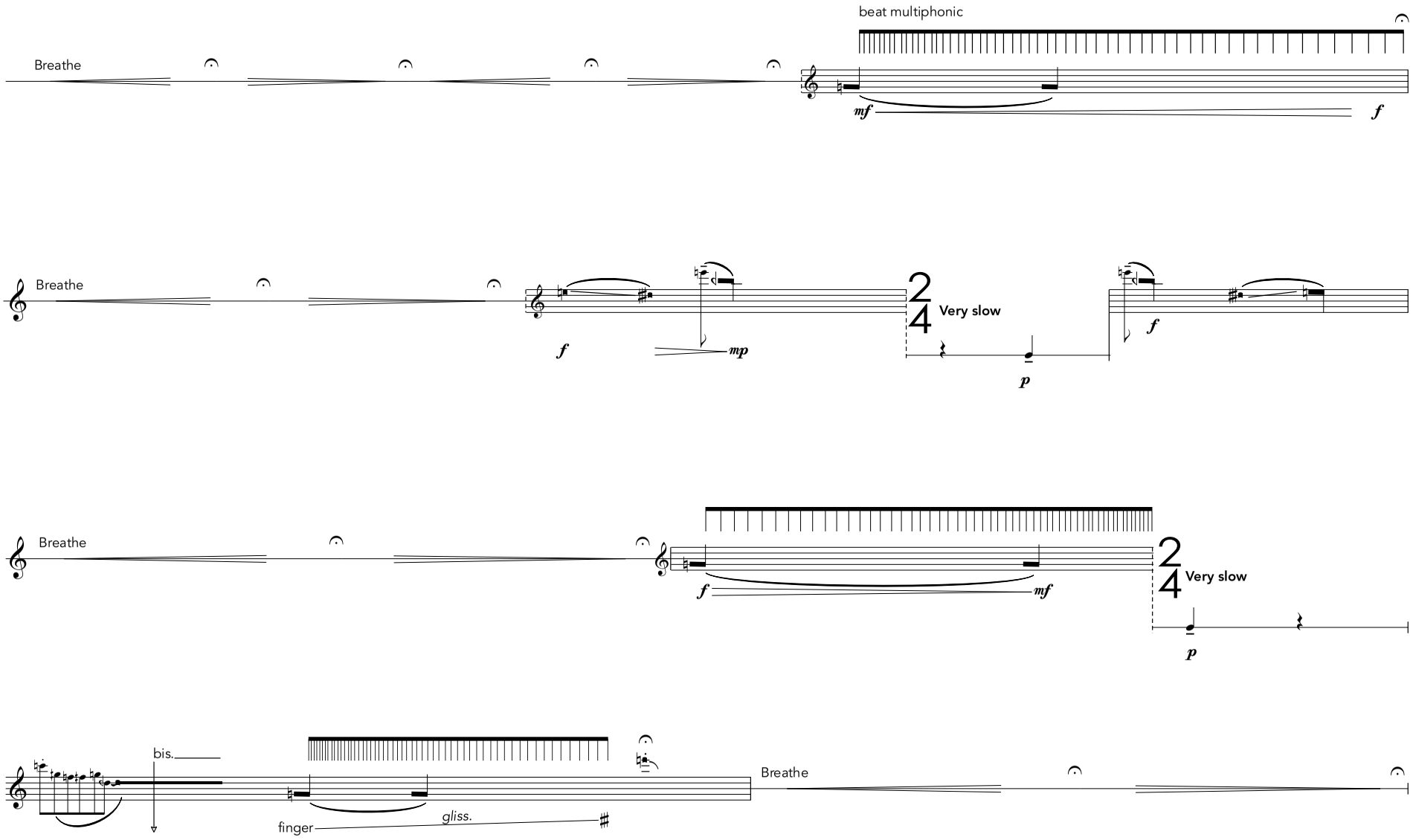

♩. = 90
flz.
mv
nv
flz.
ff
p
mf
ff

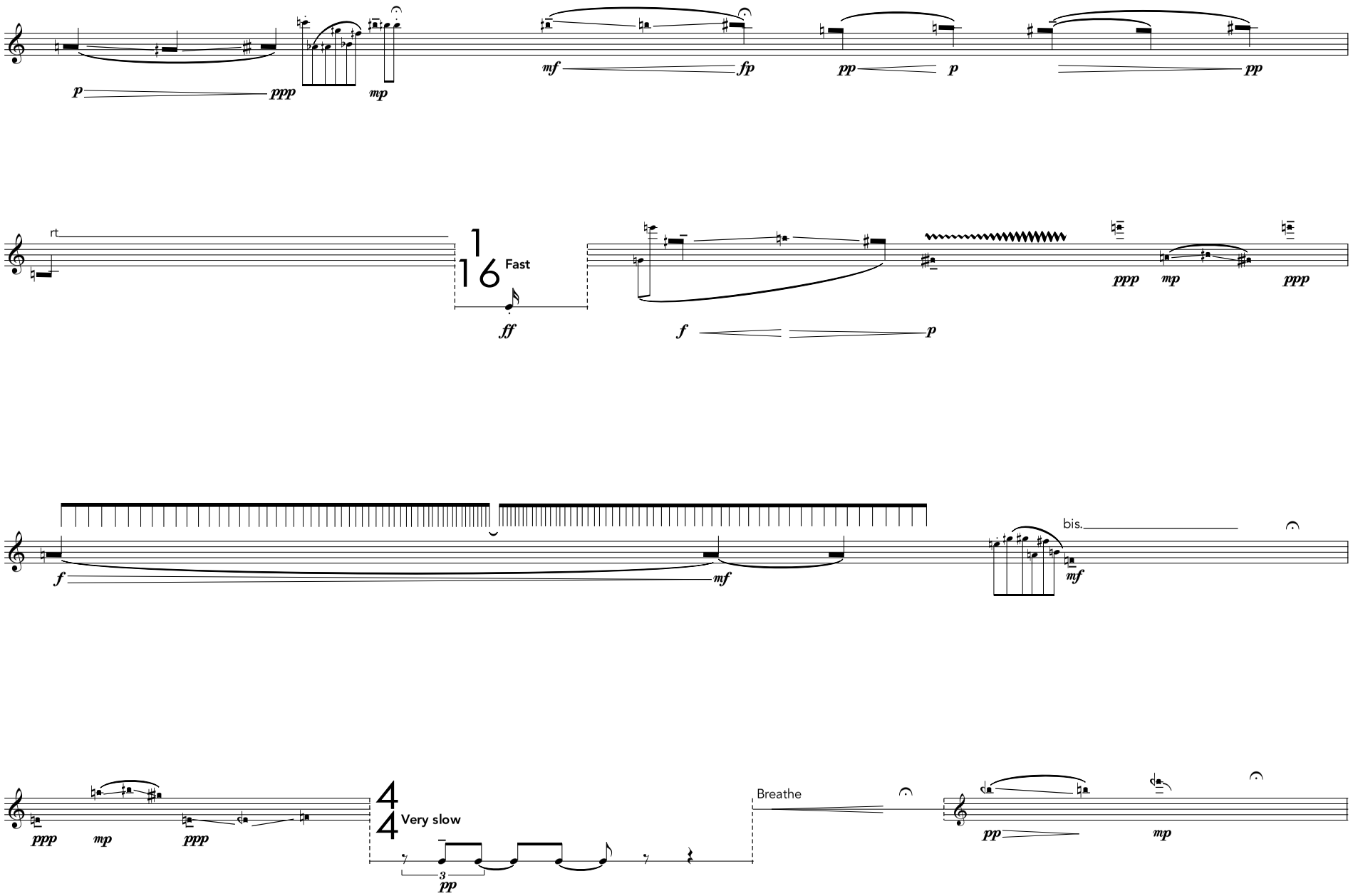

mv
nv
flz.
mv
p
mf
p
mf
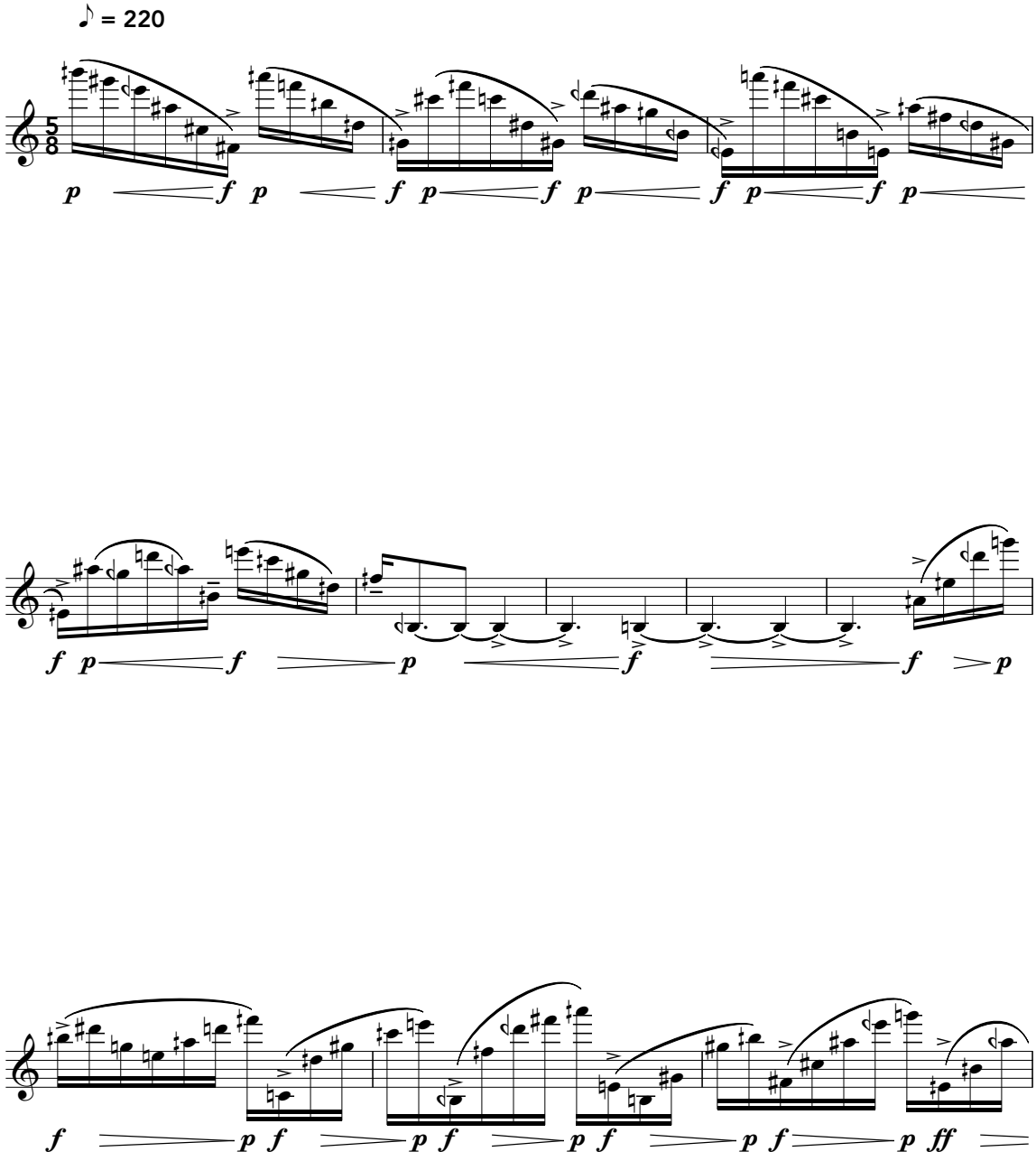

nv
flz.
flz.
mp
f
f
mp
f
sim.
p

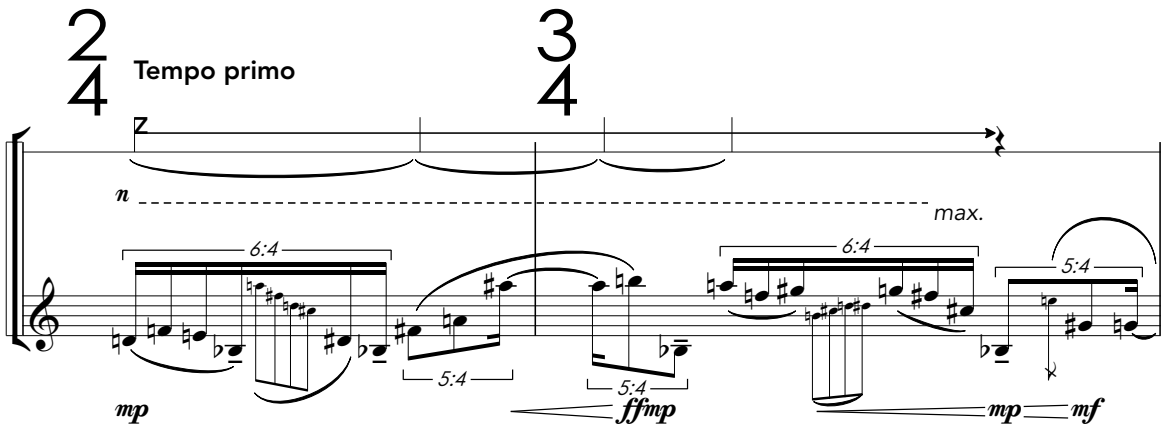

mv
nv


flz.
nv
ff
mf

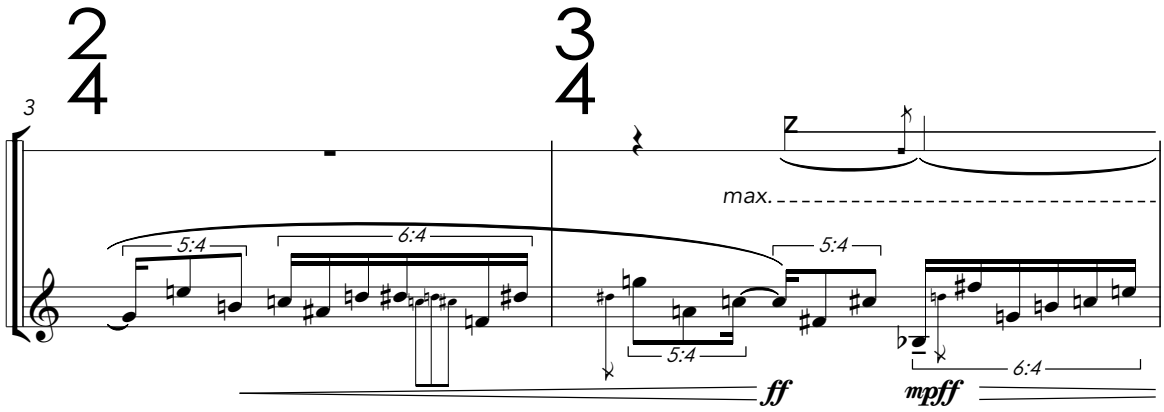

beat multiphonic
Breathe
mf
f
Breathe
f
mp
2
4
Very slow
p
f
Breathe
f
mf
2
4
Very slow
p
bis.
finger
gliss.
Breathe

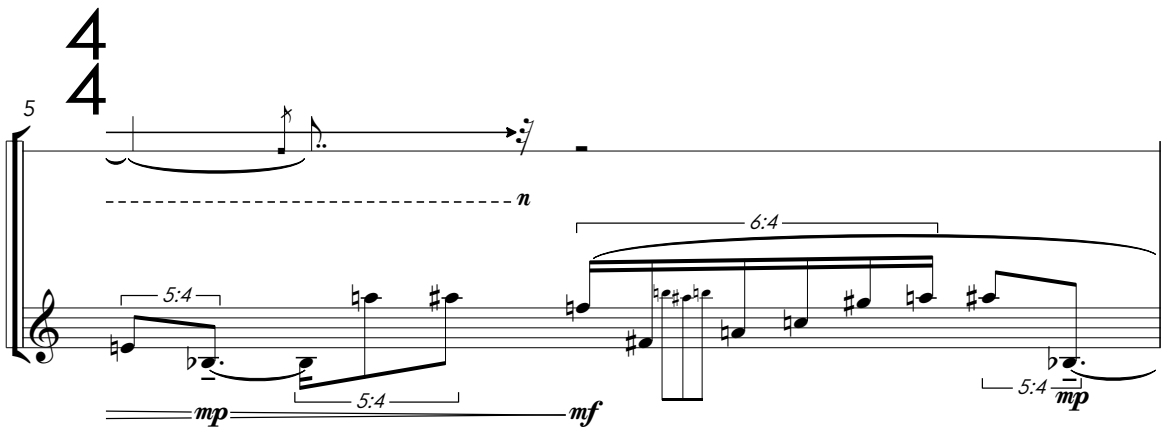

p
ppp
mp
mf
fp
pp
p
pp
rt
16
Fast
ff
f
p
ppp
mp
ppp
f
mf
bis.
mf
ppp
mp
ppp
4
4
Very slow
3
pp
Breathe
pp
mp

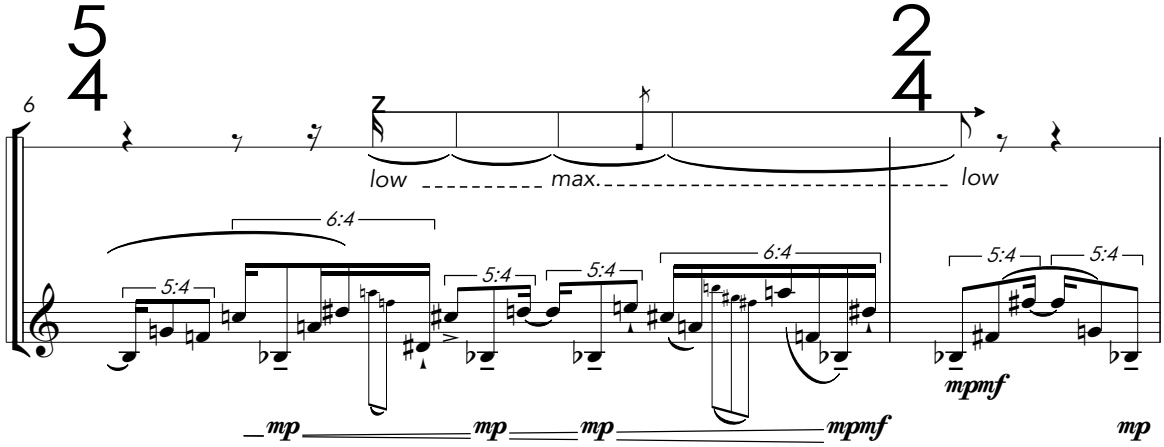

♪ = 220
5
8
p f p f p f p f p f p
f p f p f p f p
f p f p f p f p f ff
p

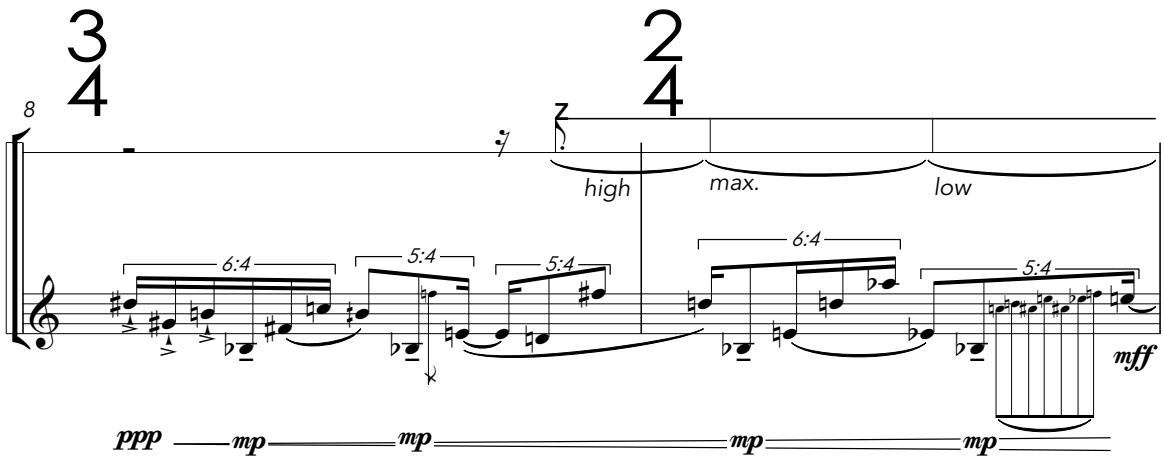


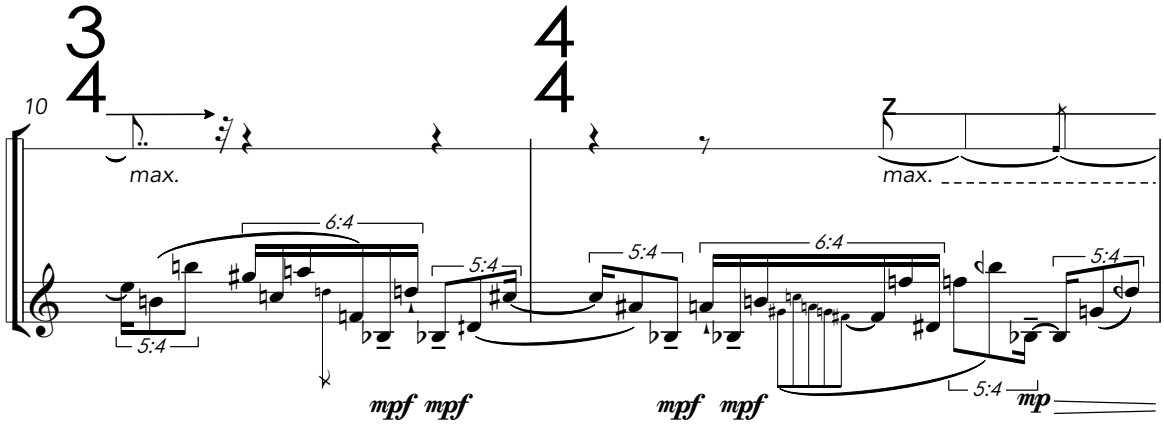
'Snatch' breaths before beats whenever needed.

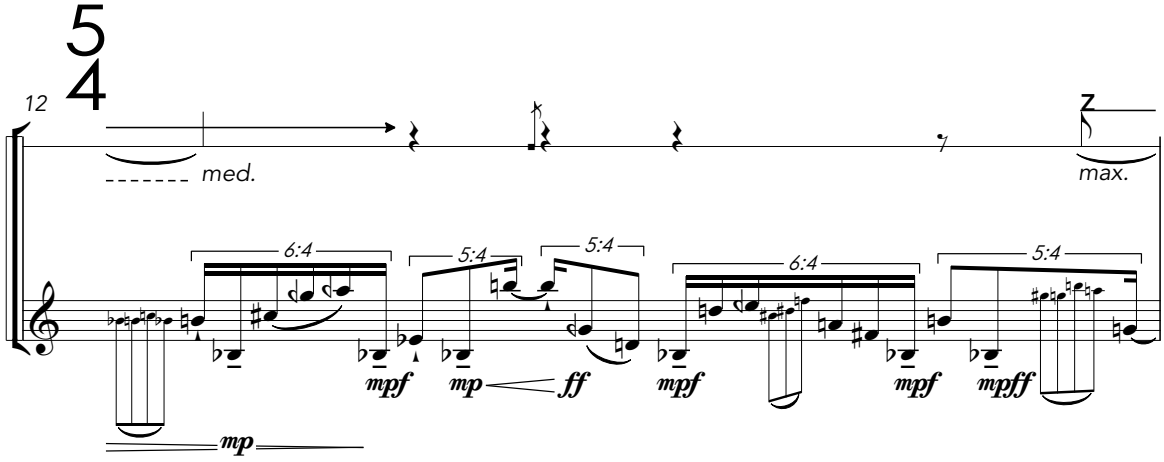


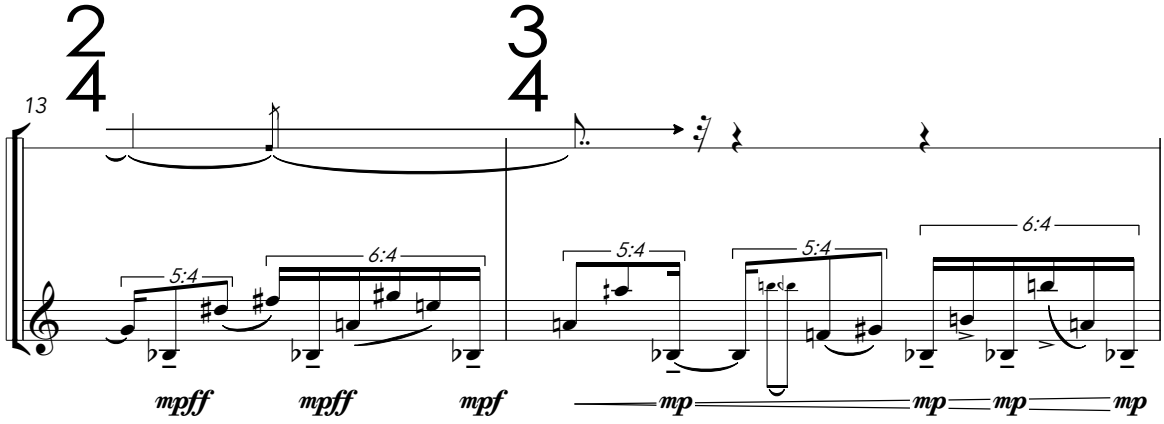


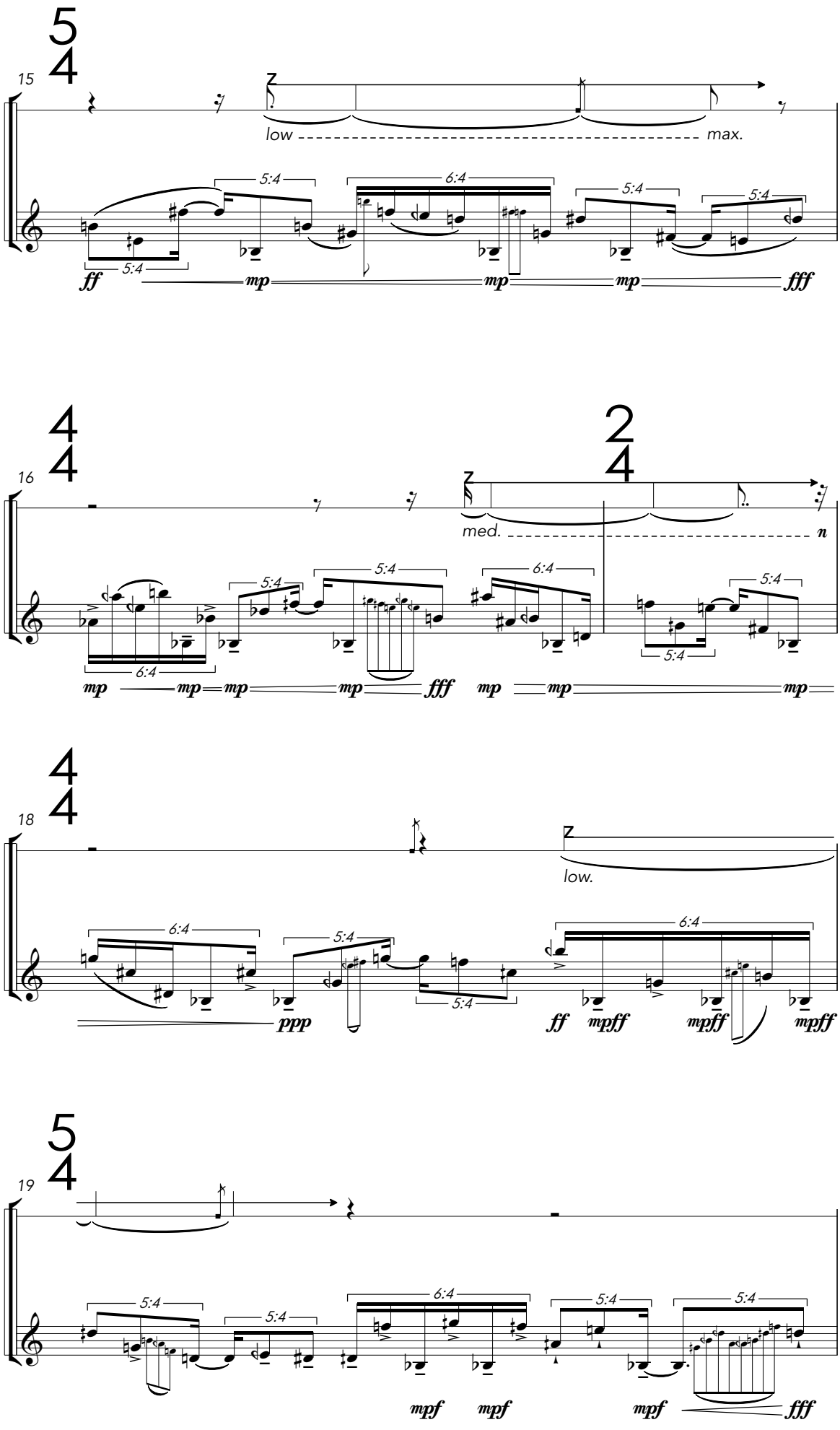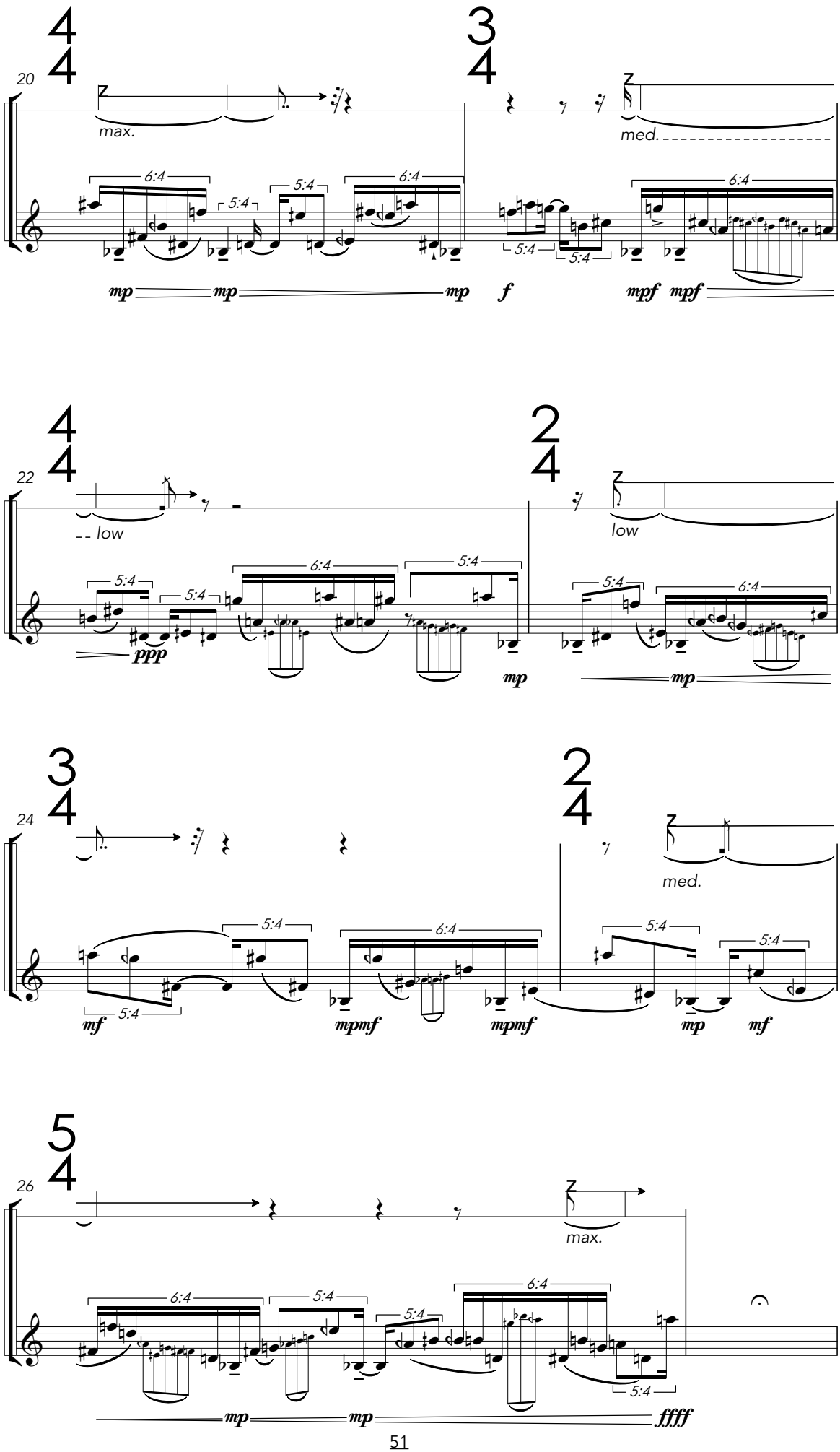



8
high
max.
low
6:4
5:4
5:4
6:4
5:4
mff
ppp
mp
mp
mp
mp

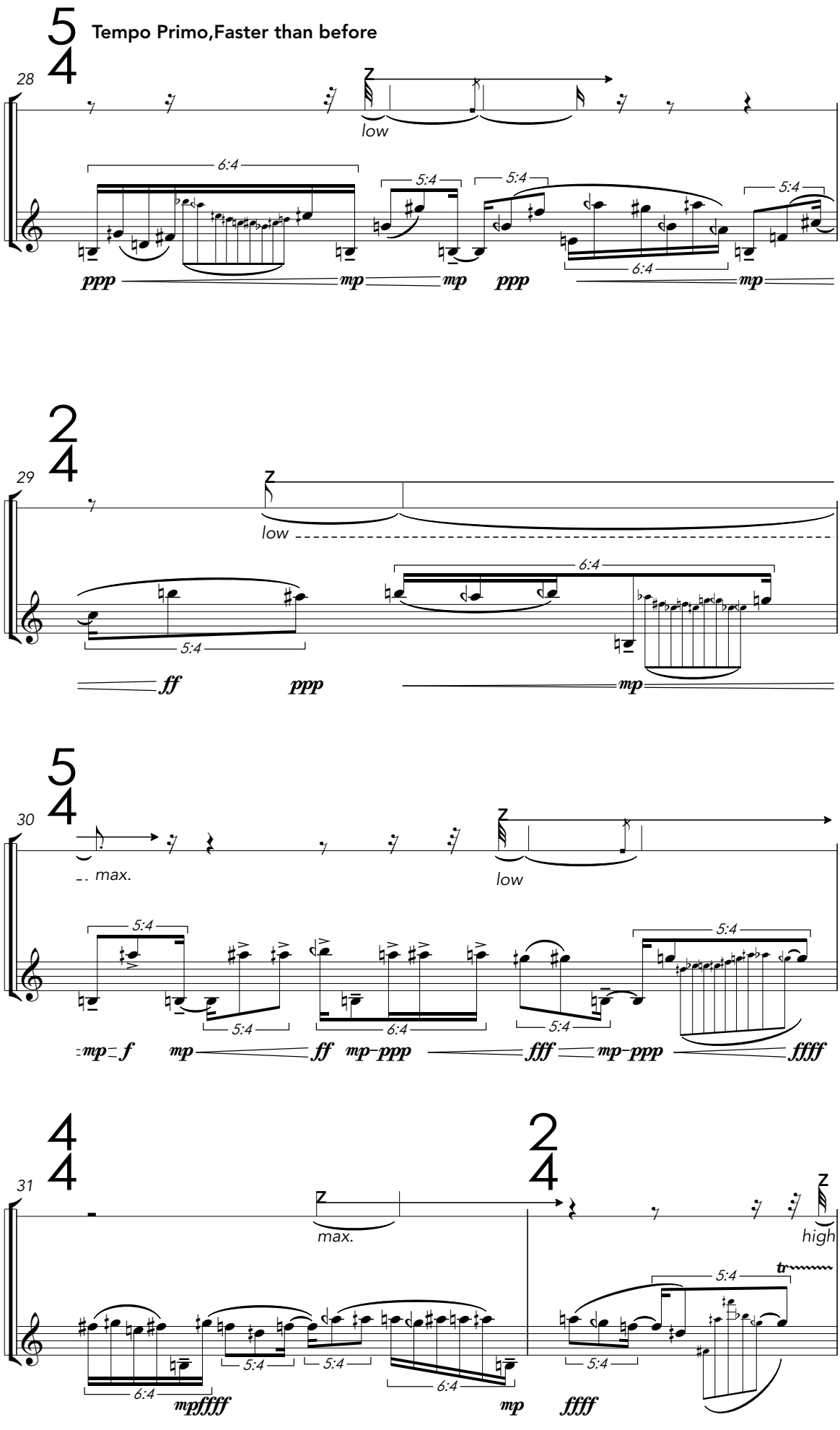

10
max.
max.
6:4
5:4
5:4
6:4
5:4
5:4
mpf mpf
mpf mpf
mp

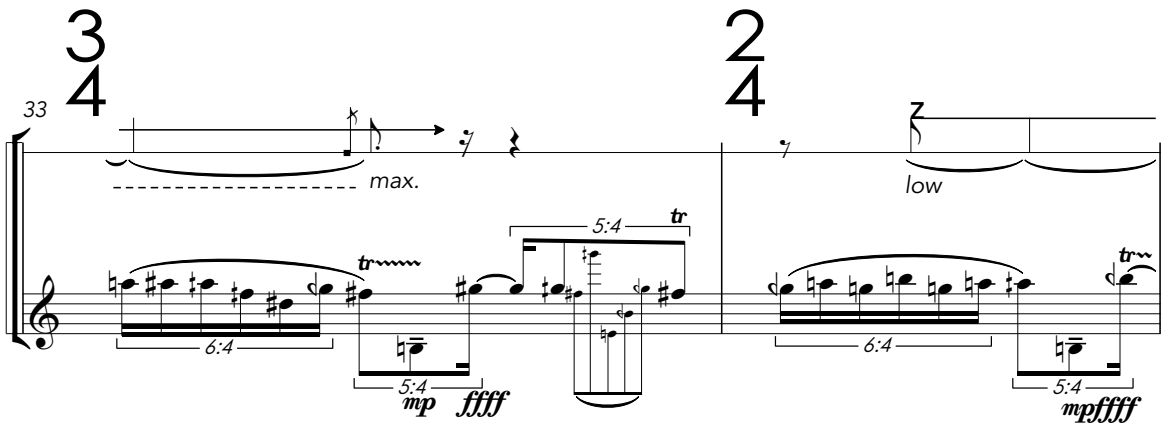

12
med.
max.
6:4
5:4
5:4
6:4
5:4
mpf
mp
ff
mpf
mpf
mpff
mp

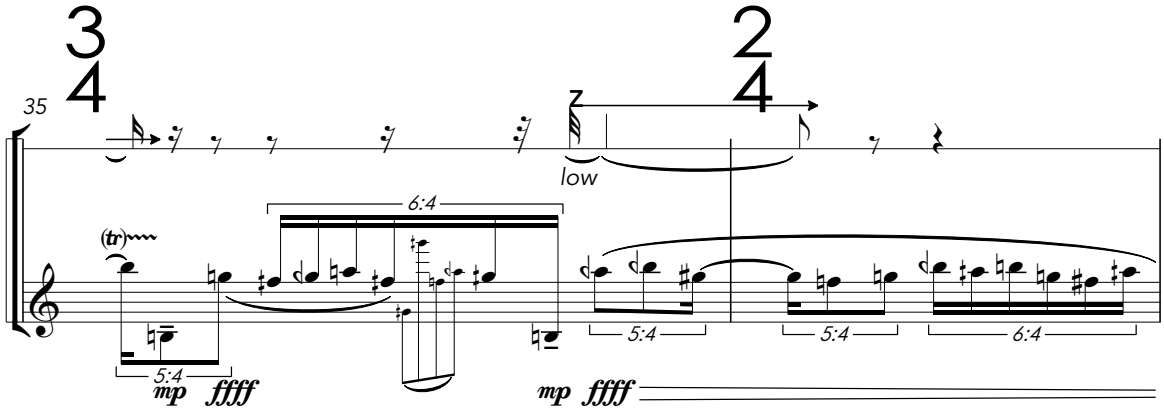

13
5:4
6:4
5:4
5:4
6:4
mpff
mpff
mpf
mp
mp
mp
mp

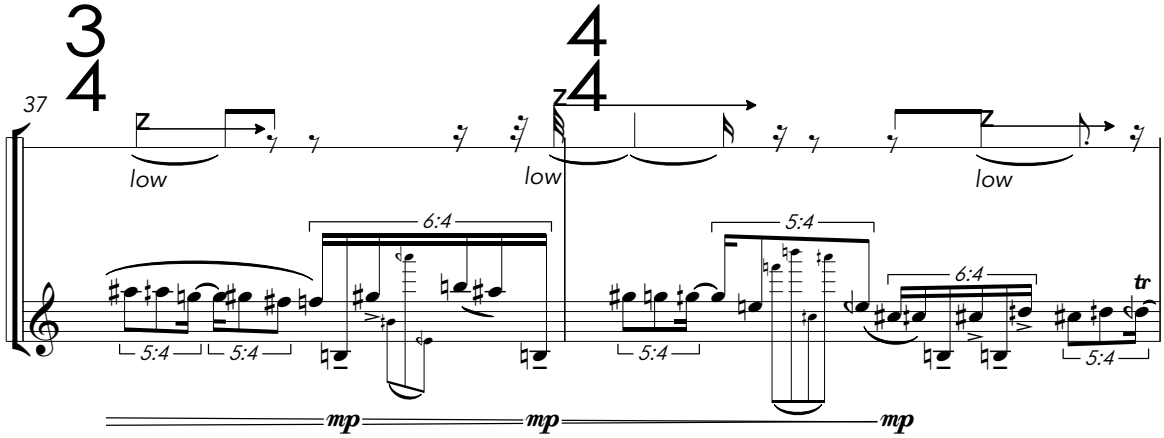

15
low
max.
5:4
6:4
ff
mp
fff
16
med.
n
18
low.
ppp
mpff
19
mpf
fff

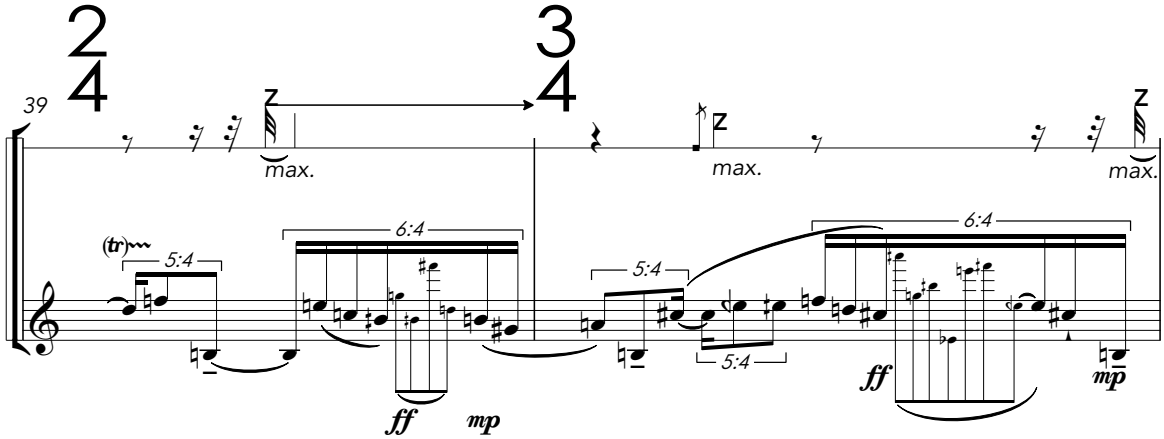

20
max.
med.
6:4
5:4
mp
f
mpf
22
low
ppp
24
mf
mpmf
26
ffff

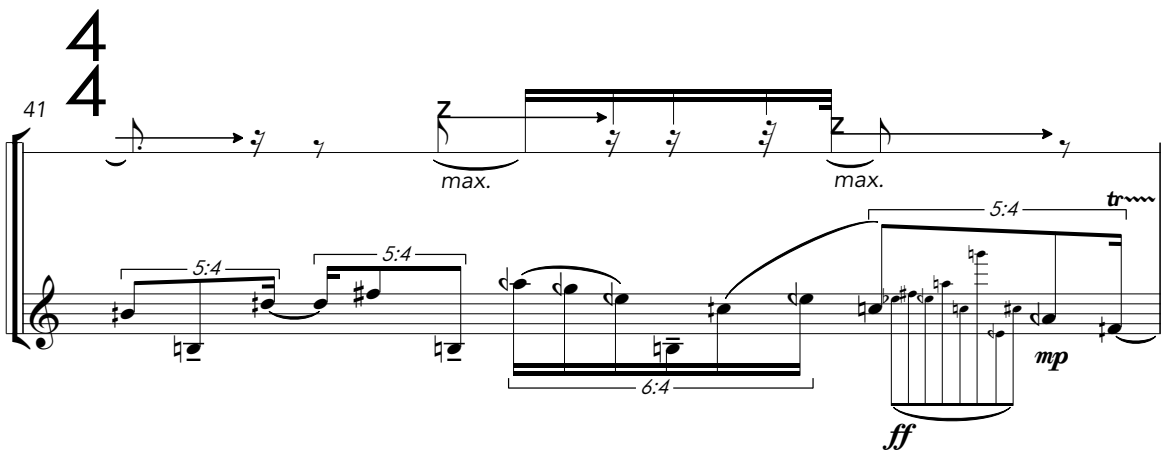

5/4
Tempo Primo,Faster than before
28
low
6:4
5:4
5:4
5:4
6:4
ppp
mp
mp
ppp
mp
2/4
29
low
5:4
6:4
ff
ppp
mp
5/4
30
max.
low
5:4
5:4
5:4
5:4
6:4
5:4
mp
f
mp
ff
mp-ppp
fff
mp-ppp
ffff
4/4
2/4
31
max.
high
tr
5:4
5:4
5:4
5:4
6:4
6:4
mp
fffff
mp
ffff

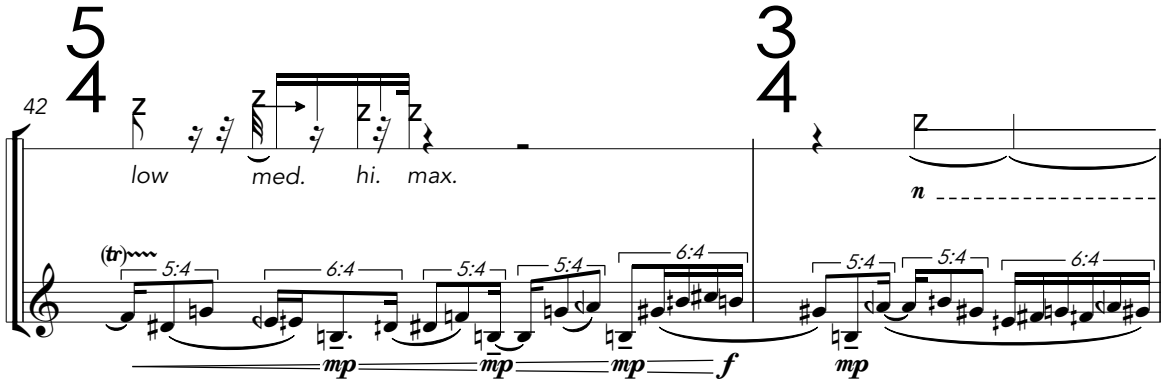

33
max.
low
5:4
6:4
mp
ffff

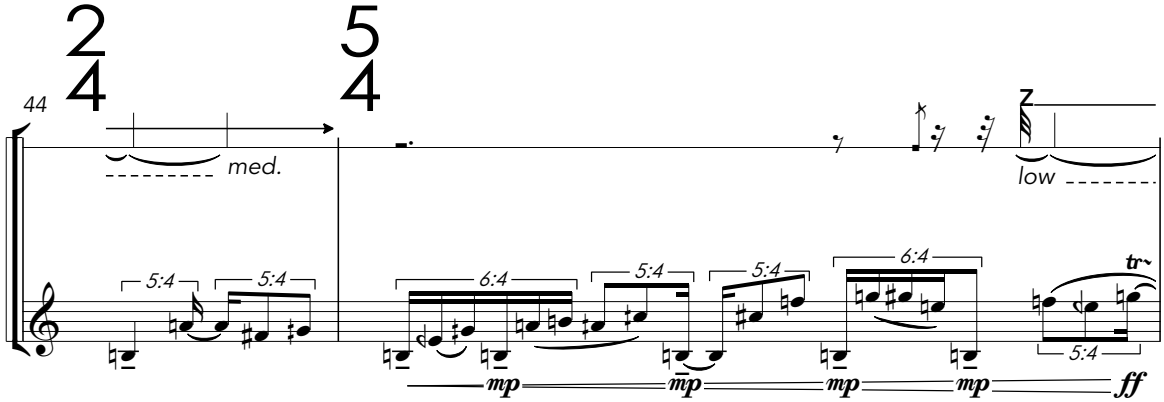

35
low
6:4
5:4
mp
ffff

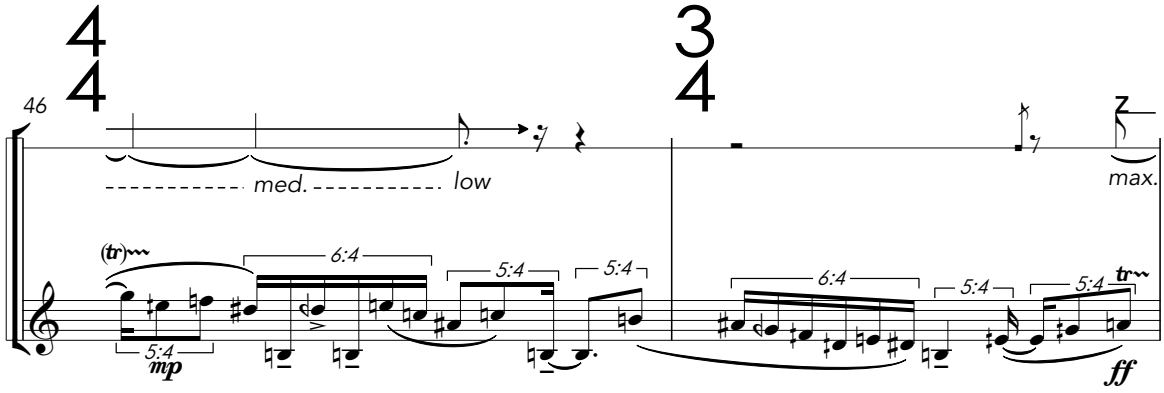

37
low
6:4
5:4
mp

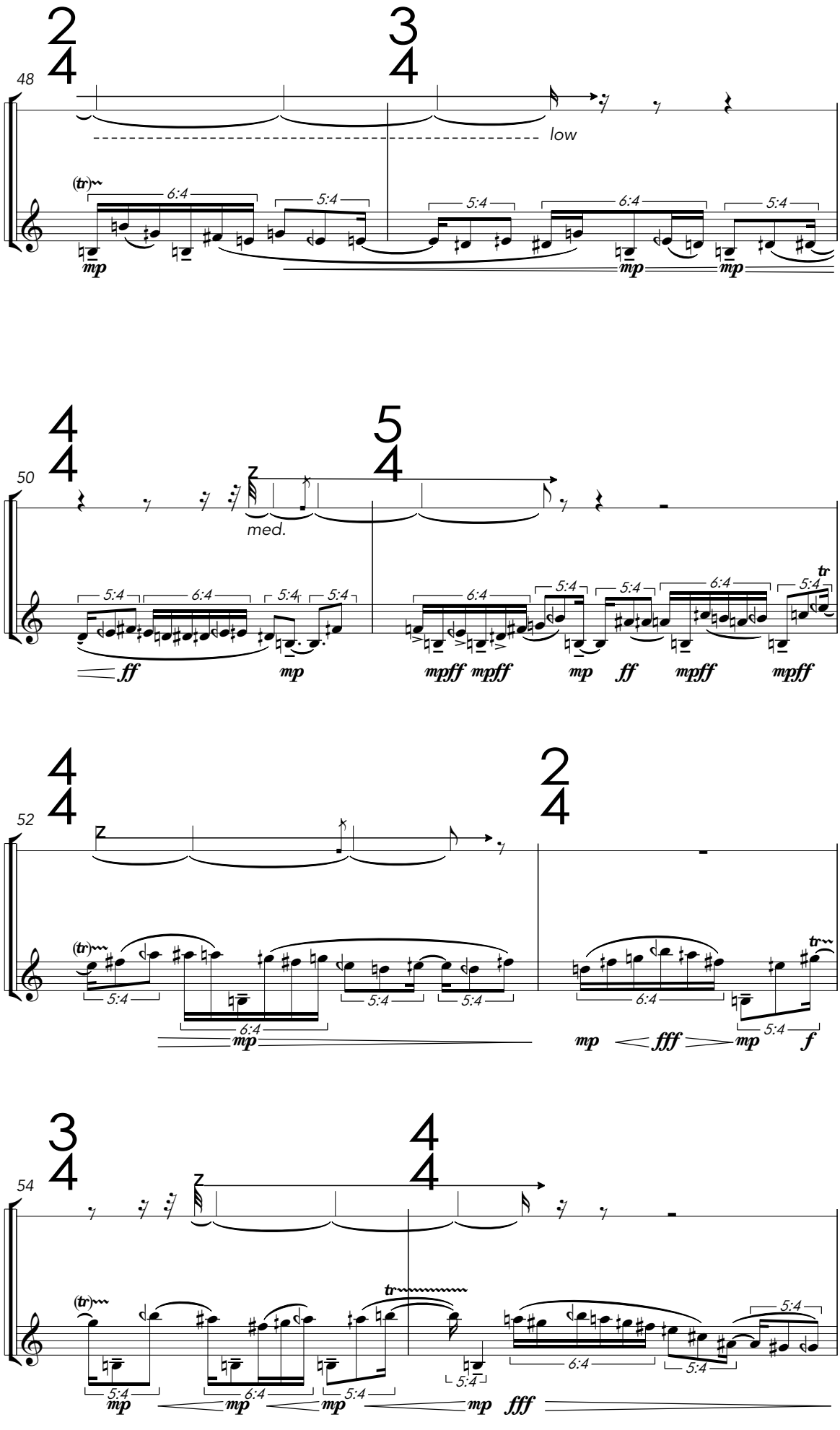

39
max.
6:4
5:4
ff
mp

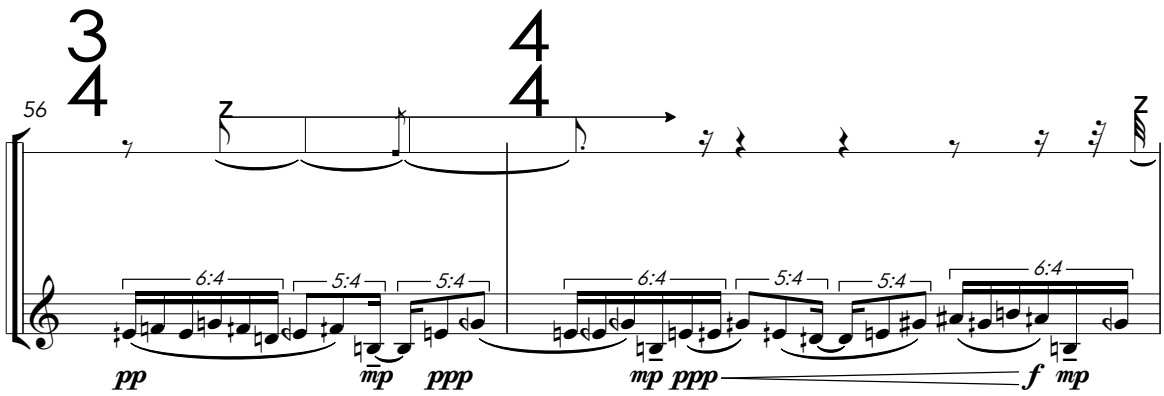

41
max.
max.
5:4
5:4
5:4
6:4
mp
ff

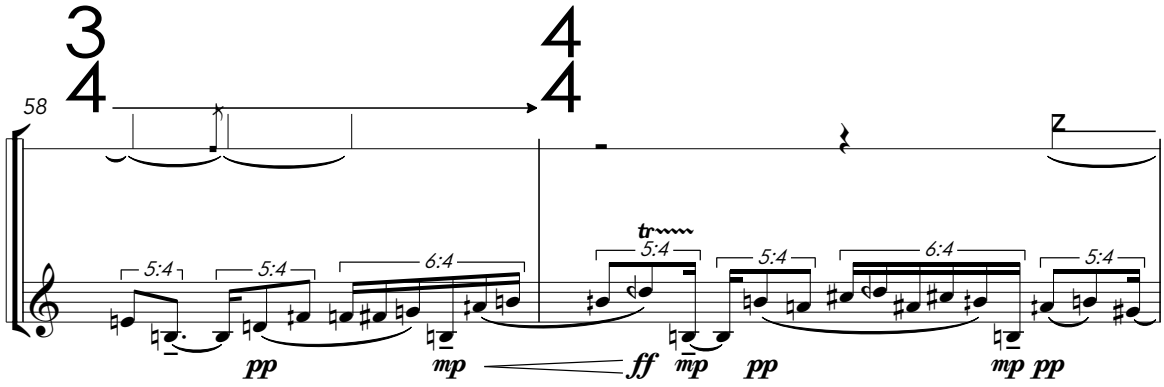

42
low
med.
hi.
max.
n
5:4
6:4
5:4
5:4
6:4
5:4
5:4
6:4
mp
mp
mp
f
mp

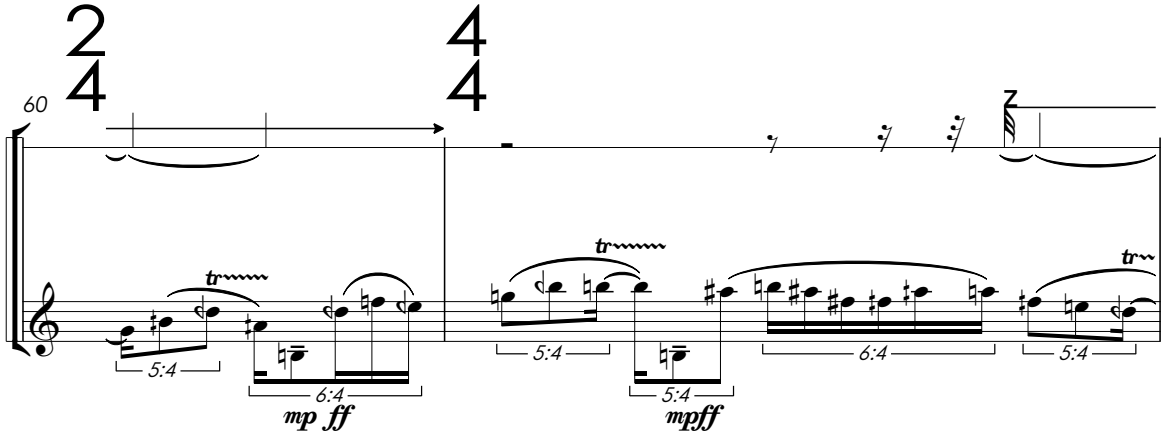

44
med.
low
5:4
5:4
6:4
5:4
5:4
6:4
5:4
mp
mp
mp
mp
ff

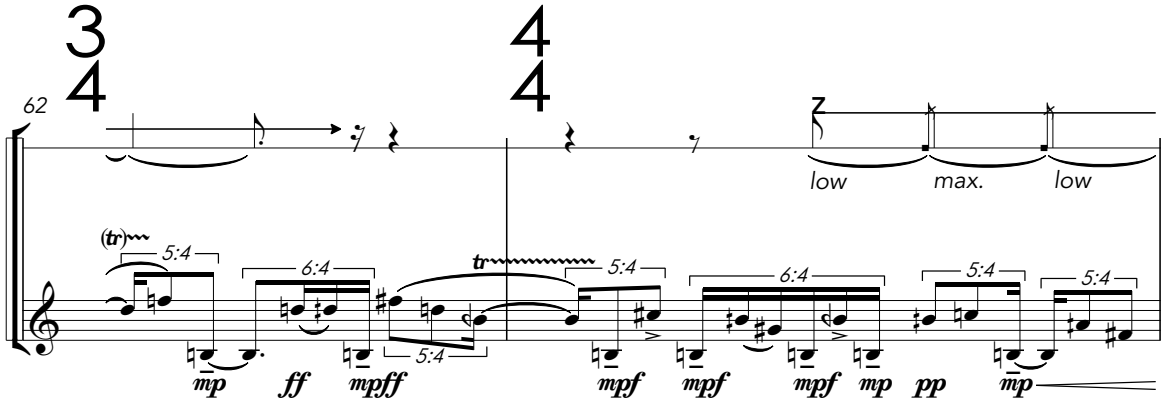

46
med.
low
max.
6:4
5:4
5:4
6:4
5:4
5:4
mp
ff

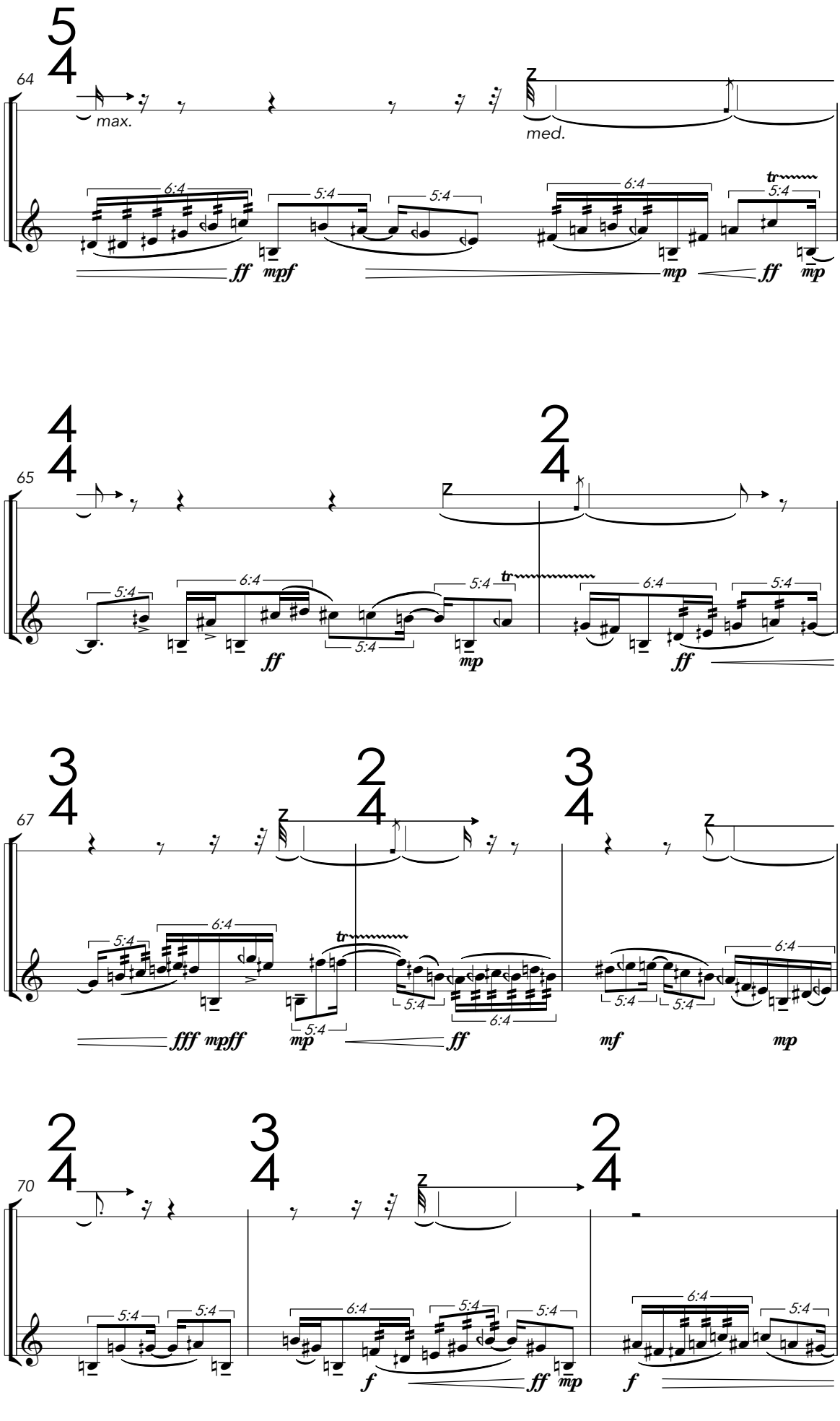

48
low
50
med.
52
54

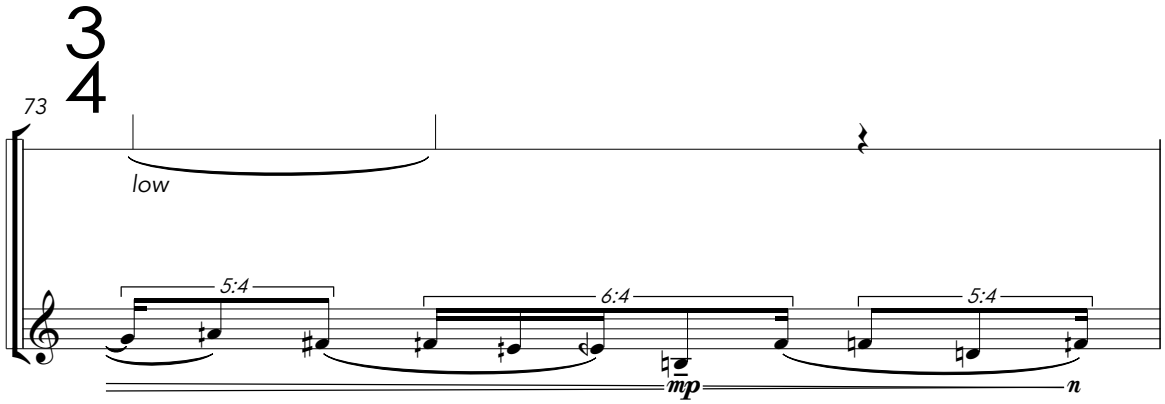

56
3/4
4/4
6:4
5:4
pp
mp
ppp
mp
ppp
f
mp

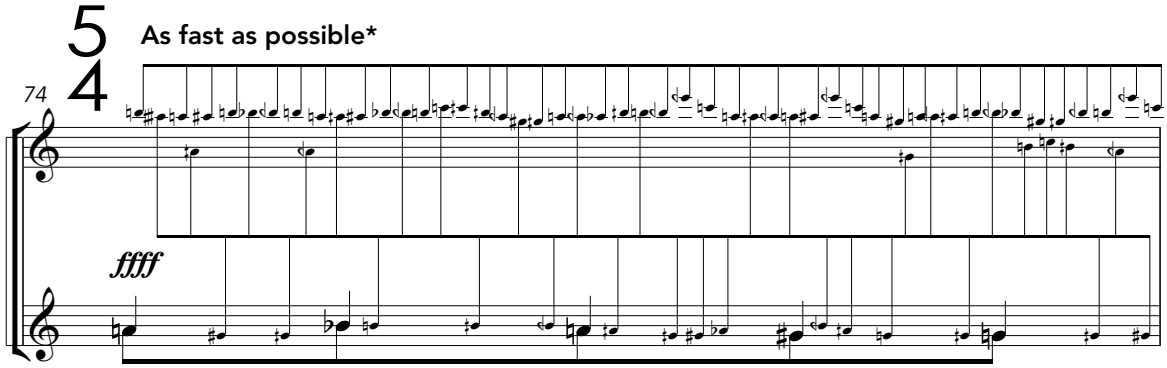

58
3/4
4/4
tr
5:4
6:4
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mp
ff
mp
pp
mp
pp

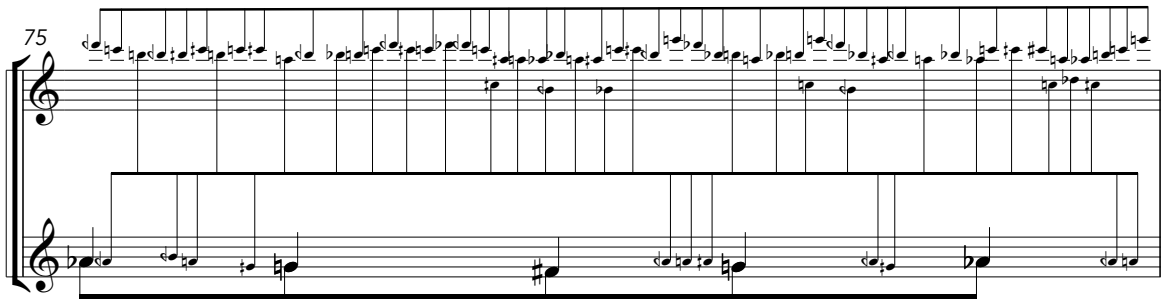

60
2/4
4/4
tr
5:4
6:4
mp
ff
mpff

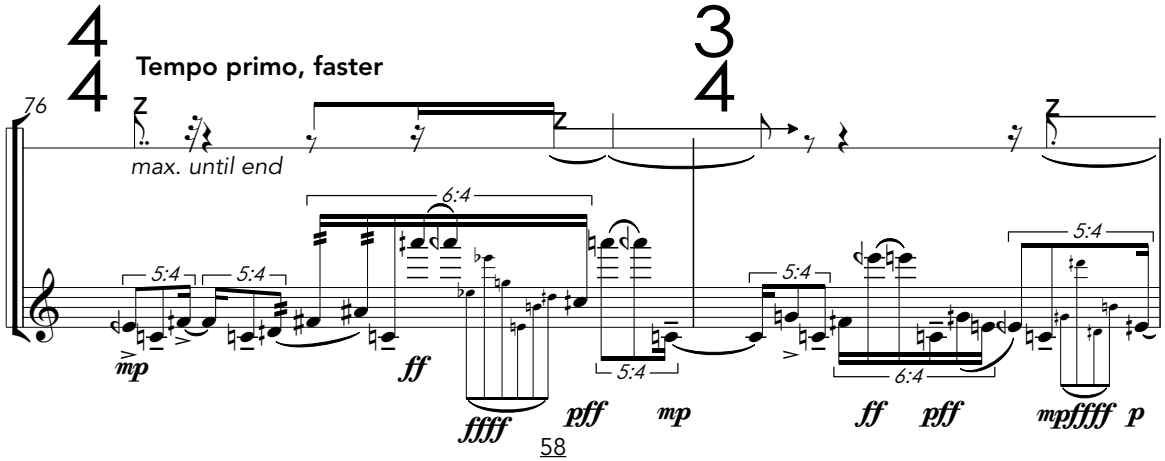

62
3/4
4/4
low
max.
low
(tr)
5:4
6:4
mp
ff
mpff
mpf
mpf
mpf
mp
pp
mp
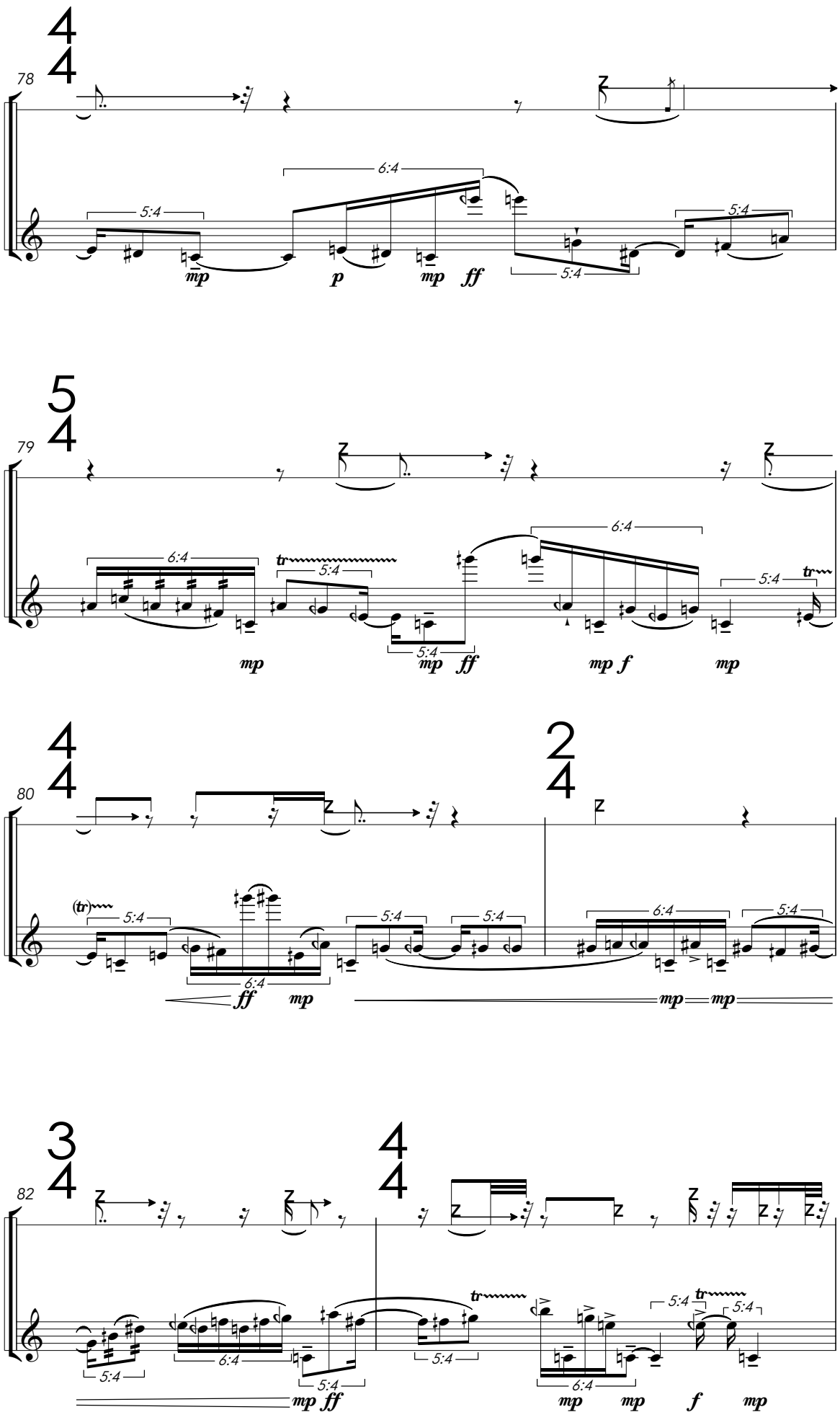

64
max.
med.
6:4
5:4
5:4
6:4
5:4
tr
ff
mpf
mp
ff
mp
65
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5:4
5:4
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mp
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67
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mp
ff
mf
mp
70
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f
ff
mp
f
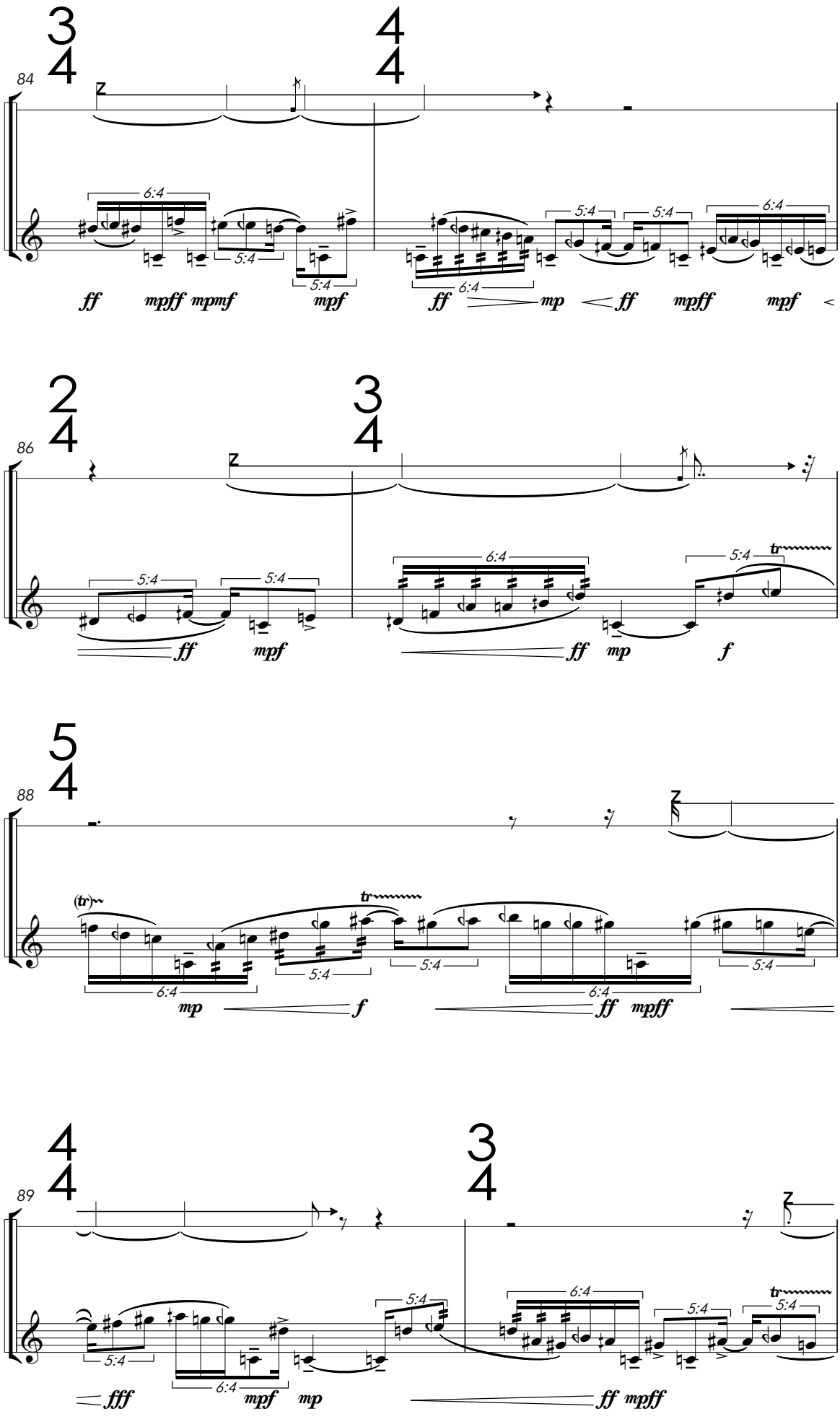

3
4
73
low
5:4
6:4
5:4
mp
n
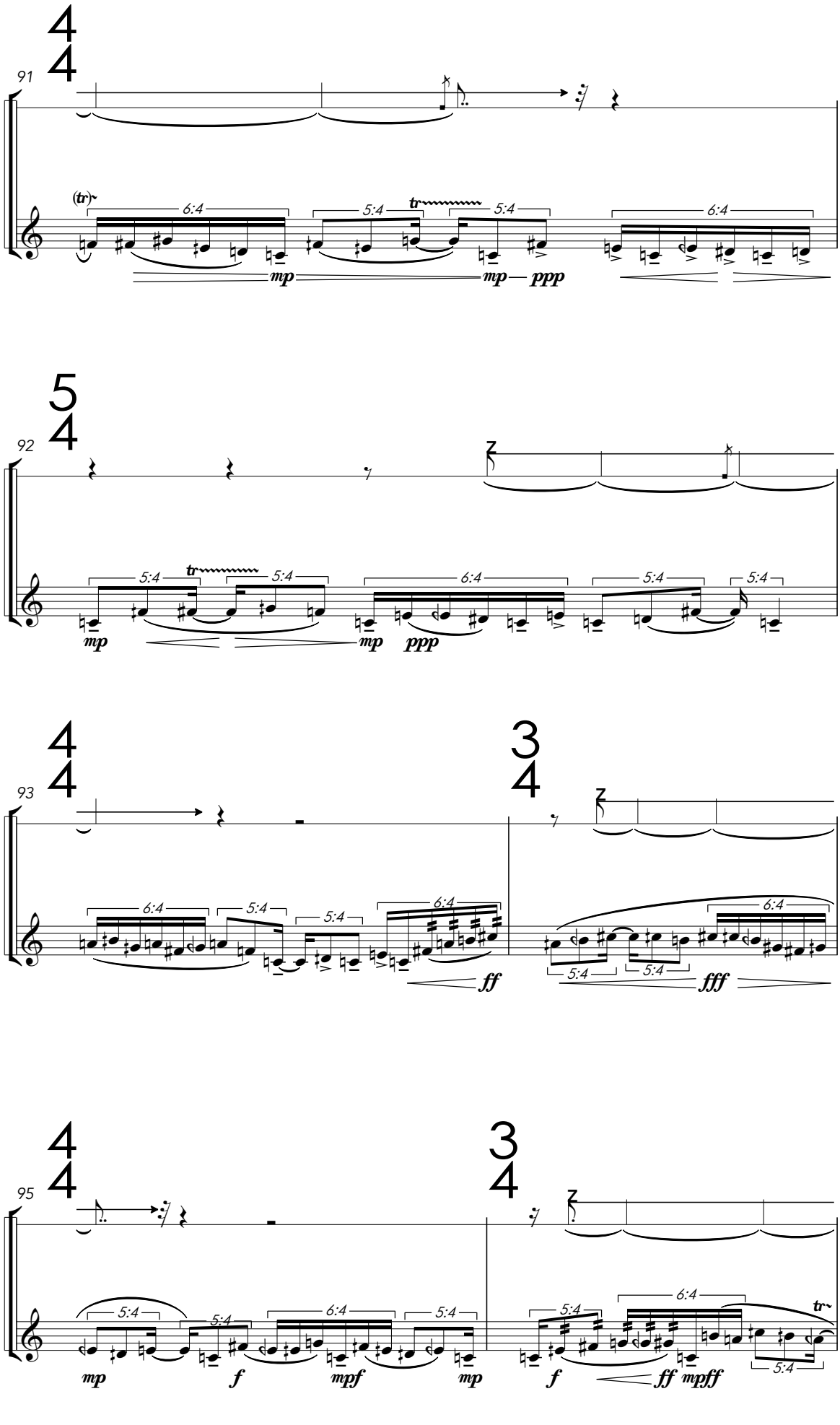

5
4
As fast as possible*
74
ffff

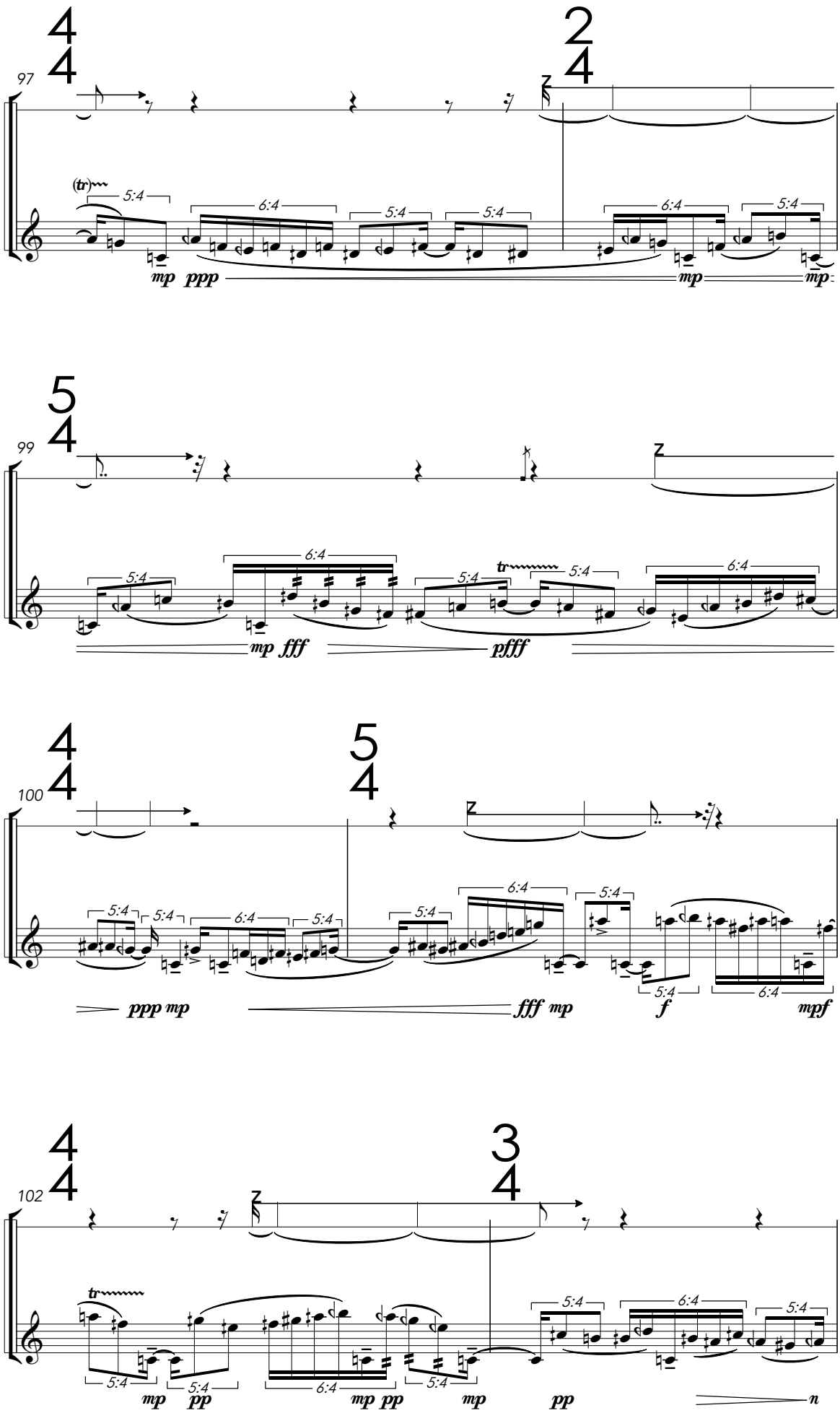

75

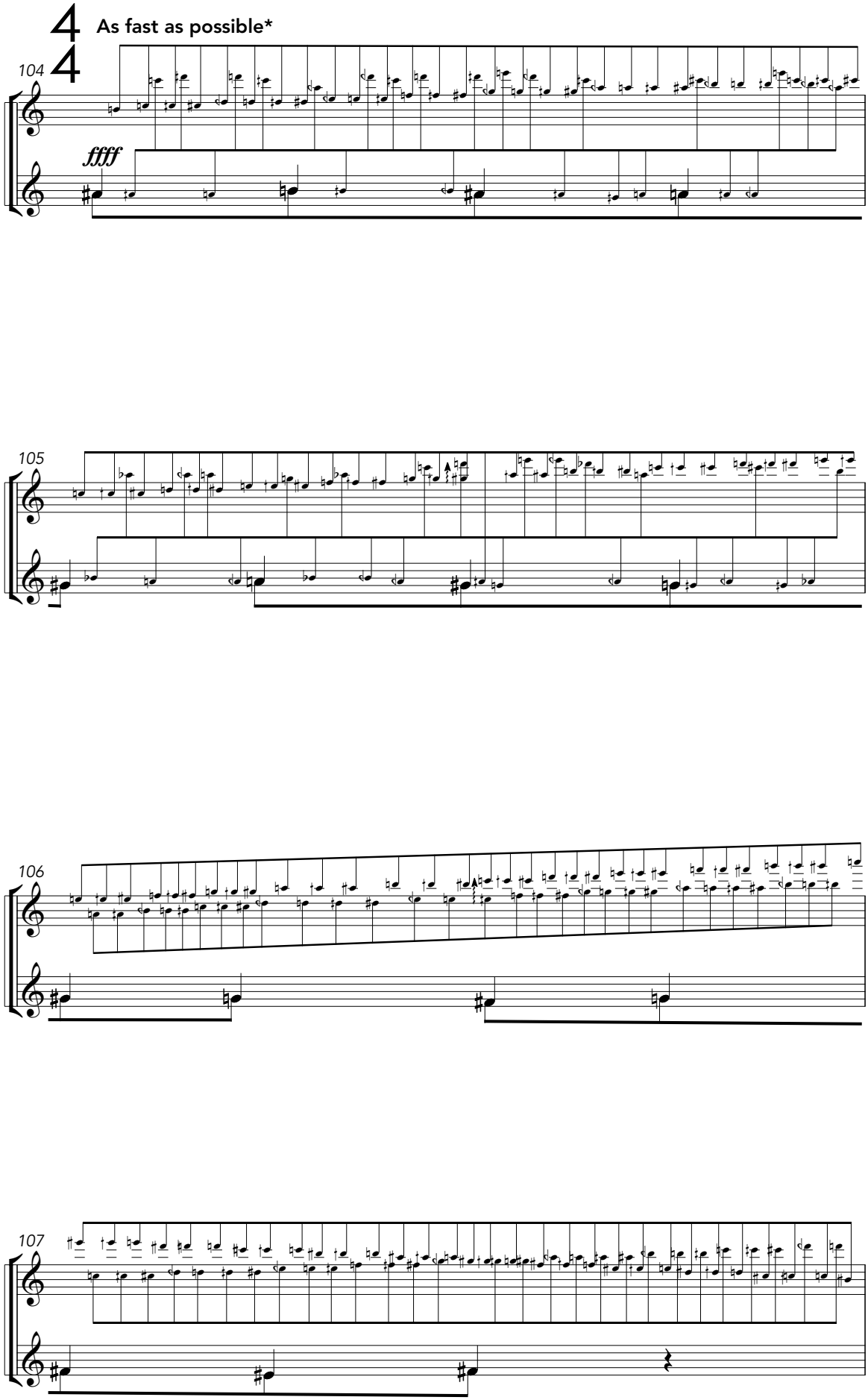

4
4
Tempo primo, faster
3
4
76
max. until end
6:4
5:4
5:4
5:4
5:4
5:4
6:4
mp
ff
ffff
pff
mp
ff
pff
mpfffff
p

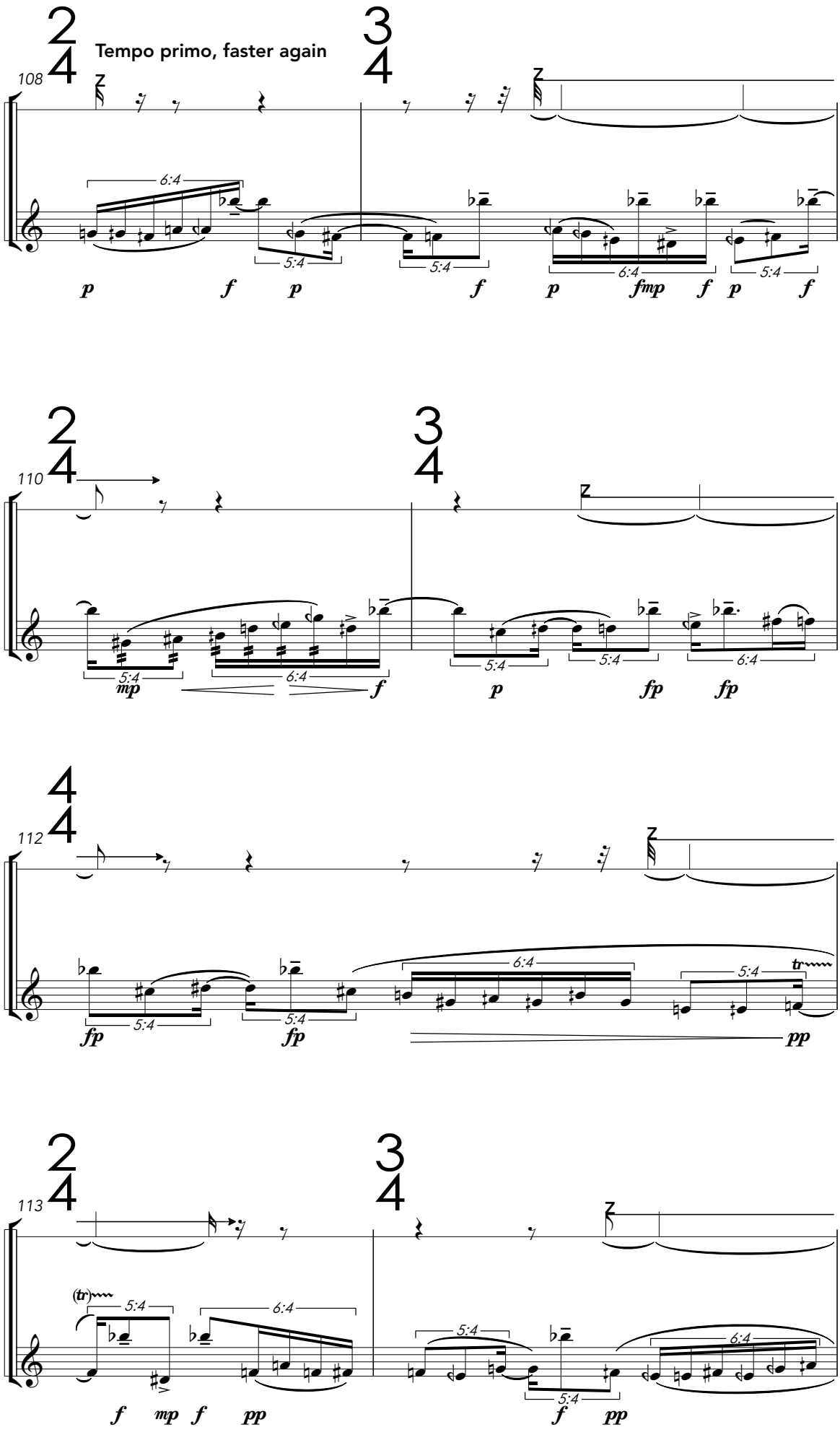

78
79
80
82
6:4
5:4
mp
p
ff
tr
f

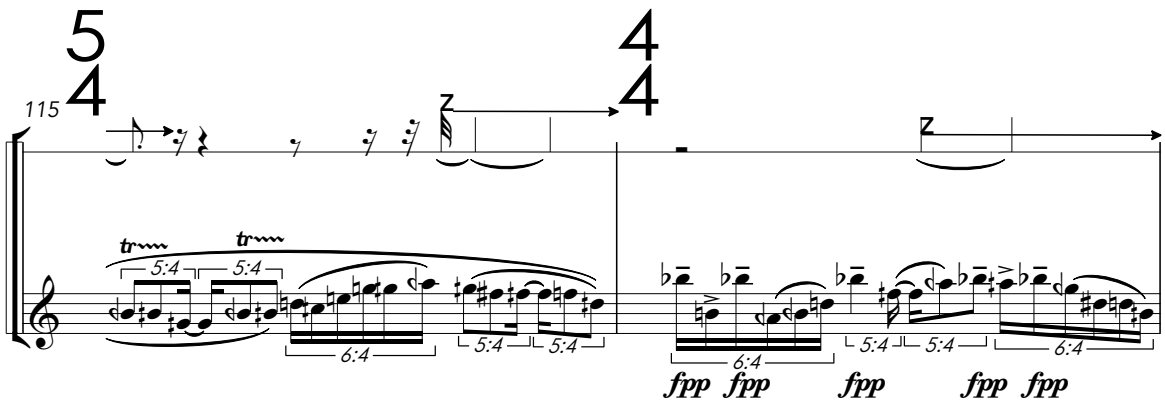

84
86
88
89
6:4
5:4
ff
mpff
mpmf
mpf
mp
f
fff

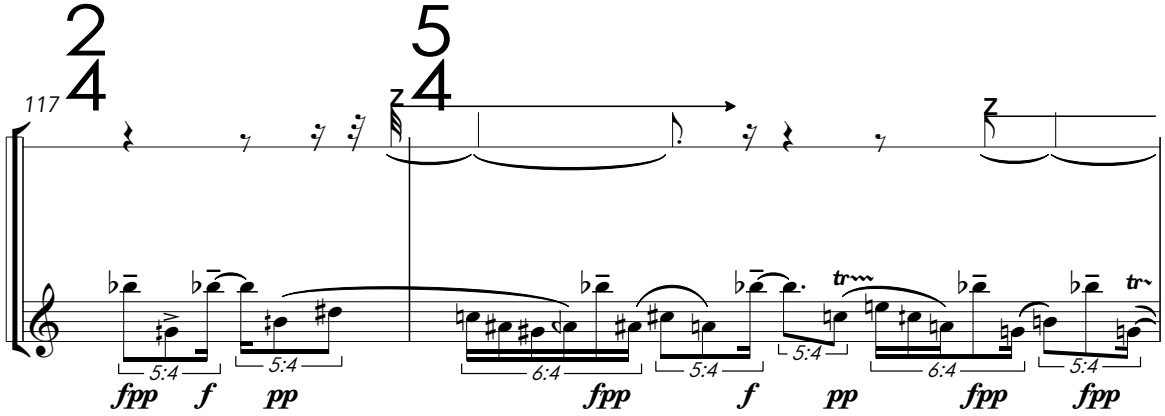

91
92
93
95
6:4
5:4
mp
ppp
ff
fff
f
mpf
mpff

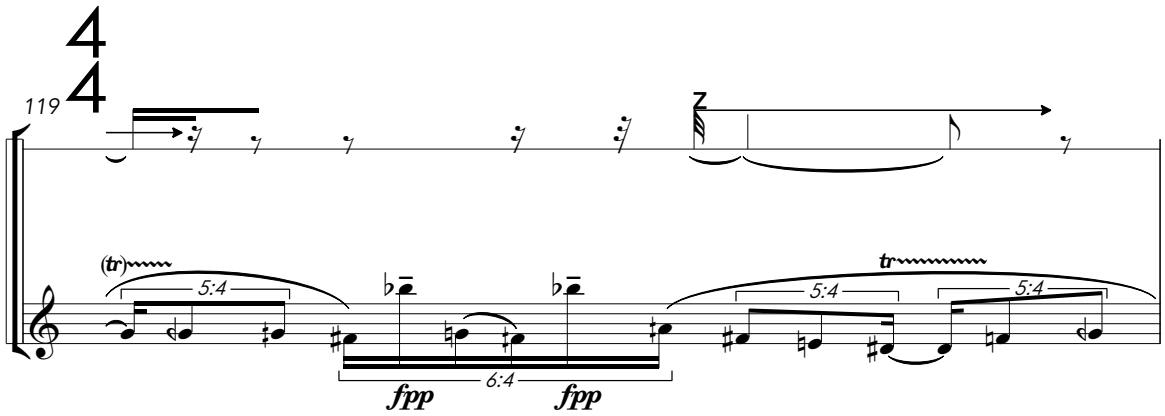

97
99
100
102
5:4
6:4
mp
ppp
fff
pfff
f
mpf
pp
n

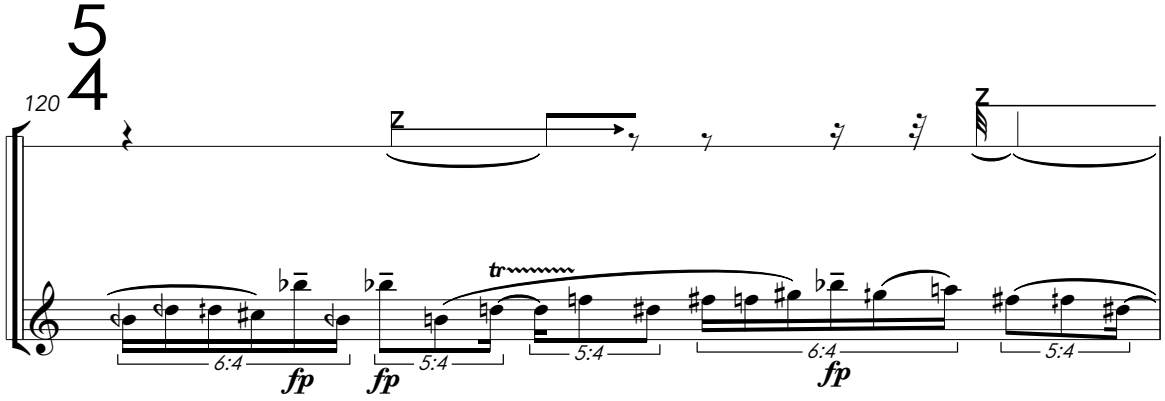

4
4
As fast as possible*
104
ffff
105
106
107

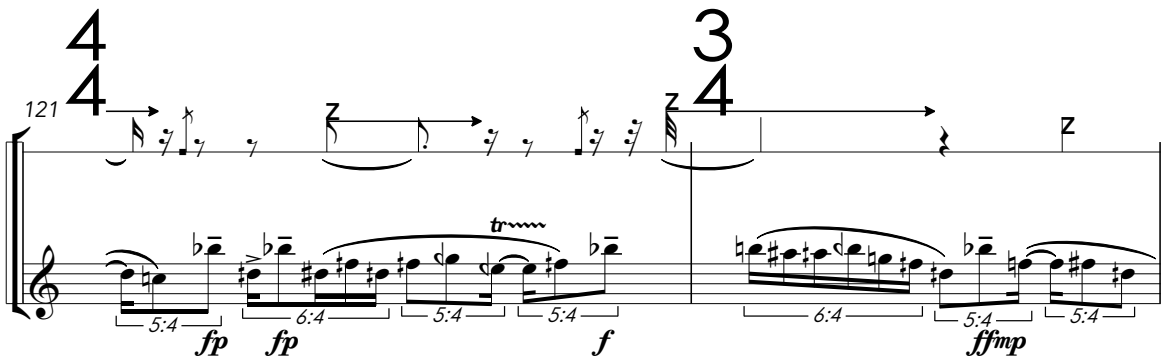

Tempo primo, faster again
108
110
112
113
6:4
5:4
p
f
mp
fp
pp
tr
(tr)

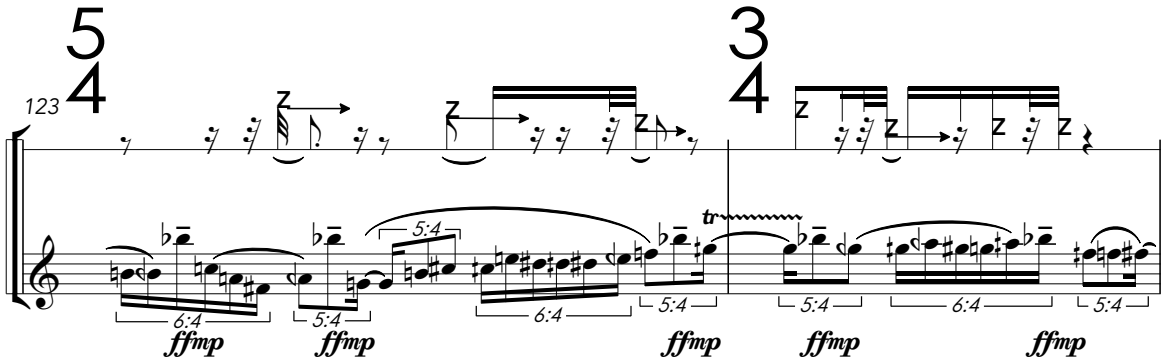

115
5/4
4/4
tr
5:4
6:4
fpp

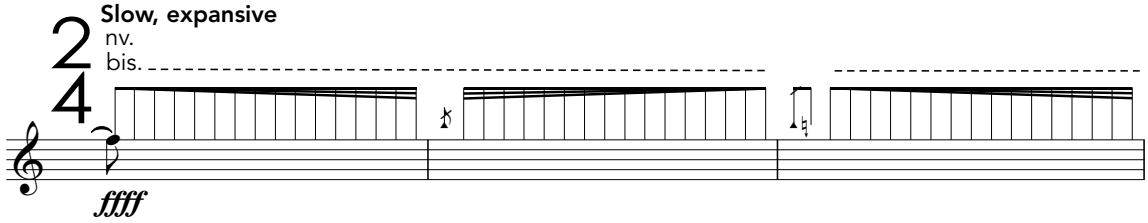

117
2/4
5/4
5:4
6:4
fpp
f
pp
tr

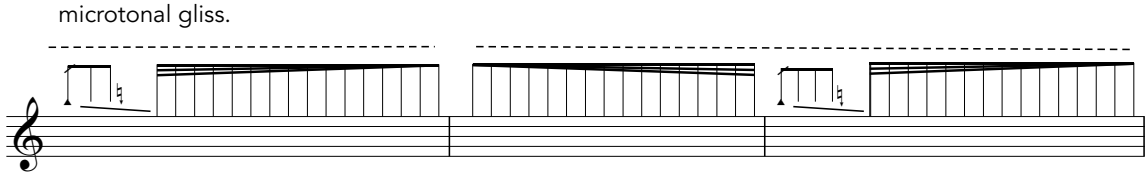

119
4/4
(tr)
5:4
6:4
fpp

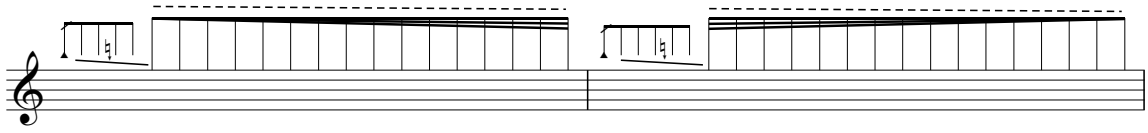

120
5/4
6:4
5:4
fp
tr

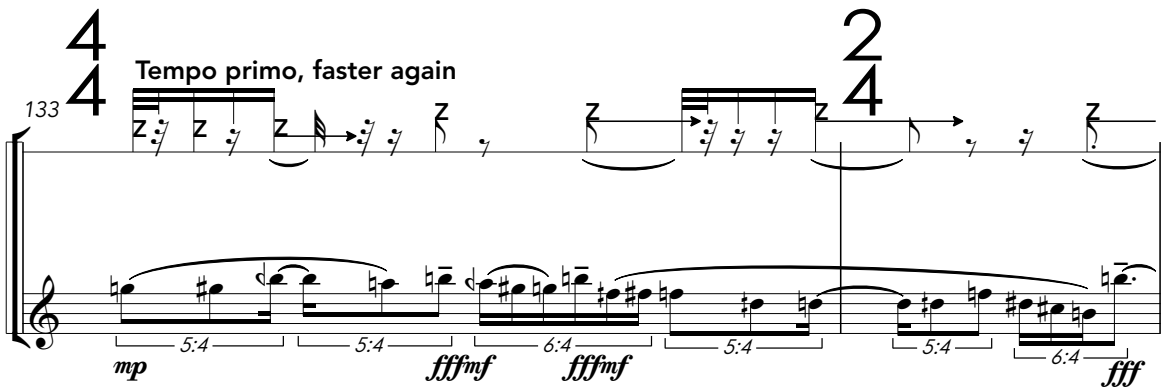

121
5:4
6:4
5:4
5:4
6:4
5:4
5:4
fp
fp
f
ffmp

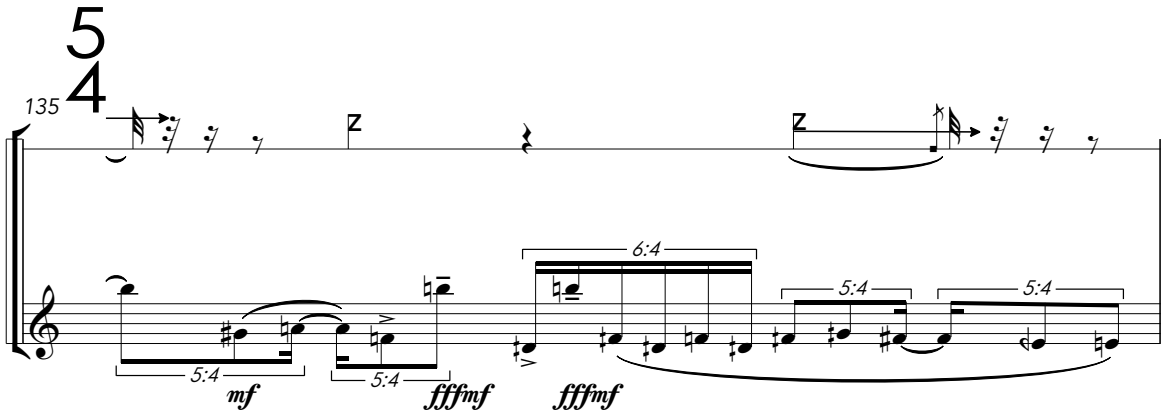

123
6:4
5:4
5:4
6:4
5:4
5:4
5:4
6:4
5:4
ffmp
ffmp
ffmp
ffmp
ffmp

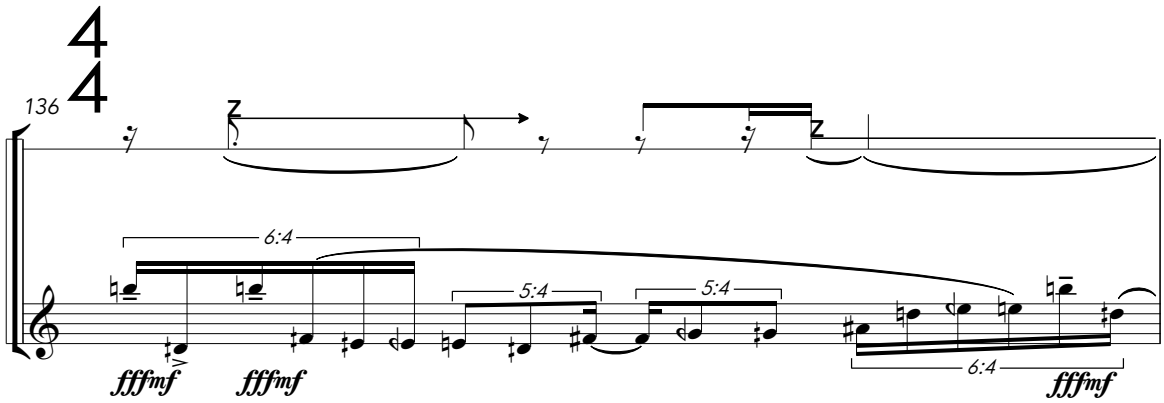

Slow, expansive
nv.
bis.
ffff

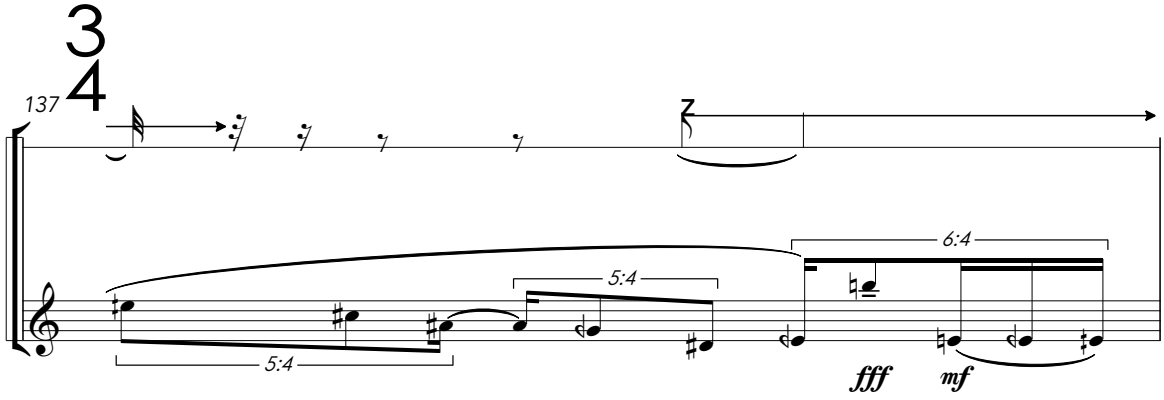

microtonal gliss.

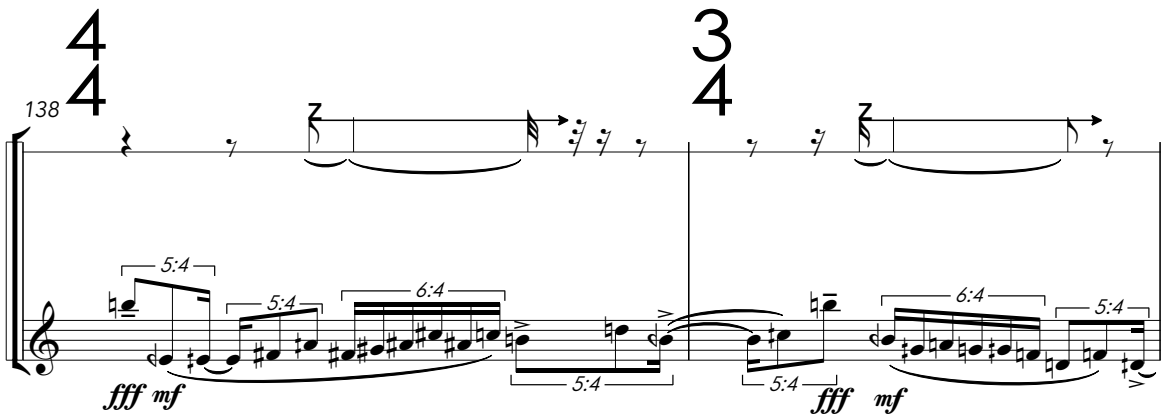


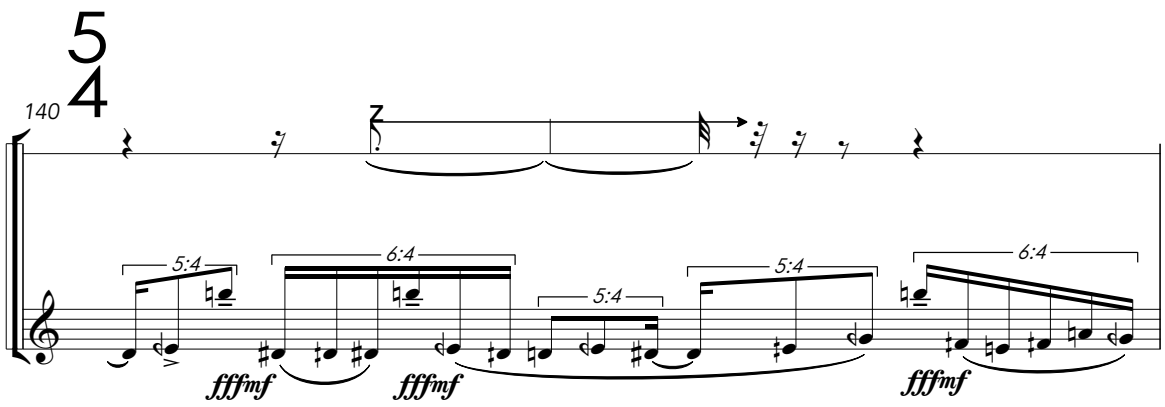

Tempo primo, faster again
133
5:4
5:4
6:4
5:4
5:4
6:4
mp
fffmf
fffmf
fff

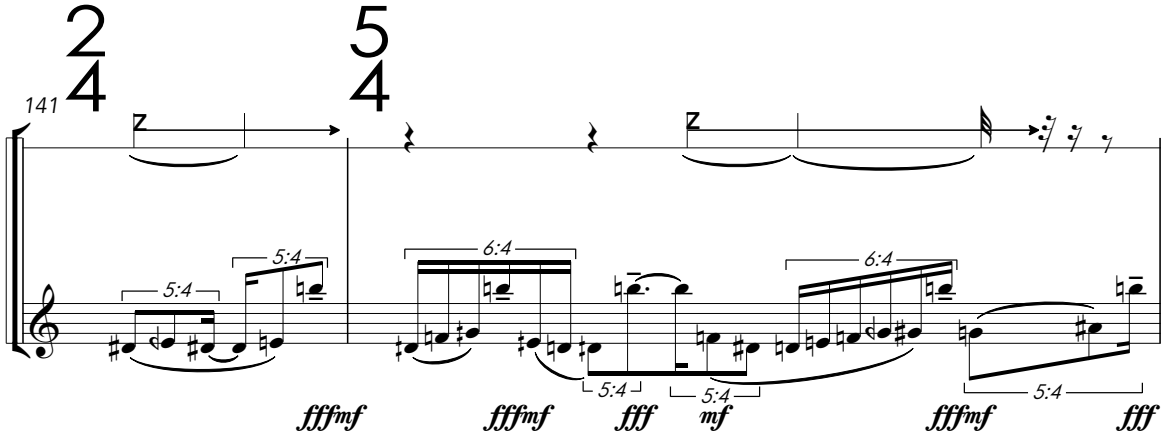

135
6:4
5:4
5:4
5:4
mf
fffmf
fffmf

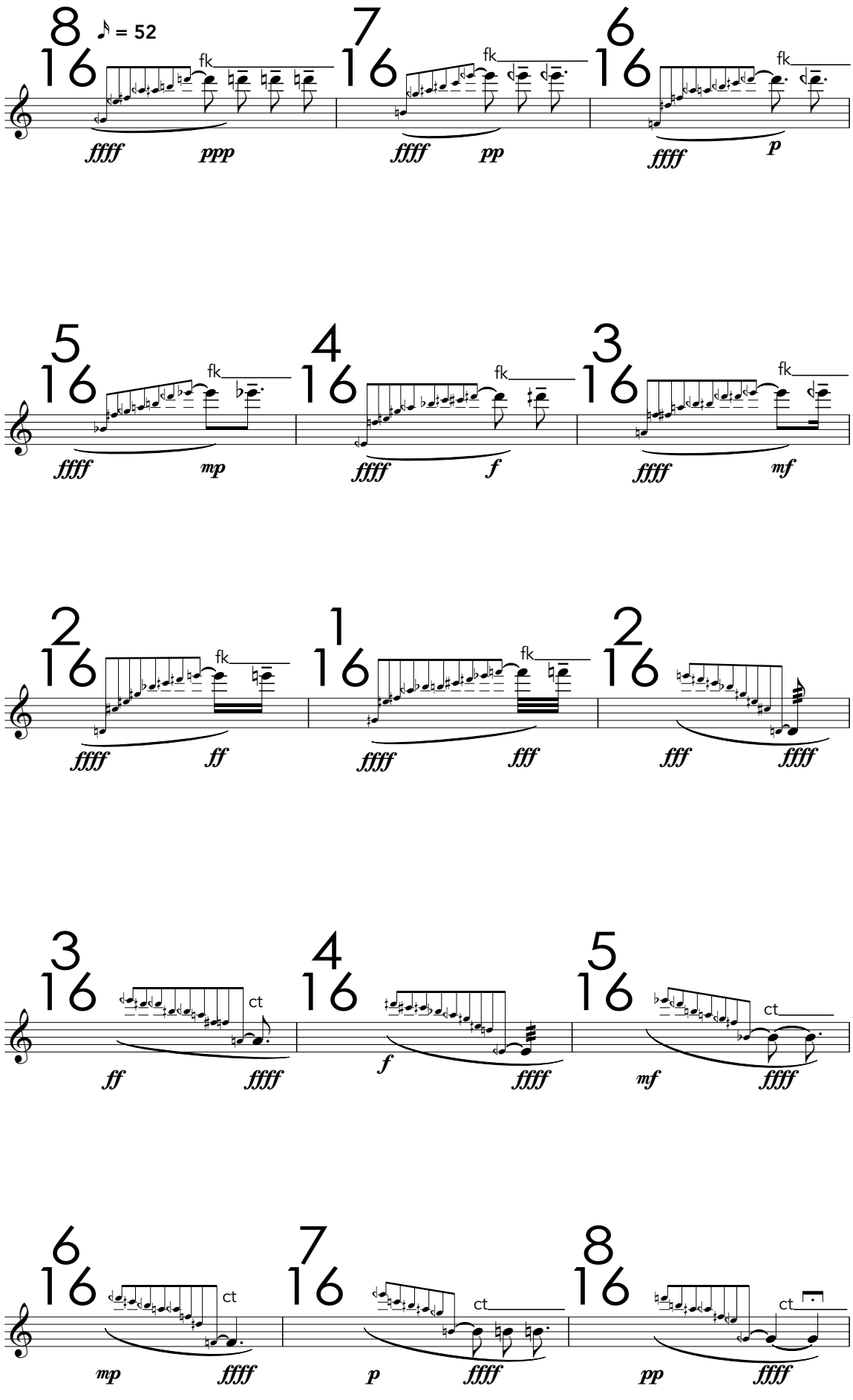

136
6:4
5:4
5:4
6:4
fffmf
fffmf
fffmf

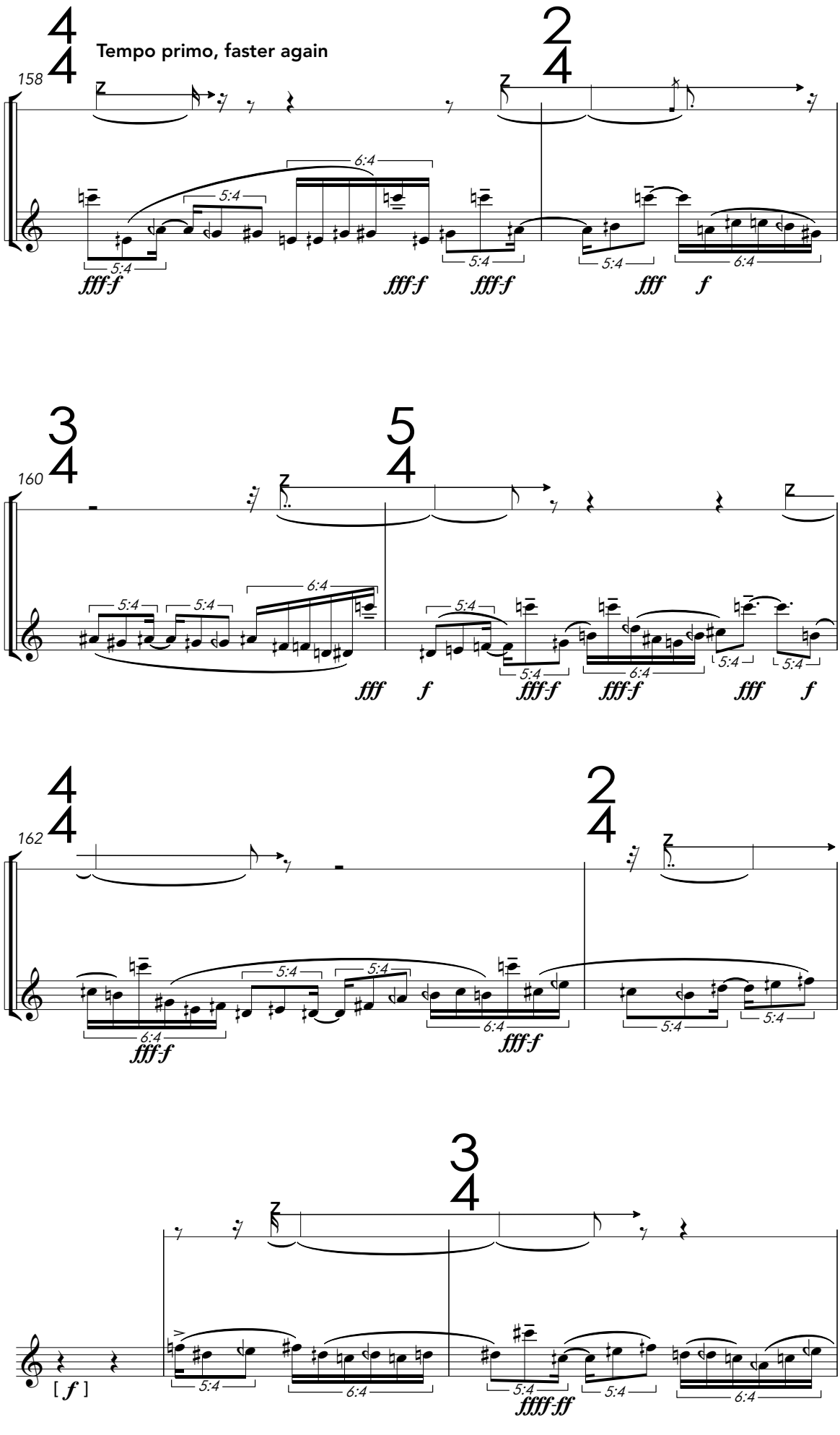

137
6:4
5:4
5:4
fff
mf

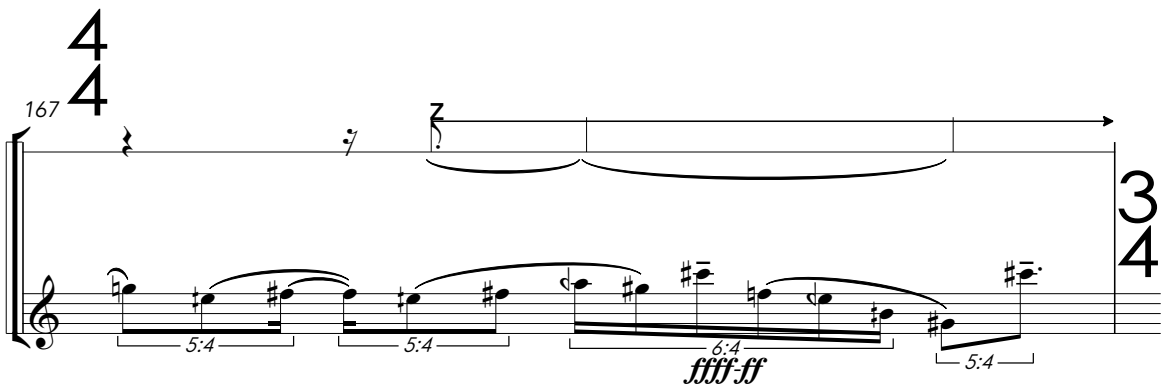

138
4
4
3
4
5:4
6:4
fff mf
fff mf

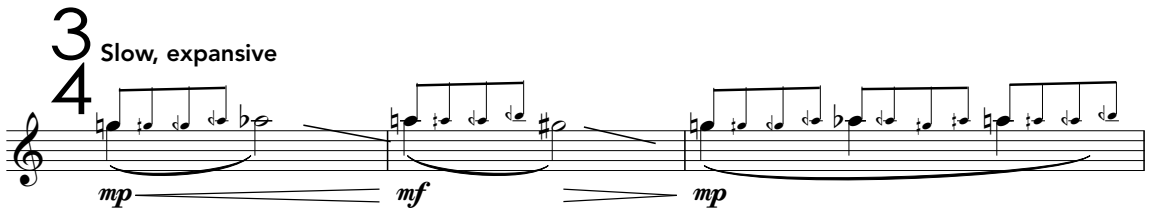

140
5
4
5:4
6:4
fffmf
fffmf
fffmf

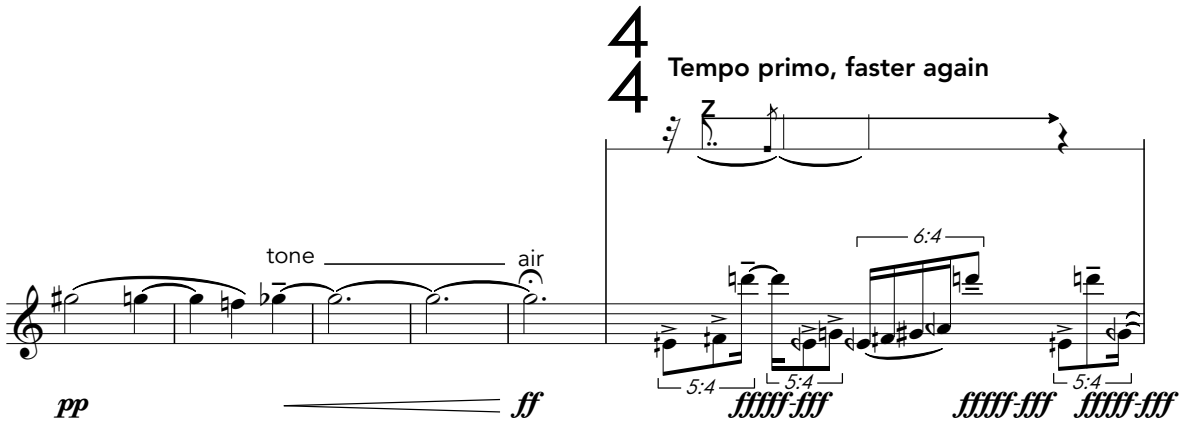

141
2
4
5
4
5:4
6:4
fffmf
fffmf
fff
mf
fffmf
fff

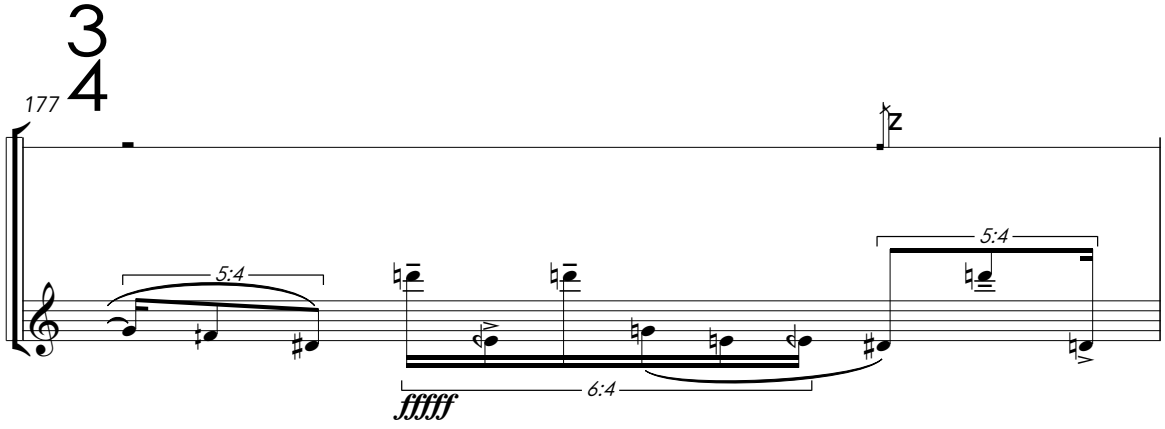

8
16
♪ = 52
fk
ffff
ppp
7
16
fk
ffff
pp
6
16
fk
ffff
p
5
16
fk
ffff
mp
4
16
fk
ffff
f
3
16
fk
ffff
mf
2
16
fk
ffff
ff
1
16
fk
ffff
fff
2
16
fff
ffff
3
16
ct
ff
ffff
4
16
f
ffff
5
16
ct
mf
ffff
6
16
ct
mp
ffff
7
16
ct
p
ffff
8
16
ct
pp
ffff

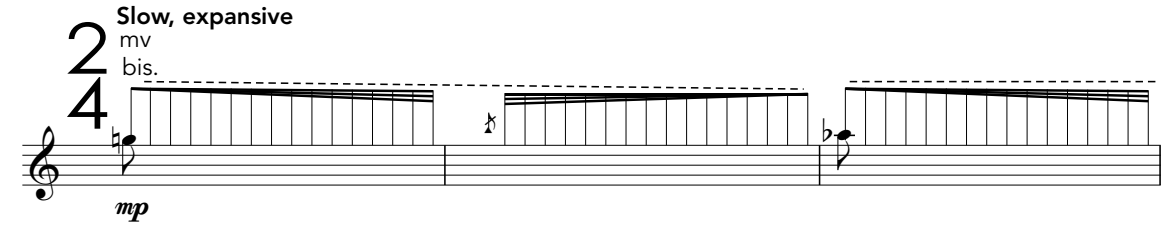

Tempo primo, faster again
158
160
162
[f]

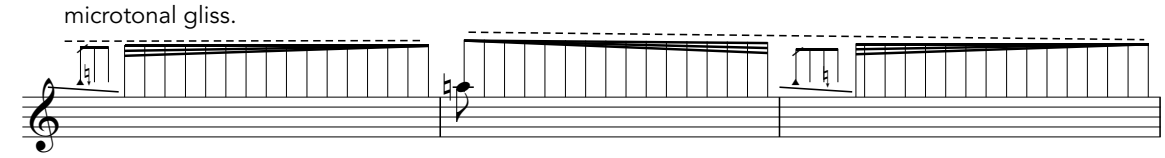

167
5:4
5:4
6:4
5:4
fffff-ff

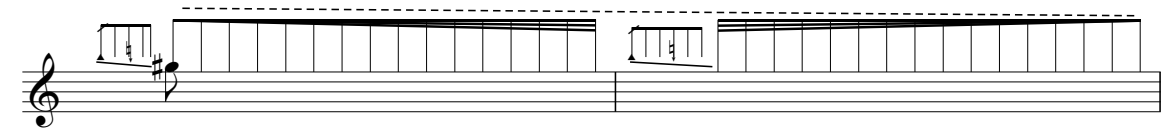

Slow, expansive
mp
mf
mp

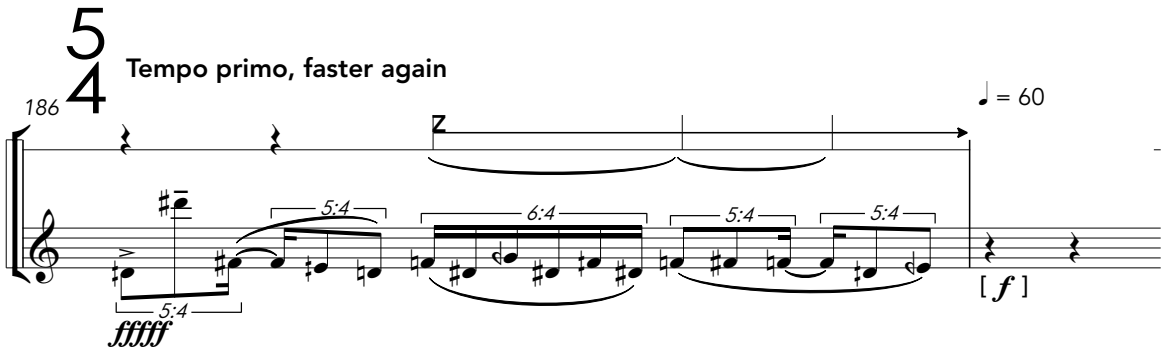

Tempo primo, faster again
tone
air
pp
ff
6:4
5:4
5:4
fffff-fff
fffff-fff
5:4
fffff-fff

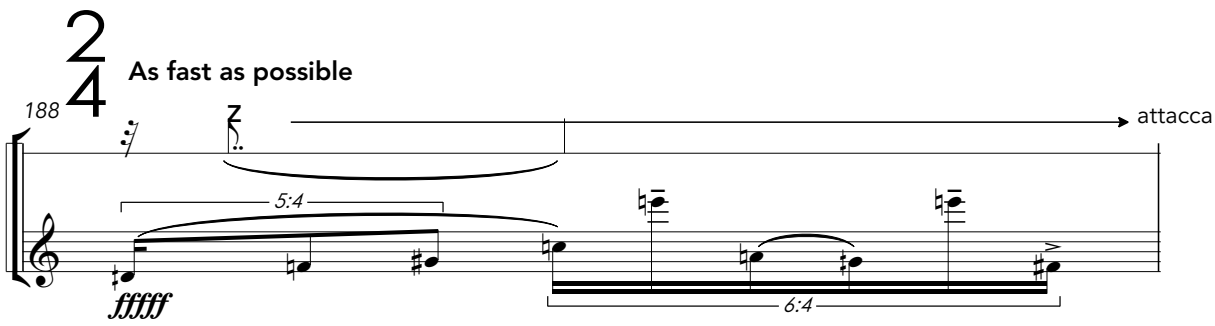

177
5:4
5:4
fffff
6:4

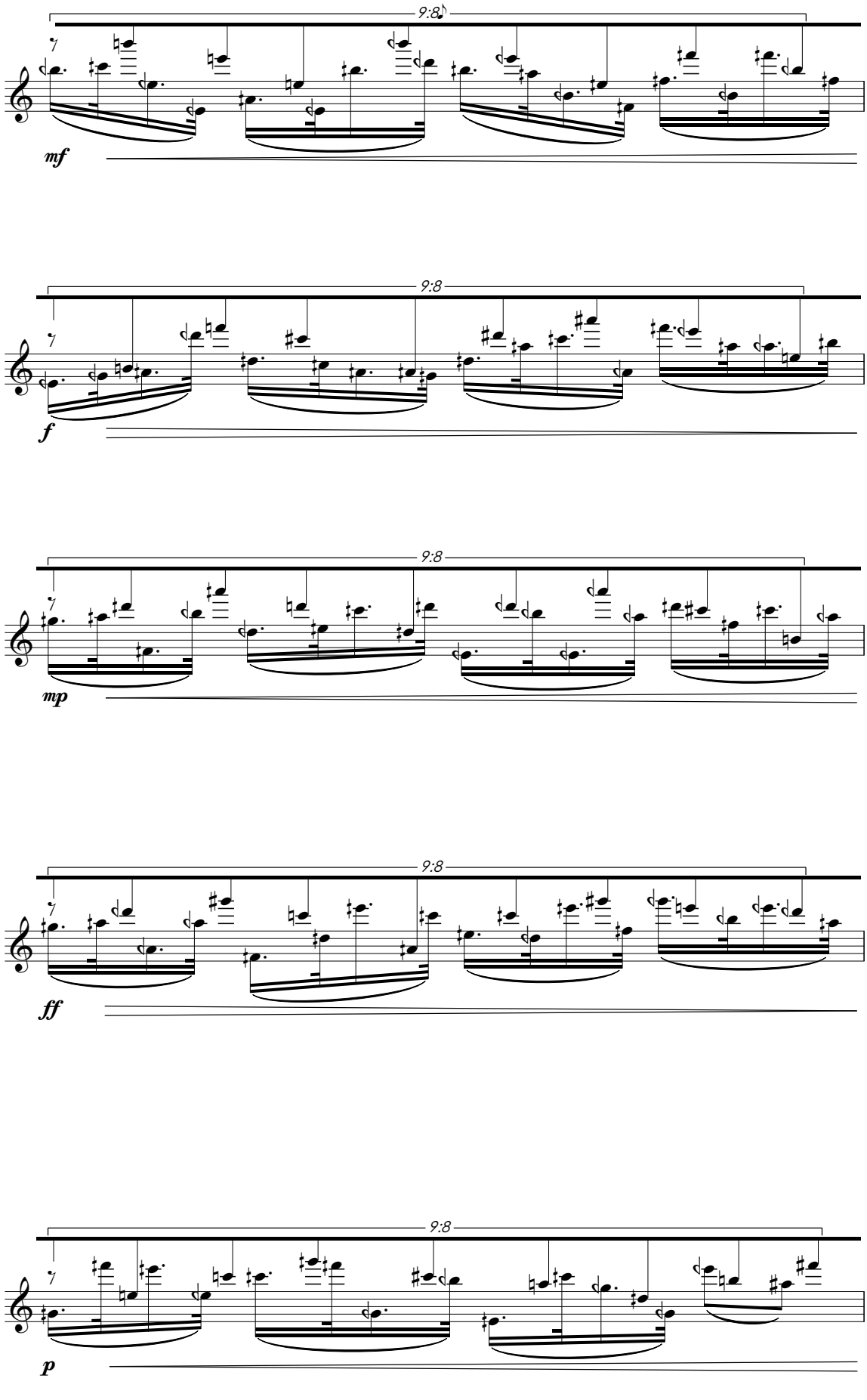

Slow, expansive
mv
bis.
mp

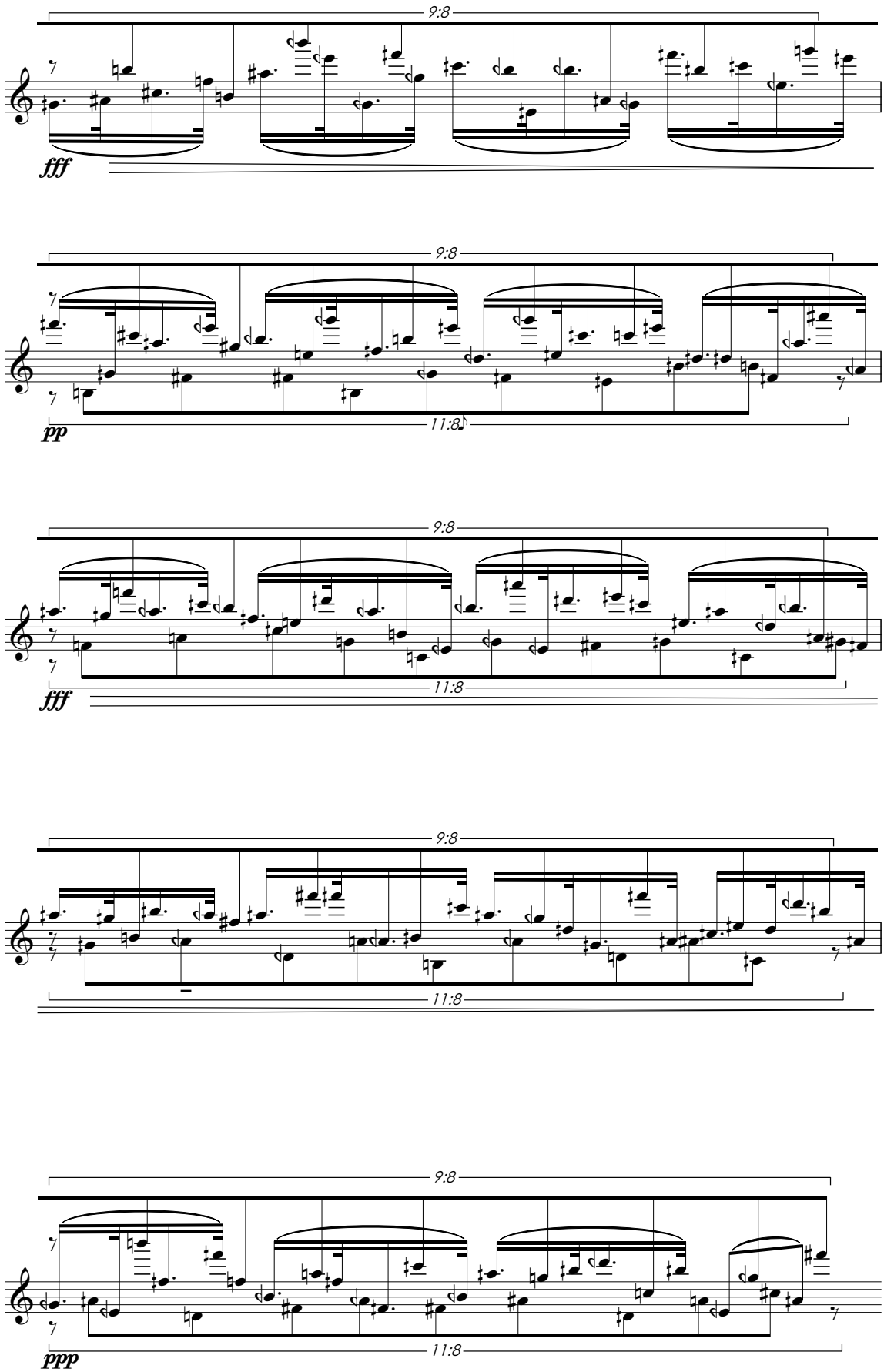

microtonal gliss.
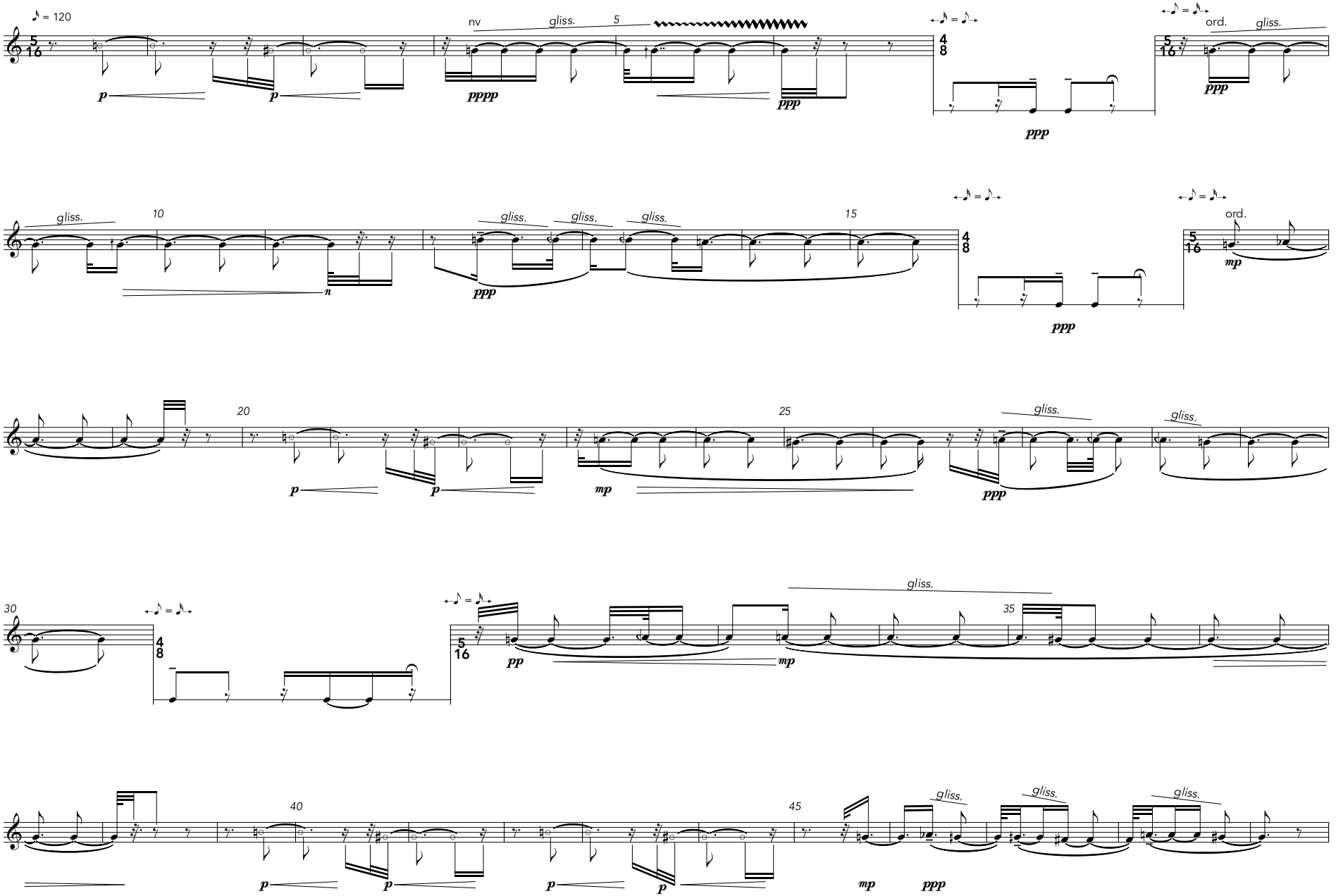


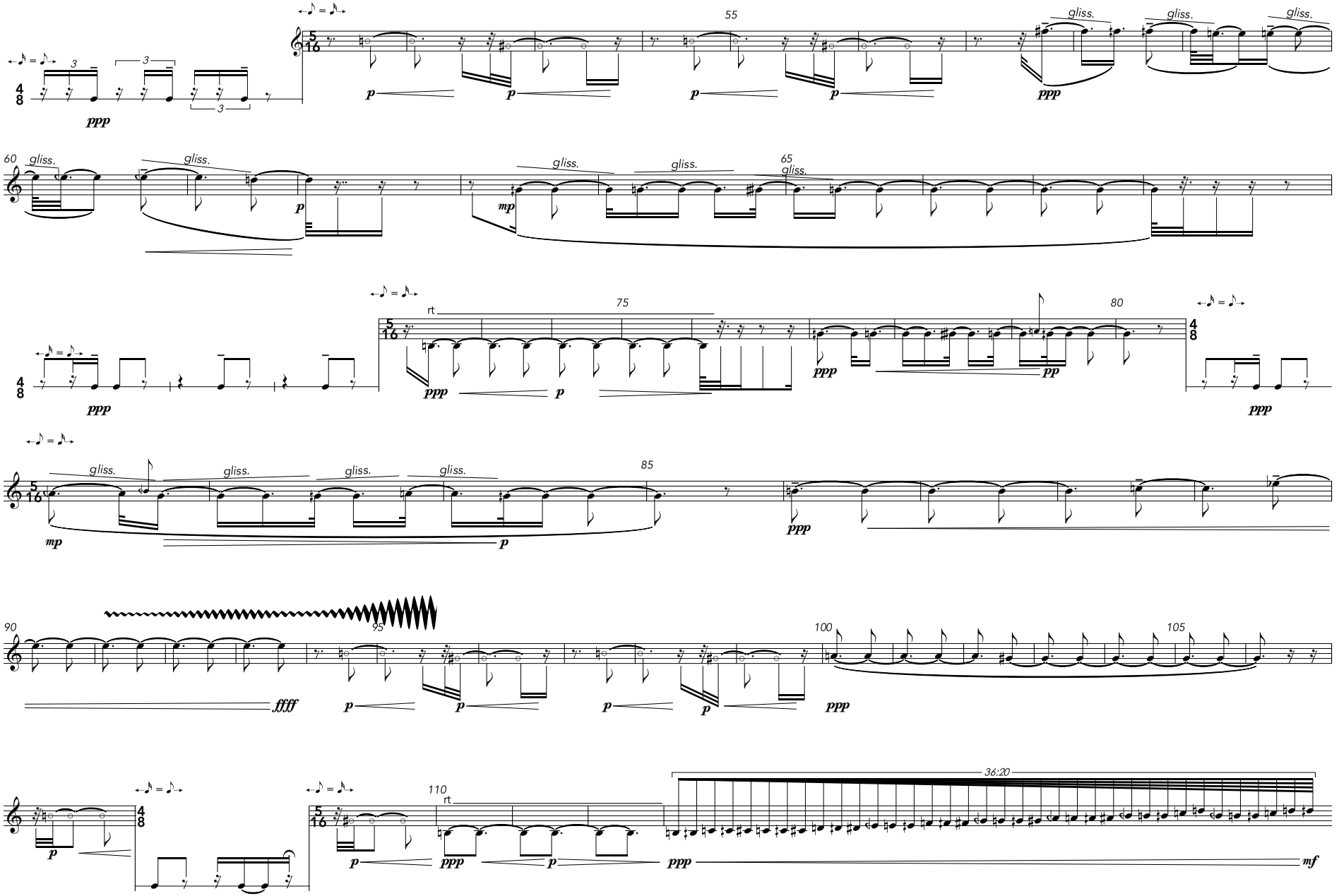

Tempo primo, faster again
186
= 60
5:4
6:4
5:4
5:4
5:4
fffff
[f]

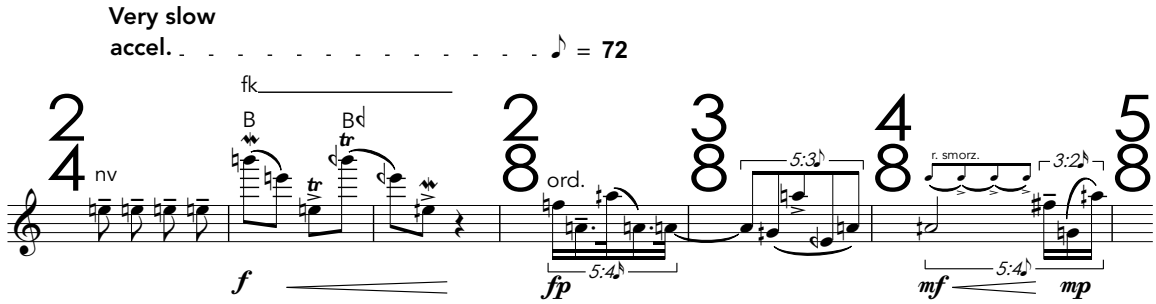

As fast as possible
188
attacca
5:4
6:4
fffff

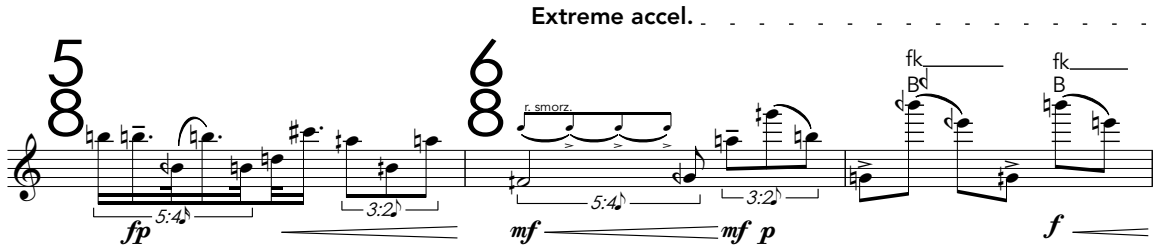

9:8
mf
9:8
f
9:8
mp
9:8
ff
9:8
p

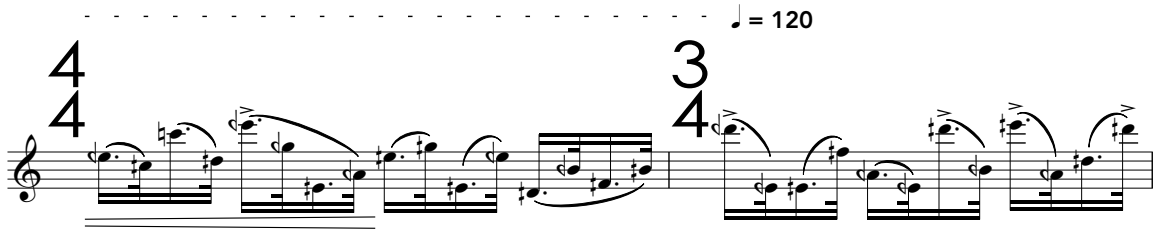

9:8
fff
9:8
pp
11:8
9:8
fff
11:8
9:8
11:8
9:8
ppp
11:8

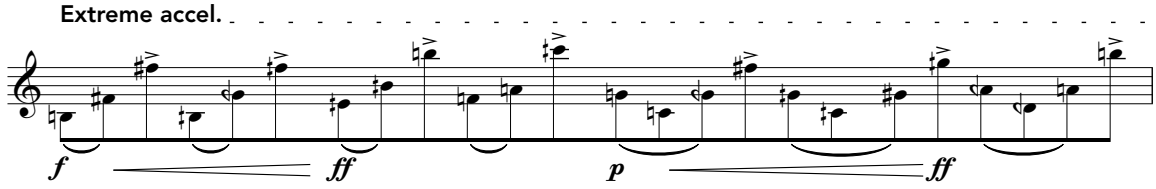

♪ = 120
nv
gliss.
5
pppp
ppp
♪ = ♪
ord.
gliss.
10
15
20
25
30
35
40
45
p
mp
pp
n


55
gliss.
60
65
75
80
85
90
95
100
105
110
rt
36:20
ppp
p
mp
pp
ffff
mf

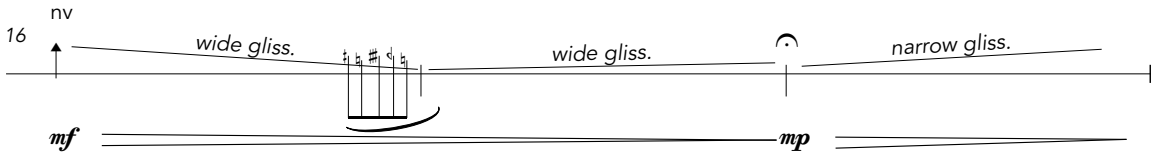

Very slow
accel.
♪ = 72
fk
B
B♮
nv
ord.
5:3
r. smorz.
3:2
5:4
f
fp
mf
mp


Extreme accel.
fk
B♮
fk
B
r. smorz.
5:4
3:2
fp
mf
mf p
f


♩ = 120


Extreme accel.
f
ff
p
ff

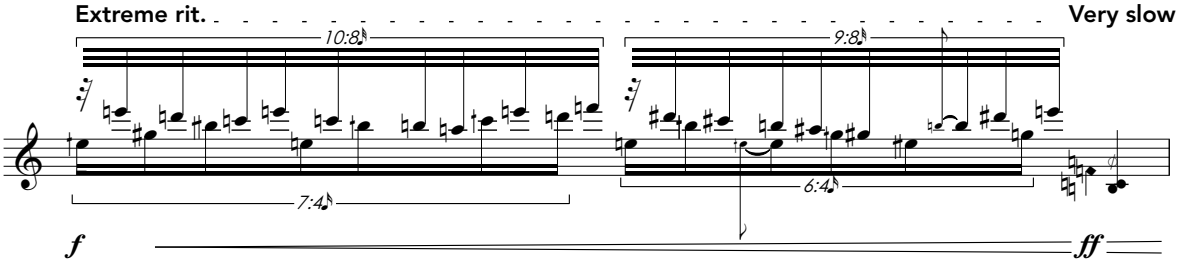
Very slow
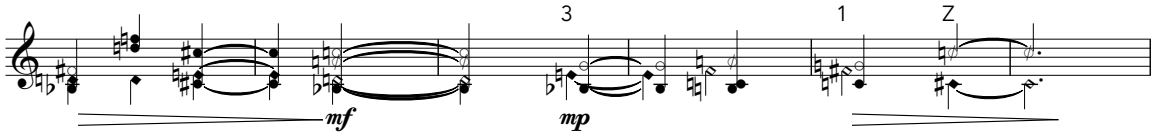


As fast as possible

Extreme rit.

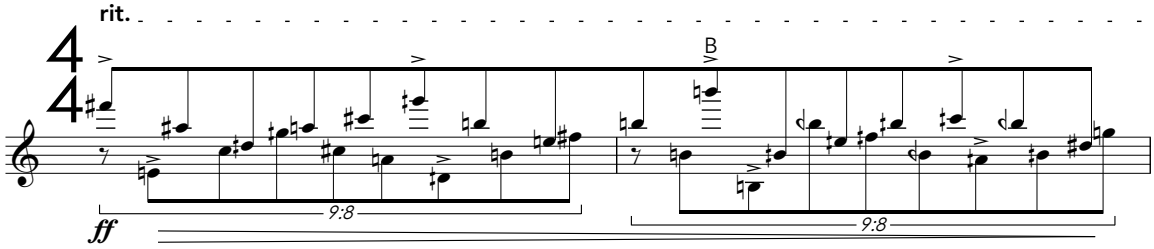
Very slow

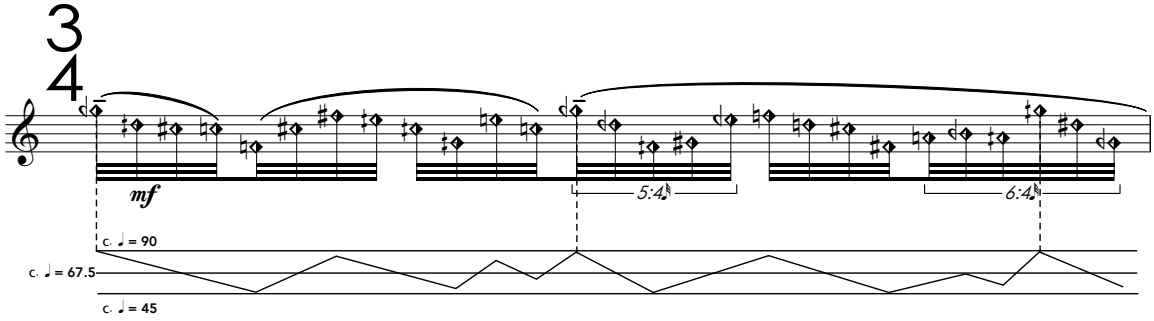


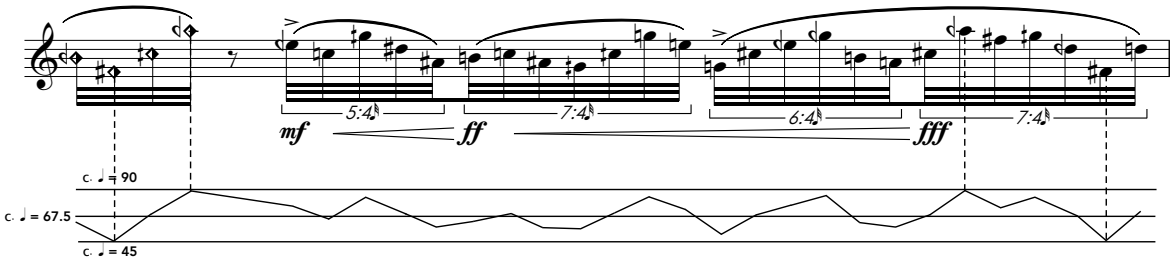


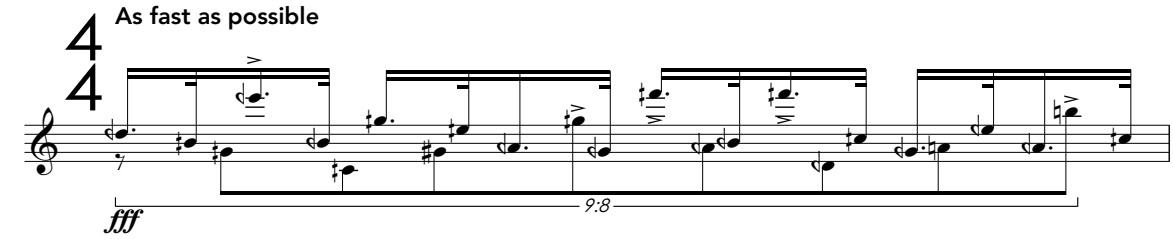
As fast as possible
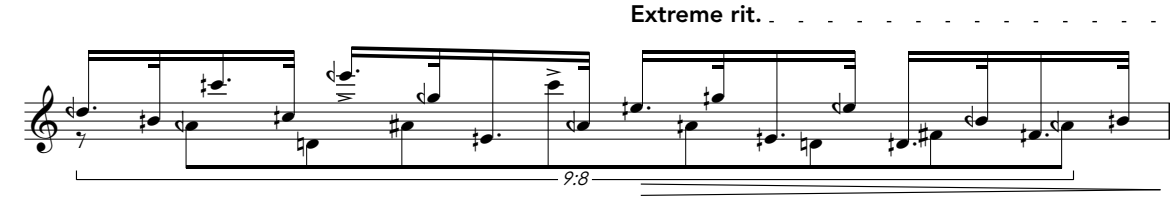
rit.

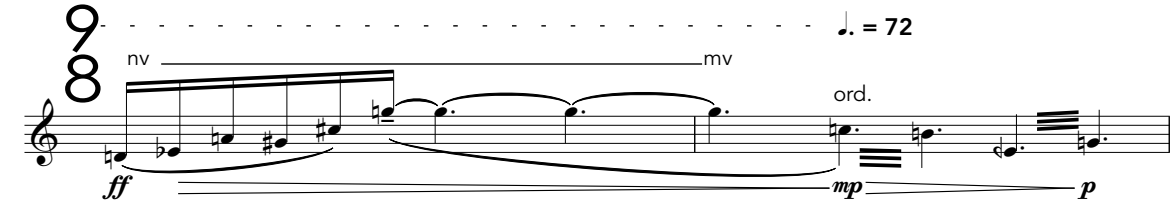


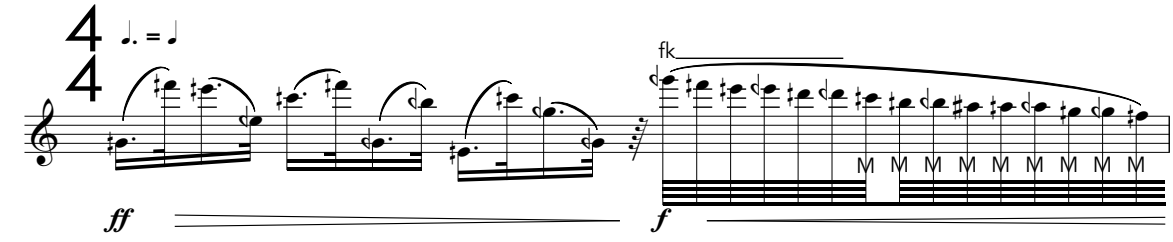


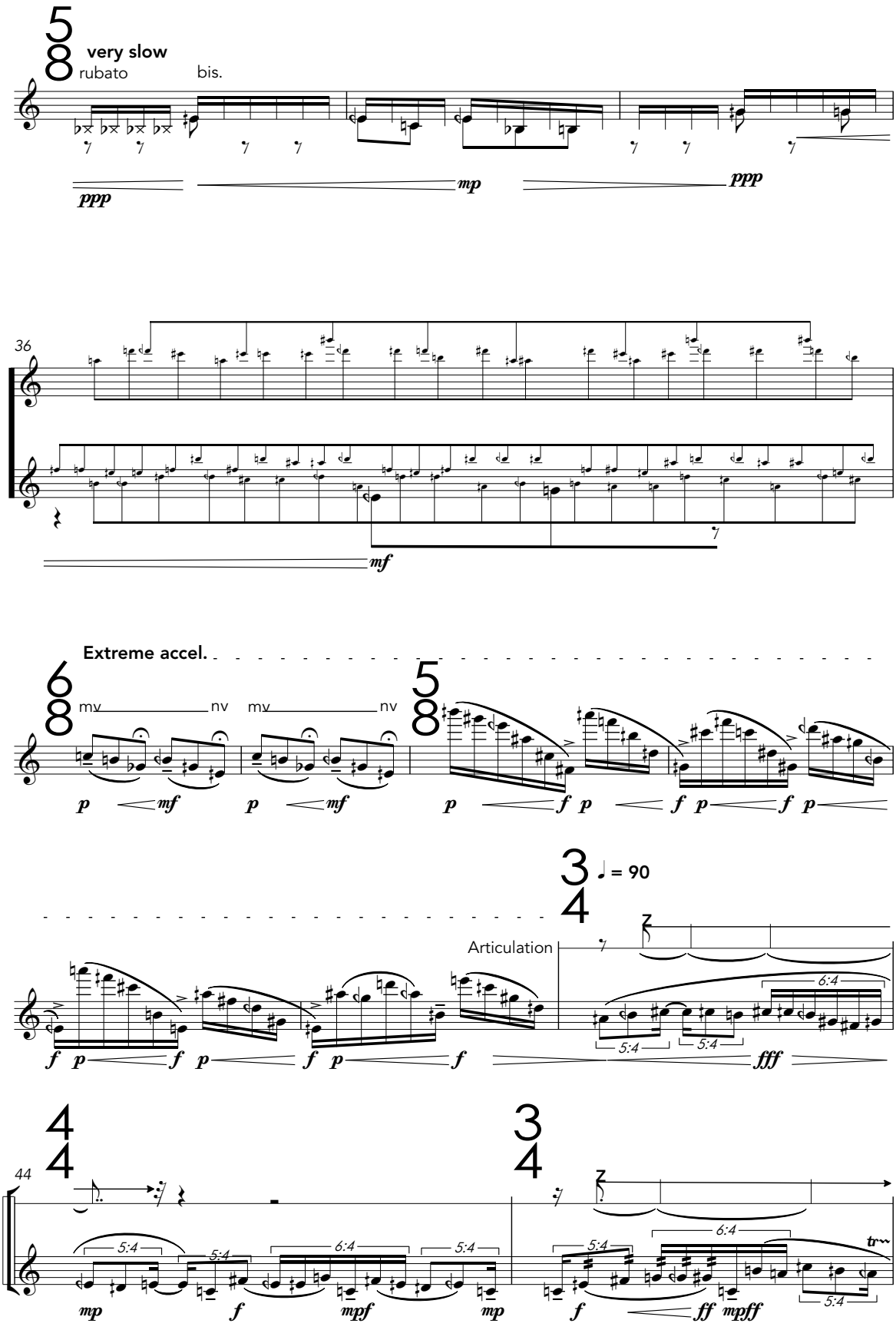

5:4
7:4
6:4
7:4
mf
ff
fff
c. ♩ = 90
c. ♩ = 67.5
c. ♩ = 45

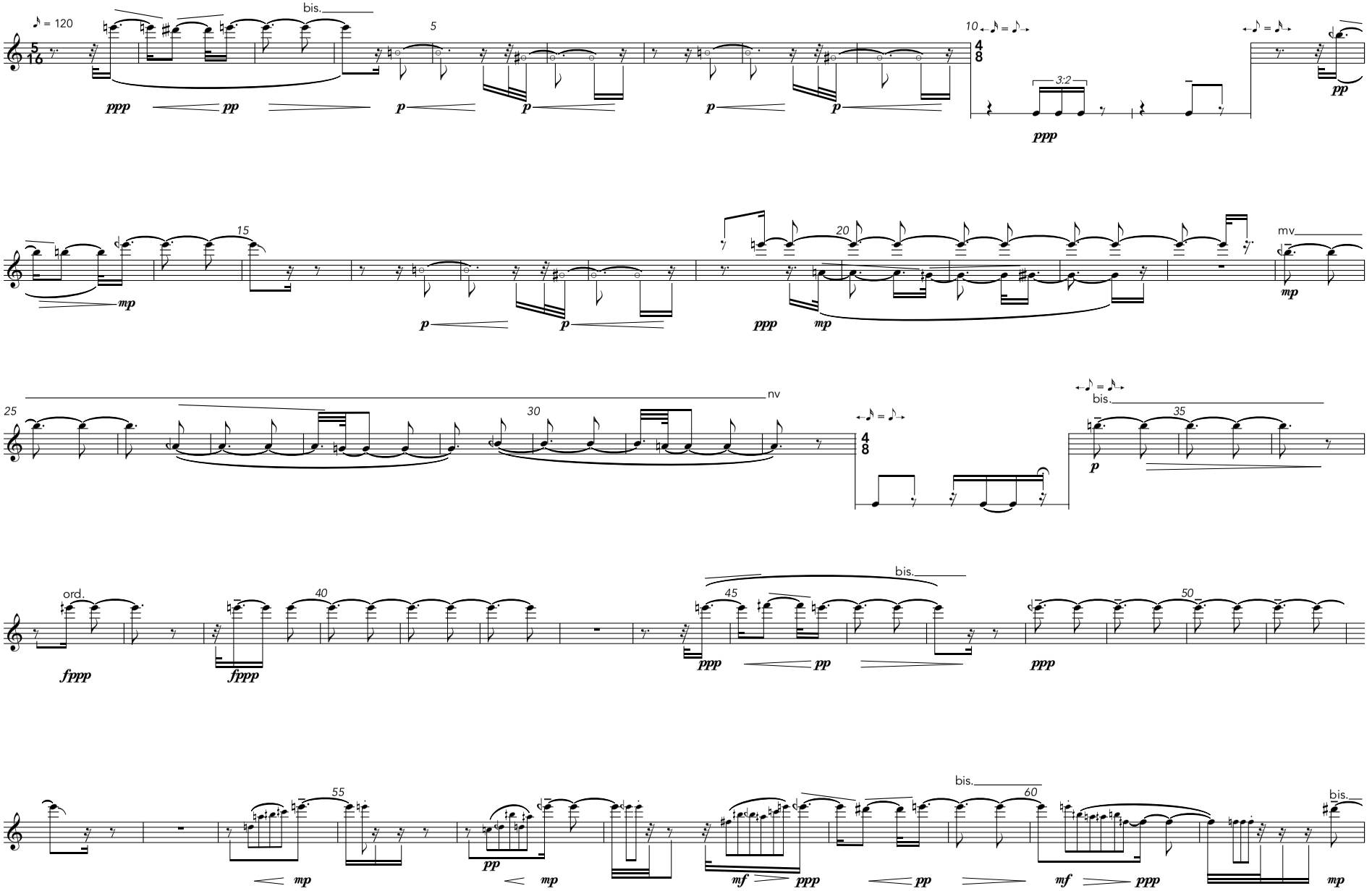

As fast as possible
fff
9:8

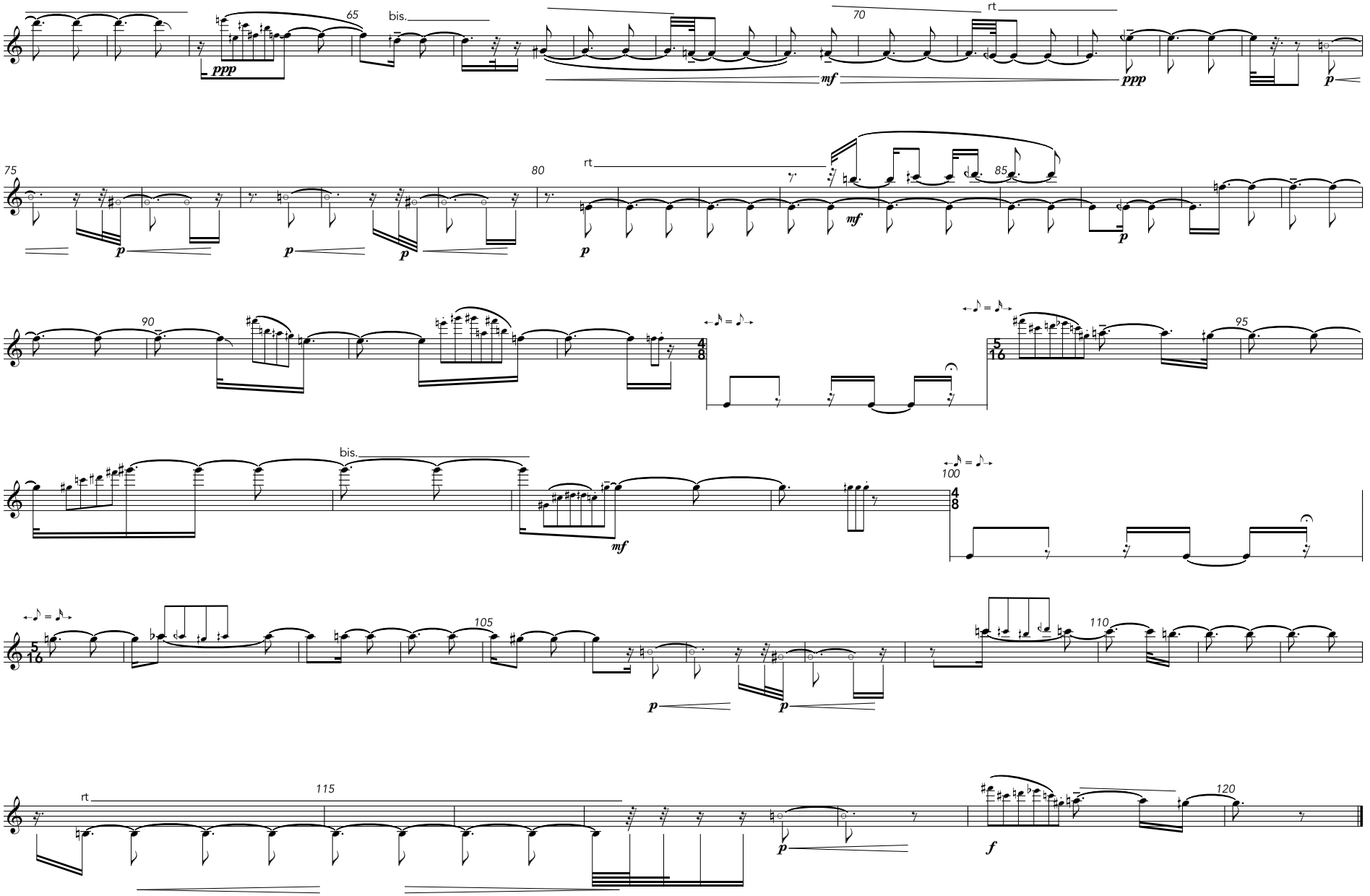

Extreme rit.
9:8


♩. = 72
nv
mv
ord.
ff
mp
p


♩. = ♩
fk
ff
f


very slow
rubato
bis.
36
Extreme accel.
Articulation
= 90
44


♪ = 120
bis.
5
10
♪ = ♪
4/8
3:2
ppp
pp
p
15
mp
20
mv
25
nv
30
ord.
fppp
40
45
50
55
60
mf


65
bis.
70
rt
ppp
mf
ppp
p
75
80
rt
85
p
p
p
p
mf
p
90
95
4
8
5
16
bis.
mf
100
4
8
105
110
p
p
rt
115
p
f
120