University of Montréal

How to create celerity in music?
Comment créer de la célérité en musique?

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Abstract and keywords

Abstract

In this thesis, I explore many of the techniques of composition and orchestration a composer can use to write a piece or a section with a great sense of speed. The techniques are illustrated by examples from the classical and contemporary repertory but also from my own compositions. By analyzing theses examples, the objective is to gain a better understanding of what can contribute to the sense of speed in instrumental music.

Keywords

Orchestration, Composition, Speed, Instrumental music

Résumé

Dans ce mémoire, j'ai étudié les techniques de composition et d'orchestration à la disposition d'un compositeur pour écrire des pièces ou des sections d'une grande rapidité. Les techniques abordées sont adjointes d'exemples venant du répertoire classique, contemporain et de mes propres compositions. À travers ces exemples, l'objectif est de gagner une meilleure compréhension de ce qui constitue l'impression de vitesse dans la musique instrumentale.

Mots-clés

Orchéstration, Composition, Vitesse, Musique instrumentale

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Contents

Introduction

In this master thesis I would like to study different techniques of writing, composition and orchestration used in pieces with very fast tempos.

To begin with, I think it's important to notice that the impression of celerity in music is always very relative. In the following example, which are the first two bars of the E Major fugue of the second book of the Well-tempered clavier from J.S.Bach, even if the quarter note could be played at a relatively fast pace like 125bpm (beats per minute), the piece would still feel slow as the main subdivision of time is the half note and the smallest subdivision is the eighth note.

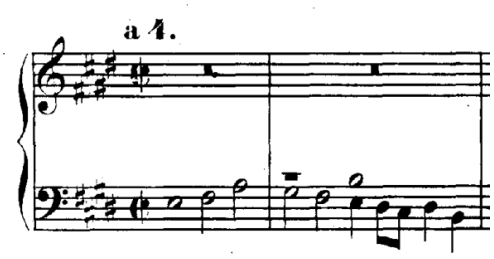


Illustration 1: J.S.Bach Fugue IX in E Major, Book 2

In the example of the Ballade n°2 of F.Chopin we also see how with relatively close tempos in beats per minutes, we can have two sections in a piece that feel radically different in their sense of speed. I will take as a reference in this example the 1988 recording by Krystian Zimerman for Deutsche Grammophon[1].

1 To listen to the performance : https://www.youtube.com/watch?v=NZfNAVQ6H4o

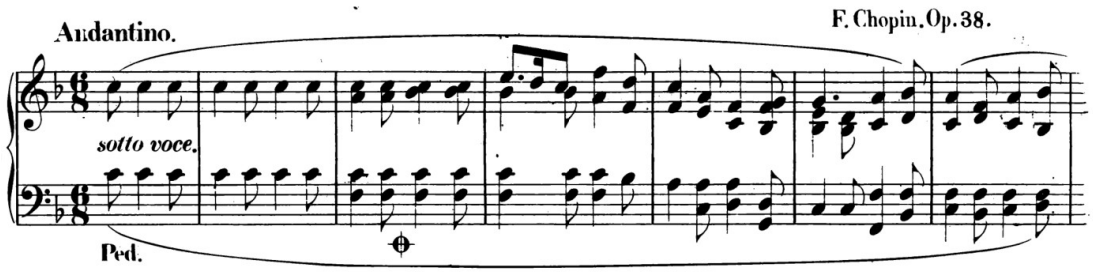


Illustration 2: F.Chopin, Ballade n°2, begenning of the first section exemple n°1

In the first section of the piece, Zimerman plays at a tempo of approximately 53bpm for a dotted quarter note. As the tempo indication suggests, the result is a relatively slow tempo.

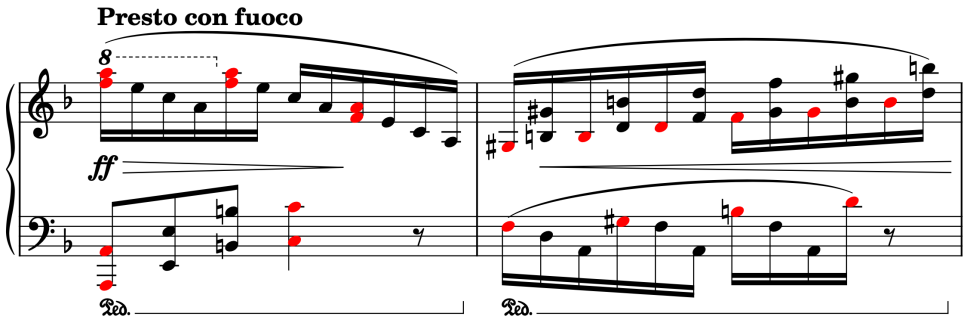


Illustration 3: F.Chopin, Ballade n°2, begenning of the second section, exemple n°2

In the second section of the piece, at the nuance indication « Presto con fuoco », Zimerman plays a dotted quarter note at around 80bpm. It is a notable increase, but this increase is way smaller than what it should be to switch from an Andantino tempo to a Prestissimo tempo. The convention for these indications in a 4/4 meter would be closer to 80 to 108 bpm for an Andantino tempo and a 168 to 200 bpm for a prestissimo tempo, meaning something closer to a 2:1 ratio[2].

The first reason for which these two parts feel so drastically different in their tempos is the subdivision of the time. The second section of the piece is constantly subdivided into sixteenth notes. In the first part of the piece, if the smallest subdivision is also a sixteenth, it is used very scarcely throughout the section and the more commonly recurring subdivision is an eighth note.

The second reason is the emphasis made by F.Chopin on smaller groupings than the pulsation in the second section.

2 (Sachs Curt,1953)

In the first section, the grouping is made throughout in dotted quarter notes (which is the same as the pulsation of the piece).

In the precedent example taken from the second section, in the first bar, the right hand's sixteenth notes are grouped every quarter note (wich feels syncopated as the piece is in 6/8), while the left hand's eighth notes are grouped every doted quarter. At the next bar, the left hand becomes the one with the polymetric pattern with groupings of dotted eighth notes while the right hand has groupings of eighths (the note marking the groupings are shown in red in the illustration).

This shortening of the groupings, between the first bar and the second, but also between the first section and the second give the impression of an acceleration, even if the smallest subdivision of time stays the same. As K.Stockohausen wrote in *Comment passe le temps* (which can be translated as *How the time flows*): “The time also depends on the density of modification (*Verändigungsdichte*): the time will “pass” as much faster as there is more surprising events; the more repetitions, the more it will “pass” slowly.”[3].

As seen in the last two examples, the writing and, as we will see in the rest of the thesis, the orchestration, both have a great impact on the perception of celerity in a piece of music. The choice of subject of this thesis reflects my interest in the use of extreme tempos and contrasts in speed in the classical repertoire and contemporary music but also in my own compositions.

3 Translated by myself from the french edition : “Le temps vécu dépend en outre de la densité de modification (Verändigungsdichte): le temps “passera” d'autant plus rapidement que les événements surprenants seront nombreux; plus il y aura de répétitions, plus il “passera” lentement.” (Stockhausen, 2017) p133.

I.Polymeters

Polymeters can be defined as "[…] the symbological techniques of simultaneous time signatures"[4]. Polymeters don't necessary imply two written time signatures as they may be highlighted by the composition itself. As Gardner Read later writes in the same passage "Multiple time signatures may be implied within a single all-inclusive meter by means of consistent cross-accenting or patterned irregular phrasing in one or more musical strands of a given composition.".

As such, if polymeters can be written with explicit metric indications like in the sixth movement of the second cantate from Anton Webern,

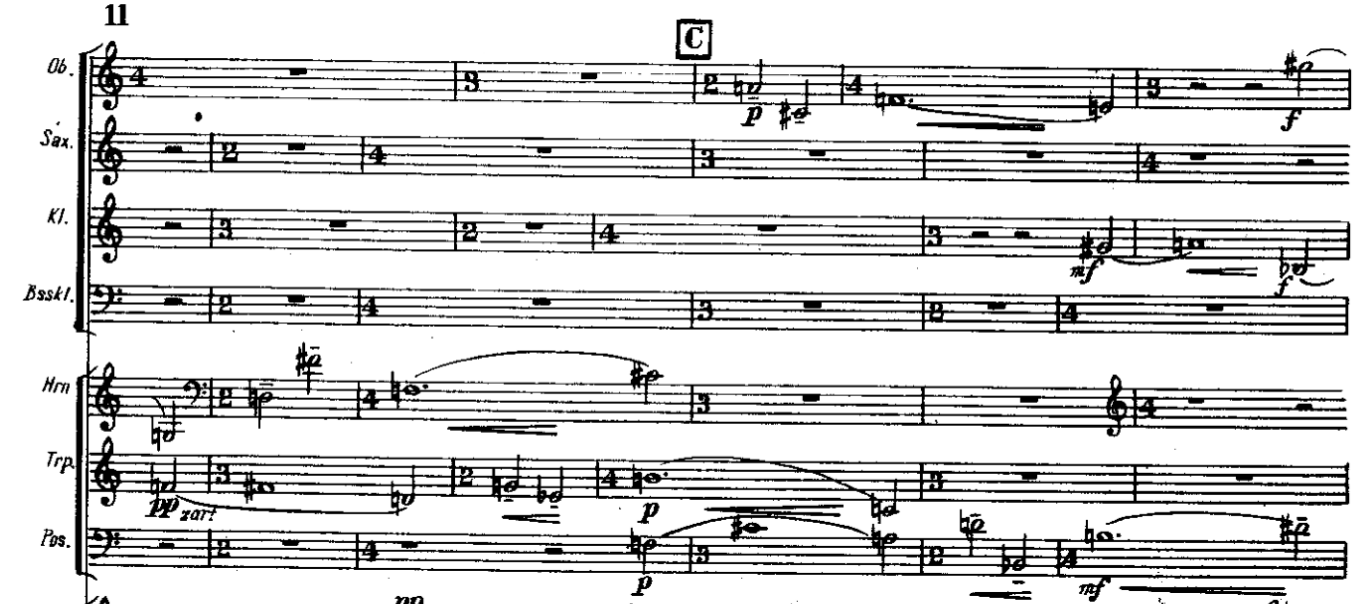


Illustration 4: Antone Webern, cantate n°2, part VI

they are more commonly directly written in the main time signature as we can see in the A Clarinet part in this example from a *Short ride in a fast machine* written by J.Adams.

4 (Gardner Read, 1978) p123.

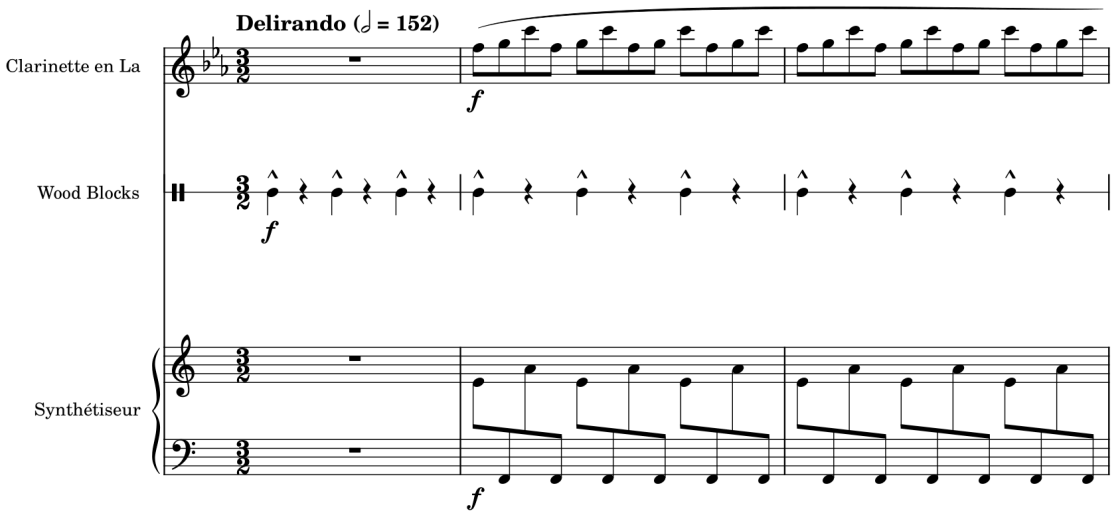


Illustration 5: John Adams, Short ride in a fast machine, 3 part takken from beginning of the piece

As seen with Chopin's second Ballade, polymeters can also be used extensively in a single voice. This can create jarring effects alternating between polymeters with time signatures implying small or large groupings and creating a faster or slower implied pulsation.

A great use of this technique can be found in Barber first concerto for violin (op.14)

A.Contrast between polymeters in a single voice

In this section and the ones following, and to avoid any confusion when referring to polymeters contained in tuplets, I will use Thomas Ades's irrational time signature system to define the time signatures of these tuplets polymeters.

This system allows to write down an entire section in tuplets using the divisor in the time signature to indicate the ratio of the tuplets. As an example, a 4/4 time signature could be filled with two 4th note triplets. This would result in a bar split in 6 notes and with Tomas Ades's notation, would be written down as a 6/6 time signature. A 4/8 bar filled with triplets would then become a 6/12 bar and a 4/8 bar field with quintuplets would be a 5/10[5].

5 See The use of irrational time signatures in Thomas Adès (Justeen Wei Ting Chan Wheatley, 2019)

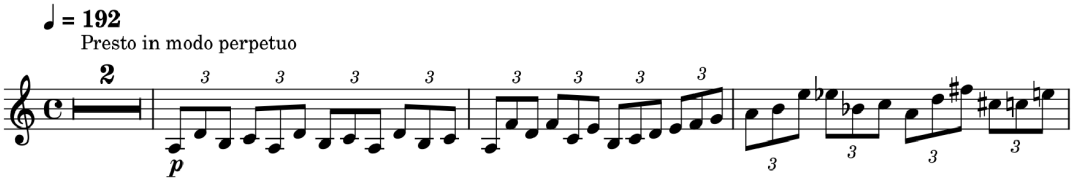


Illustration 6: Samuel Barber concerto for violin n°1 op. 14 part III

With the violin's main motif starting with a 6/4 polymeter in triplets (or a 6/6 polymeter using Thomas Ades's irrational time signature system) and a very similar motif of introduction, with the same polymeter, at the timbale, Samuel Barber, puts us in a guessing situation about the true tempo and time signature of the piece. If 192 bpm is already a very fast tempo, there is no context to know that this is the written tempo of the piece, as the polymeter underlines a second pulsation at 288bpm (192*3/2), wich is the one perceived by the listener.

At the second bar, Barber expands the first motif to a half note length. There is no longer a polymetric relationship between the motif and the time signature of the piece. Even if the first polymeter technically stops at the start of the second bar, we only realize it when the motif gets extended which avoids putting too much emphasis on where the first beat of the bar is located.

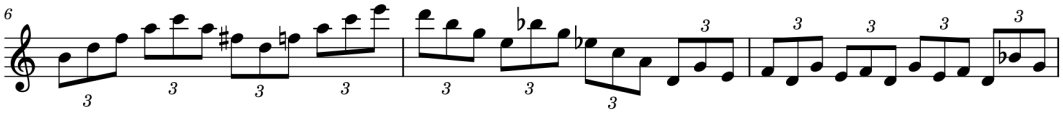


Illustration 7: Samuel Barber concerto for violin n°1 op. 14 part III

Following up in the 6th bar, the grouping of the notes start to change constantly. First with a seven notes arpeggio then five, four and five again; creating a section with more rhythmic accents than the previous one. The theme and its triplet polymeter are then re-exposed but this time with a syncopation; contrasting even more with the 4/4 time signature.

These contrasts between the different groupings are also underlined by the use of the harmonic rhythm and the register. The first polymetric section is on one single chord in the bottom register of the violin; the in-time section is higher on the register and further outside of the main mode of the piece; the section with irregular arpeggios is in the high

register. The re-exposition of the theme is again in the low register and in the main mode of the piece.

B.Use of polymeters to structure an entire piece

If polymeters are useful to create contrast, they can also serve more structural purposes. In 2021, I wrote a 3-minute piece for a symphonic orchestra composed of amateurs and reinforced by the *Orchestre National de Lyon* (ONL), it was played in front of the opera house of Lyon to support the re-opening of cultural spaces that were shut down due to the lockdown restrictions in France. In this piece, I used a relationship between two time signatures and two tempos to structure its form.

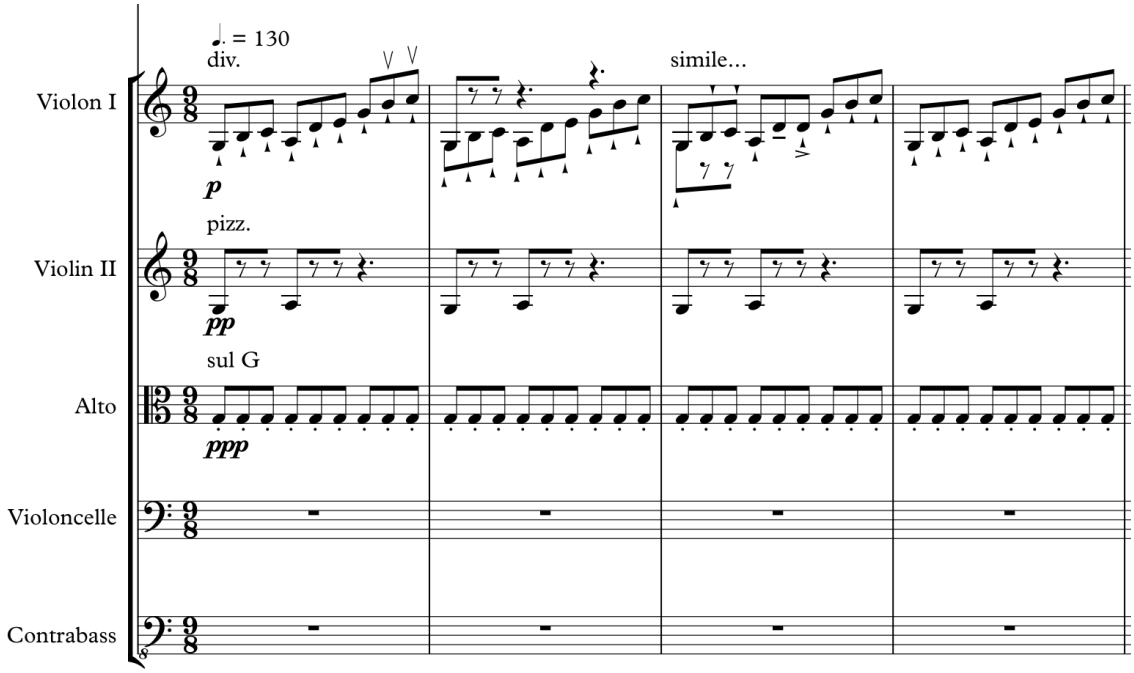


Illustration 8: Essentiel (2021)

The piece starts off with a 9/8 time signature. The main motif of the piece is given to the first violins.

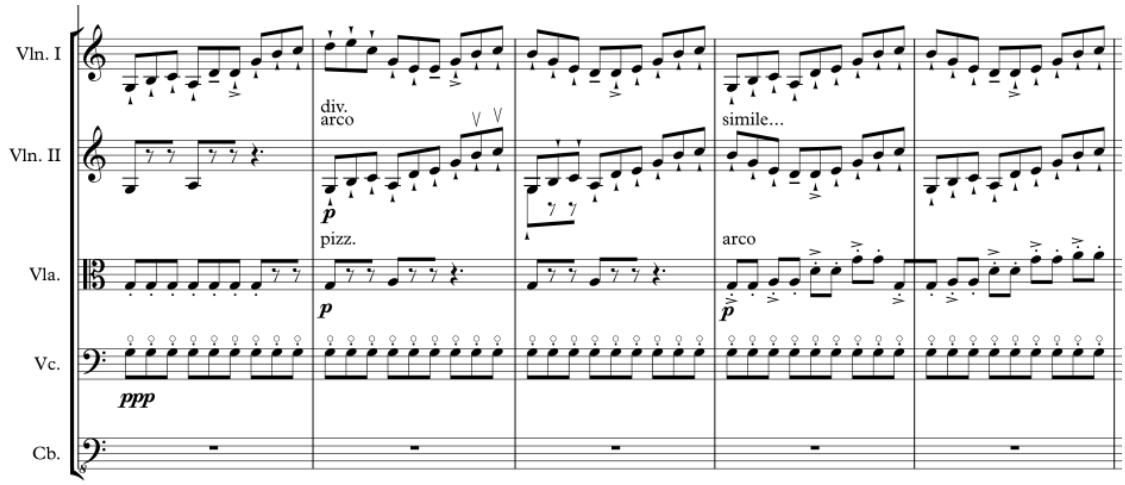
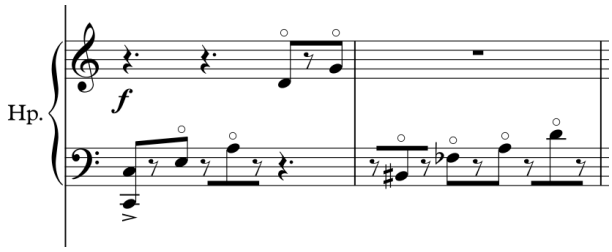


Illustration 9: Essentiel (2021)

Then, after a syncopated development in the wind section, a new element appears at the viola, hinting at another subdivision of time. Unlike the precedent examples, here, this subdivision does not fit perfectly in the 9/8 bar, and so, takes the span of 2 bars to get back in synchronization with the main motif.

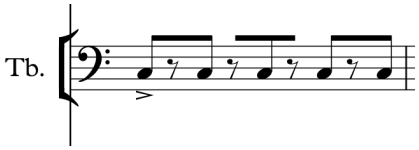
Even with its different subdivisions of time, the viola part shares many notes with the main motif of the violins and is contained within the same harmony. Because of that, the new division of time isn't too prominent in this section.

I then proceed to introduce more elements in the accompanying parts, hinting at another time signature that becomes more important in the next section of the piece.



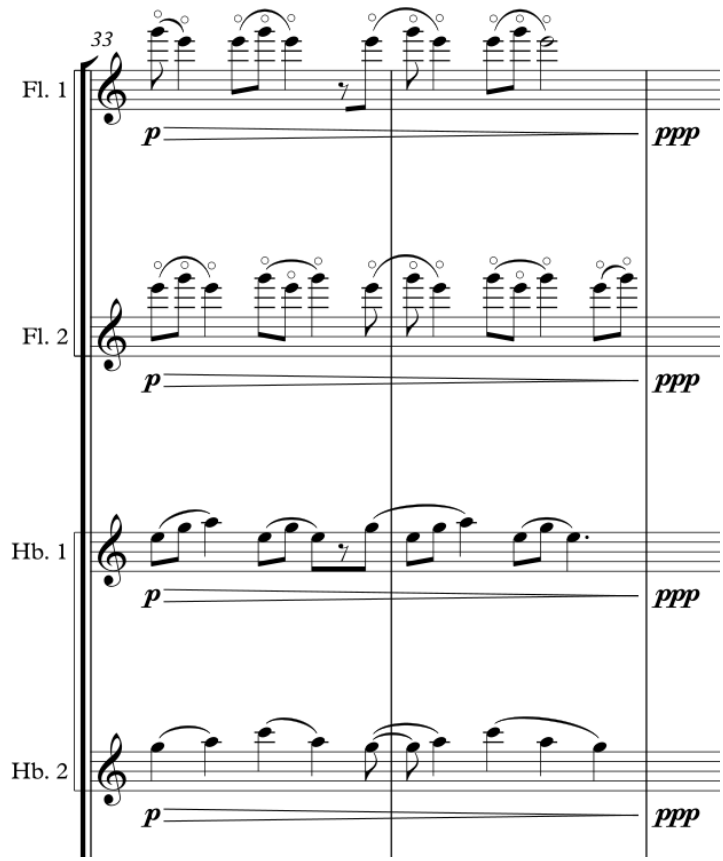
First the Harp with a motif still very close to the arpeggio of the viola, also looping every 2 bars.

Illustration 10: Essentiel (2021)



Then timbale further emphasizing the subdivision.

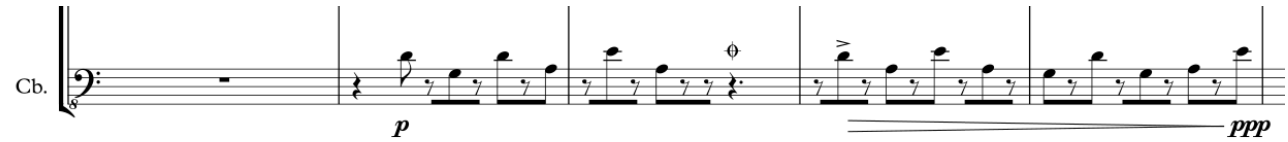
Illustration 11: Essentiel (2021)



Then the wind section with a polymeter of 4/4, that also functions as a resonance of the harp.

And the double bass playing in *pizzicato* a four note subdivision against a harp polymeter of 12/8.

Illustration 12: Essentiel (2021)



Slowly introducing this new subdivision and playing with many orchestral colors, the section then abruptly stops to get back to the start of the piece at the letter G.

The next section of the piece consists of a long crescendo. If the previous section was built around incises and contrast, new elements appear in the background to contrast with the main pulsation of the piece.

Then, in the same fashion as in the beginning of the piece, a polymeter enters at the viola.

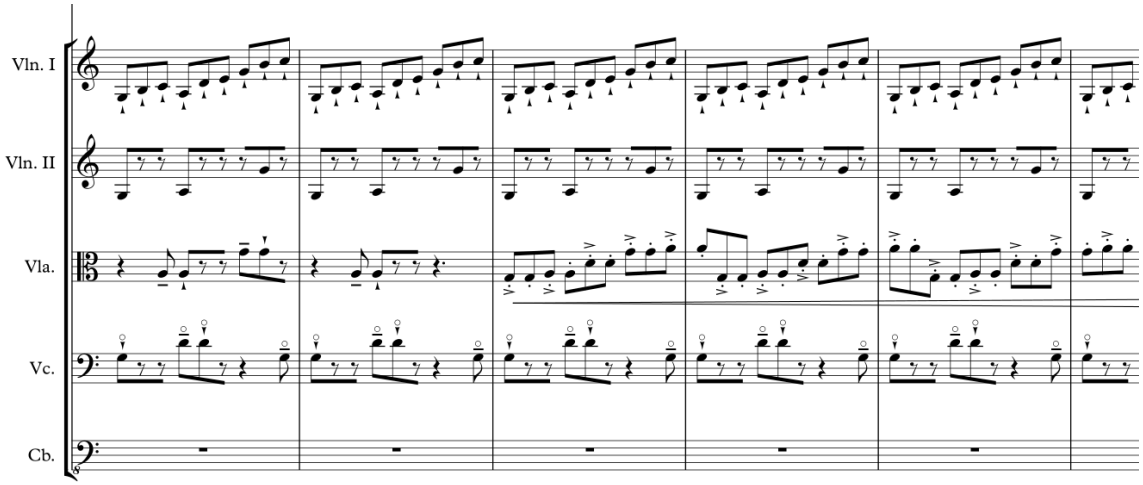


Illustration 13: Essentiel (2021)

Only this time, rather than looping every 2 bars, the motif stops after its first section and creates a more complex 5/4 polymeter. The 9/8 and the 5/4 time signatures are only off by an eighth note. Since they are so close together, it takes them a long time to get back together; every 10 bars; This time frame becomes useful to structure the greater form of the piece.

In this first 10 bars, the double basses join the polymeter. Then in the next, they are joined by the cello, a clarinet and are supported by another 2/4 polymeter at the second violin. While in the same section, a 7/8 polymeter also brings more rhythmic tension in the first flute.

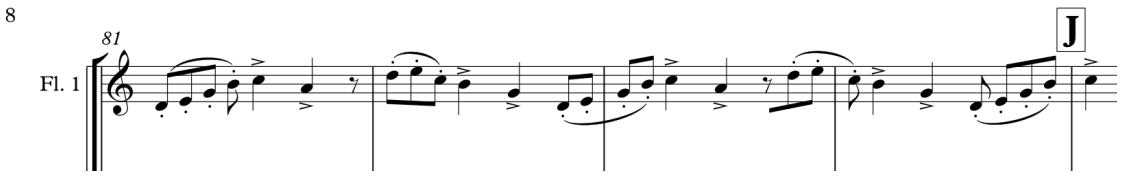


Illustration 14: Essentiel (2021)

This tension brings us to the next section of the piece with an orchestral tutti. The highs remain in the 9/8 subdivision while more and more instruments join the double basses 5/4 polymeter. First in the low register then in the middle with the trombones and the french horns.

In the last section of the piece, the entire orchestra finally switches entirely to 5/8 and 5/4 motifs.

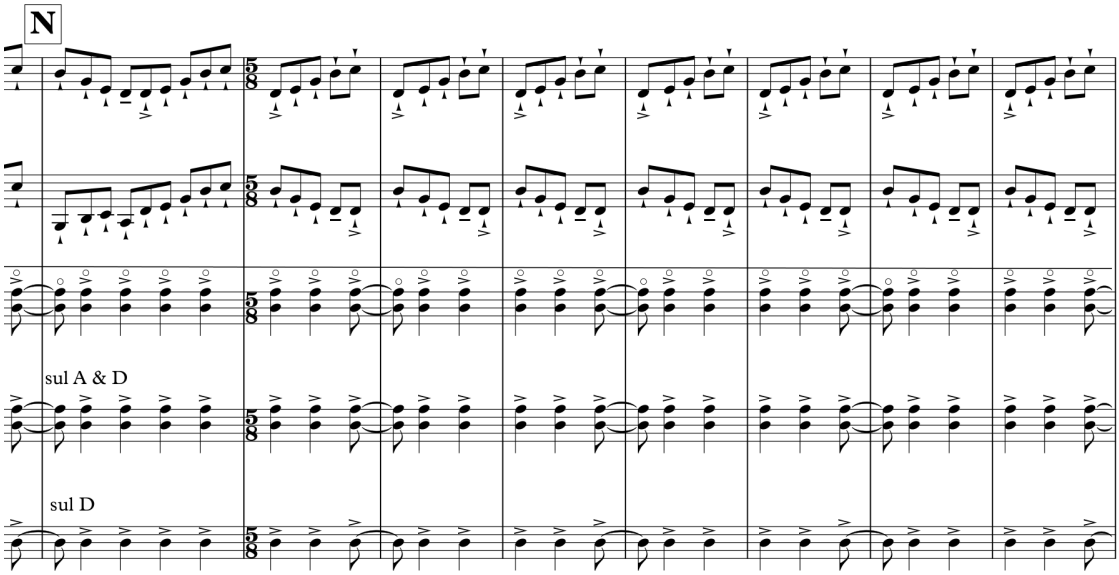


Illustration 15: Essentiel (2021)

To conclude the piece, the main starting motif, abruptly cuts the orchestra with a mirrored version of the main theme (which, because of the mode I chose for the piece, is also its negative[6]).

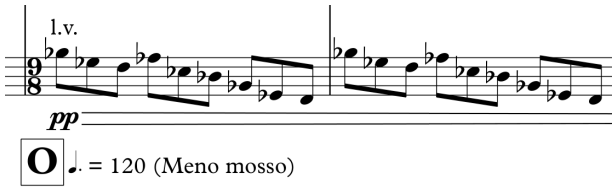


Illustration 16: Essentiel (2021)

This contrast is not only a way to conclude the piece but also serves its purpose: the very sudden drop in mood of the piece, as well as a reference to the widelying aim of the piece as a whole.

As seen in these examples, polymeters are very effective at structuring time, both in short sections and in the overall structure of a piece. They also always keep a clear proportion between the pulsation of the piece and the pulsation of the polymeter. In extremely fast pieces, it can be very hard to suddenly switch in tempo; the polymeter can be used as a tool to create contrast in the sense of speed without changing the original pulsation.

6 An harmony that is the negative of an other harmony is one that contain all of the notes that aren't contained in the other in the chromatic scale. For example the G flat Major pentatonic scale is the negative of the C Major scale.

II.The subdivision of time and the Heterophony

Even a piece with a slow tempo can have a very fast section or orchestral elements to serve as a contrast in the piece itself. A good example of such a contrast can be found in the optional interlude from the version of *Pelléas et Mélisande* by Jean Sibelius.

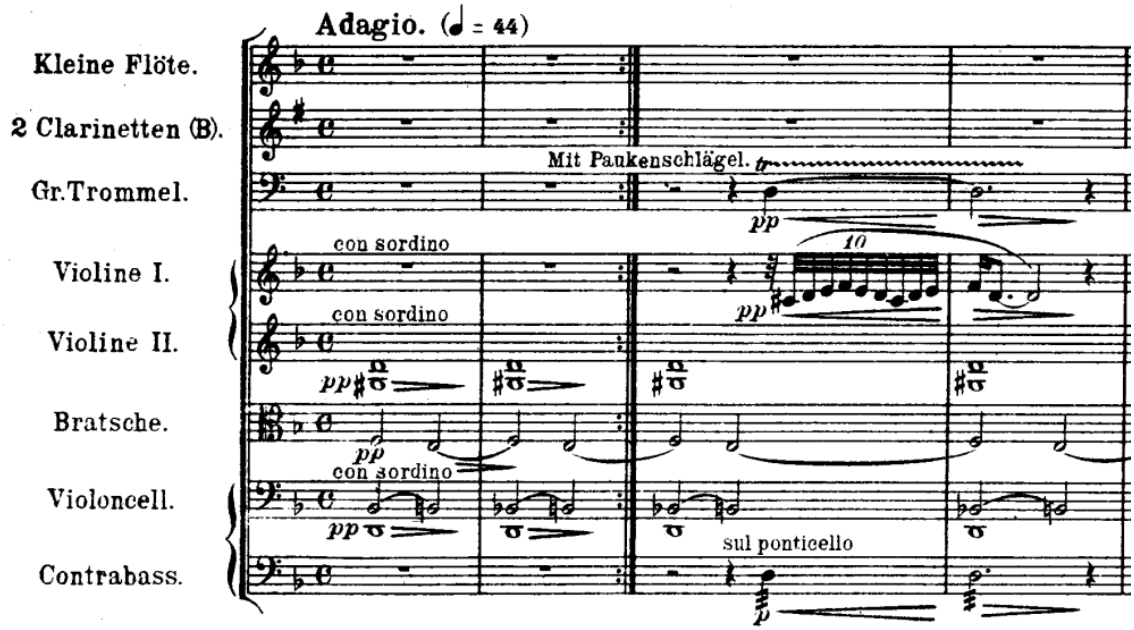


Illustration 17: Pelléas et Mélisande, suite for orchestra by Jean Sibelius, op.46, 1905

The piece starts with an extremely slow and minimalist *Adagio* for string orchestra, in a constant oscillation. Then a very fast motif, split between the percussion, the double basses and the violins appear. The motif reoccurs at an odd 3 bar rate. It then suddenly, after a longer silence, blows out of proportion in an orchestral tutti only to return to its first state at the end of this short movement.

The element features a technique that I found particularly effective to obtain very fast and chaotic textures: the heterophony. If the homophony describes a rhythmic situation where multiple voices of a counterpoint follow a similar rhythmic pattern, heterophony describes "(...) a way to play simultaneously a melody and its variations. A variation can

consist of the addition or the suppression of notes, a simple shift (a section played slightly earlier or later), or a change in rhythm or tempo.”[7].

A.Rational and irrational division of time, the tuplets

In the same way a polymeter clashing with the time signature can create contrast, so can a heterophony written in a different subdivision than the rest of the pieces.

I would propose three ways to write subdivisions that each provide different results. The example is taken from Saga, a piece I wrote for the end of my precedent master's degree in 2020, for two dancers and a chamber orchestra. The piece consists of three parts, a slow introduction (from which the following example is taken), a fast central part and a minimalist and contemplative ending.

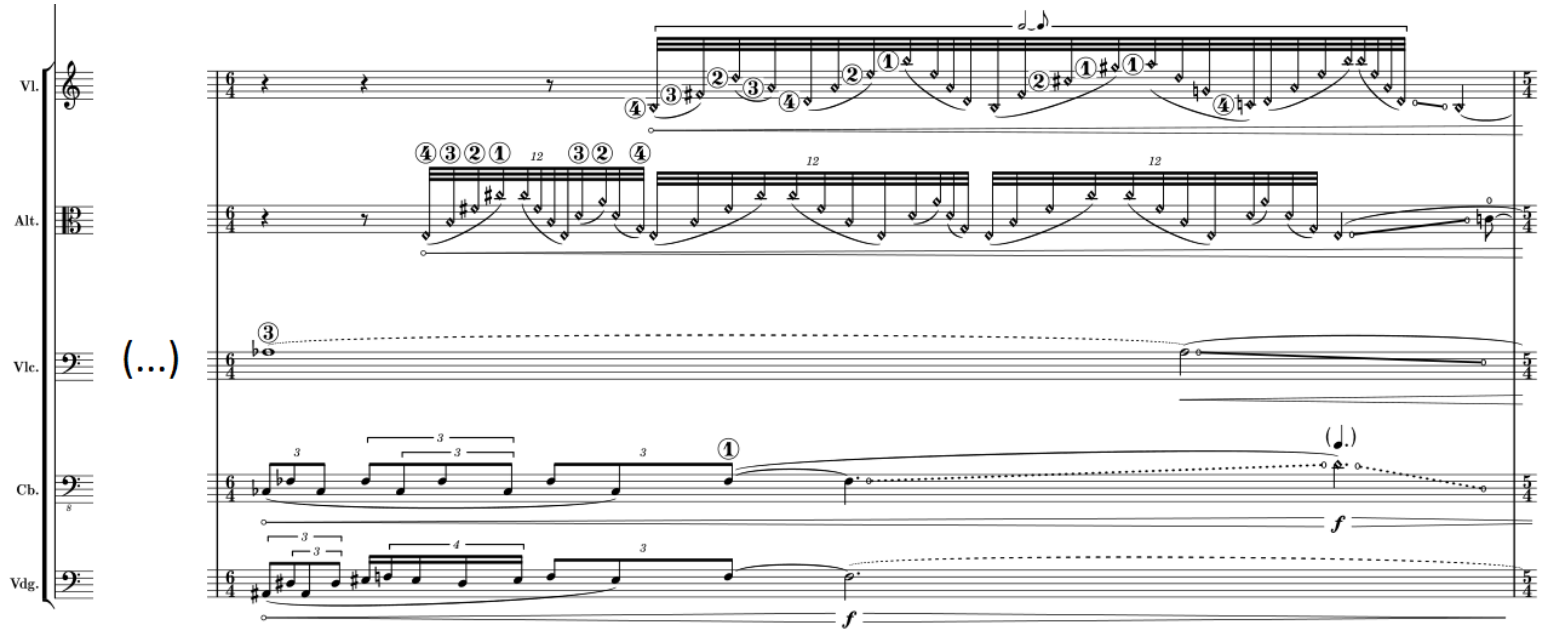


Illustration 18: Saga (2020), piece for two dancers and chamber orchestra

First at the double bass and at the viola da gamba (the last line), we can find on the second beat the simplest subdivision of time, the tuplet. This subdivision of one or multiple times can be especially useful with larger tuplets where the ratio between the

7 Translated from the french “l’hétérophonie est une manière de jouer simultanément une mélodie et des variations de celle-ci. Une variation peut consister en l'ajout ou la suppression de notes, un simple décalage (avance ou retard léger), ou un changement de rythme ou de tempo” ”Guide de la théorie de la musique” (Claude Abromont and Eugène de Montalembert, 2001) p608.

music's natural subdivision of time and the tuplet subdivision is less obvious (as in the last example from Sibelius with the 10:8 ratio of the first violin).

To increase subtility, a tuplet can be played off beat as in the viola part, or on a fraction of a full beat as in the viola da gamba part. In this example, the result is a rhythmically controlled accelerando.

The tuplets can be nested into each other as in the double bass part. In this case the result has the same effect as the 4:3 subdivision of the viola da gamba and results in an *accelerando*. With more extreme uses as in the first Black page from Frank Zappa, it can be used to create surprising and contrasting divisions of time during a piece.

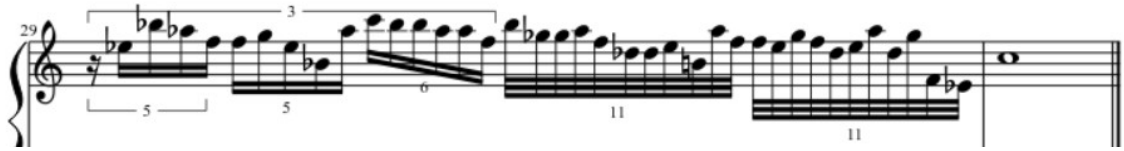


Illustration 19: Exemple from the end of the Black Page n°1

The last element used here is an irrational, duration dependent subdivision of time, in the violin part. With a more traditional notation, the tuplet would be at a ratio of 27:20 (27 notes played in the span of 20). But rather than indicating this extremely complex ratio at the tuplet number, there is an indication of time, so the musician precisely knows where to begin and where to end the rhythmic subdivision, and then plays the notes regularly within this time span. It results in a rapid flow of notes that blurs the sense of pulsation but is still precisely set in time.

B.Heterophony used in an entire section of a piece

Heterophony can be used continuously when multiple voices coexist while being written in different subdivision. A piece that makes good use of this is *Frontispice* (1918) by Maurice Ravel. The version of the piece I will use in the following examples is the one for two pianos and five hands.

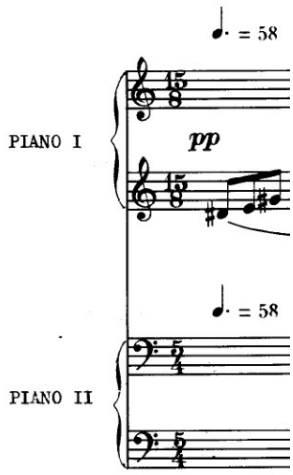


Illustration 20: Frontispice (1918), by Maurice Ravel

In this piece, two time signatures coexist between the two pianos.

The first is a 15/8, the second 5/4. The 15/8 would be notated with the T.Ades's notation of irrational time signature as a 15/12 as the eighth notes are equal to triplets in the 5/4 section (alternatively the 5/4 could also be notated as an irrational time signature but would then result in an irrational divider for the time signature).

To avoid confusion between the two divisions of time in this piece I will use the irrational (15/12) notation for the first piano part.

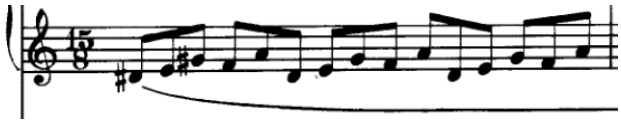


Illustration 21: Frontispice (1918), by Maurice Ravel

The piece starts with a motif in a 5/12 polymeter, looking a lot like the S.Barber concerto studied before. Without knowing the rest of the piece, this leaves us in an ambiguous situation about the precise pulsation and time signature of the piece.

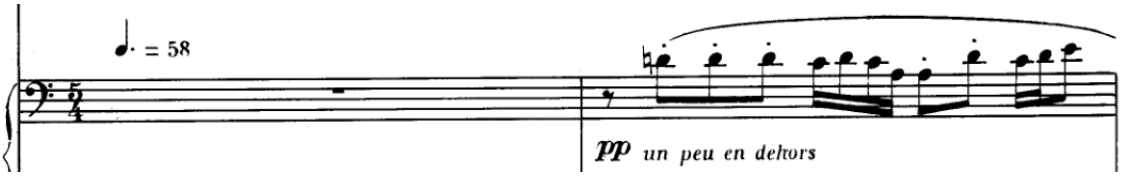


Illustration 22: Frontispice (1918), by Maurice Ravel

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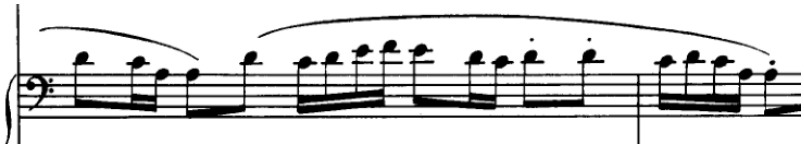

Illustration 23: Frontispice (1918), by Maurice Ravel

In the second part of the piece, rather than clearly giving us the time of the piece, it further accentuates the confusion created by the first motif. The 5/4 time signatures brings a new division of the time, the smallest being the sixteenth. The melody also never repeats itself exactly throughout the piece and the start of the phrasing mostly occurs offbeat and never on the first time of the bar.

The two divisions of time together create a denser resulting rhythmic pattern.

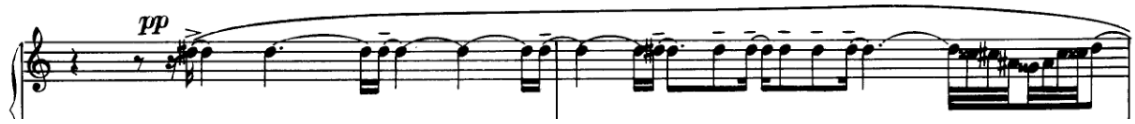

Illustration 24: Frontispice (1918), by Maurice Ravel

Next to be introduced, is a syncopated element in the 15/12 time signature with a smaller 20th subdivision of time (16th in triplets).

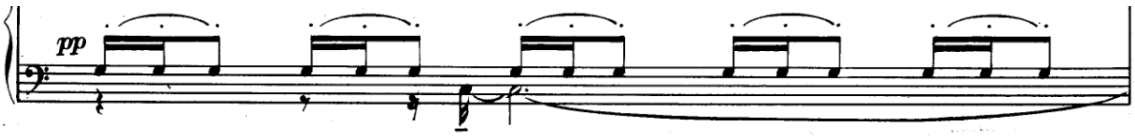

Illustration 25: Frontispice (1918), by Maurice Ravel

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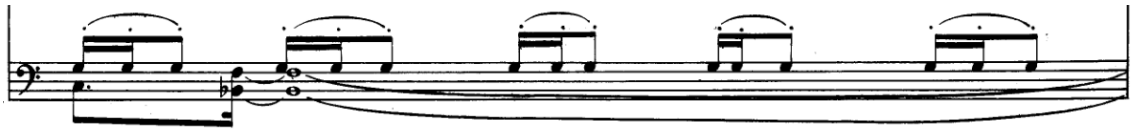

Illustration 26: Frontispice (1918), by Maurice Ravel

The next element is in the 5/4 time signature. With its ostinato, it is the element who gives a clear indication of the meter of the piece. As most of the other elements are conflicting with this meter, it is not perceived as the main pulsation. It also contains a bass line played in syncopation in the same fashion as the preceding part but in a binary division of time.

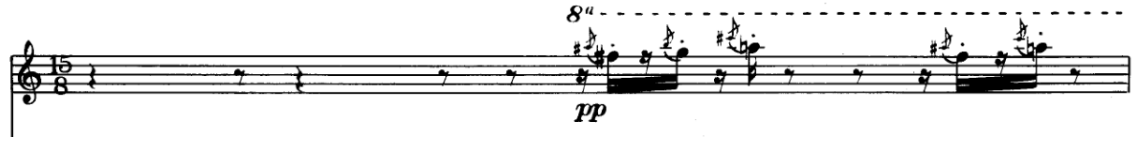

Illustration 27: Frontispice (1918), by Maurice Ravel

The last element to be introduced is an arpeggiated syncopated melody, played in a very high register.

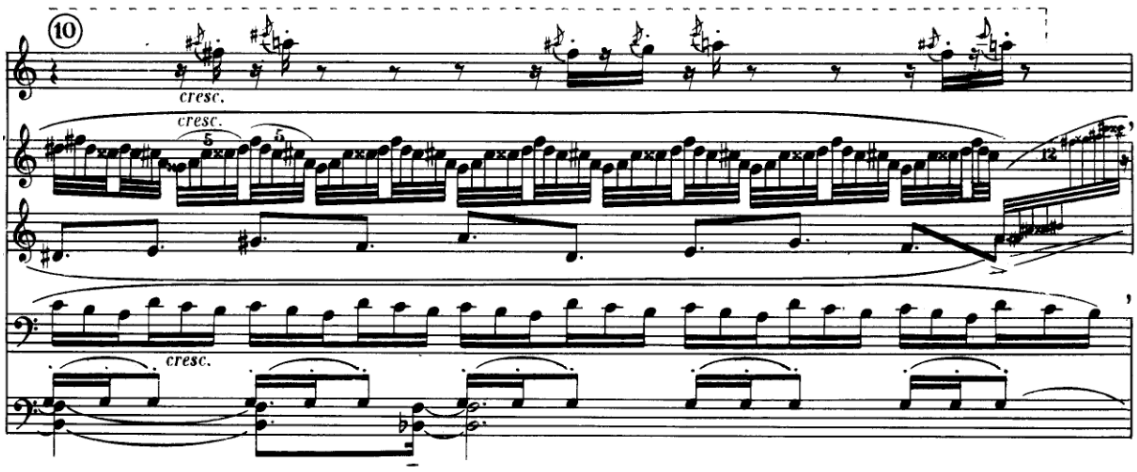

Illustration 28: Frontispice (1918), by Maurice Ravel

In the very last bar before the end of the coda, some elements are transformed. The second part is now played in 16th tuplets while the first part in 15/12 is slowed down to become a 5/8 grouping, getting in time with the 5/4 time signature.

The third part is now playing a fast ostinato in 5:4 tuplet in a 3:2 time division (or in a subdivision of a 25th note). Even if the tempo is a slow 58bpm for a fourth note, this extensive division of the time feels extremely fast and chaotic.

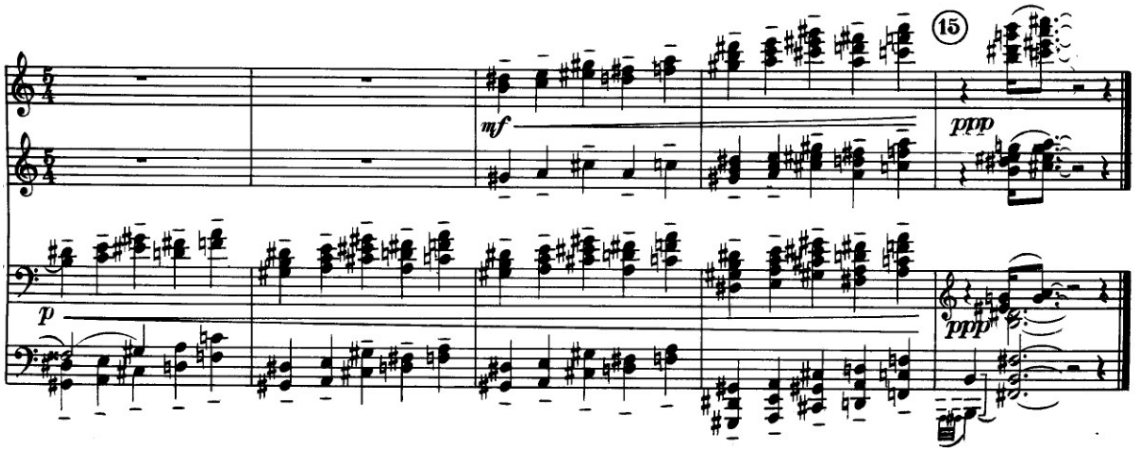

Illustration 29: Frontispice (1918), by Maurice Ravel

To conclude this extreme example of heterophony, Ravel abruptly stops the music for a rigorously homophonic coda.

Apart from its compositional applications, heterophony can also have specific uses in orchestrations.

C.Heterophony and time subdivisions in the orchestra

1.First example : *Bluebeard's castle* from Béla Bartók

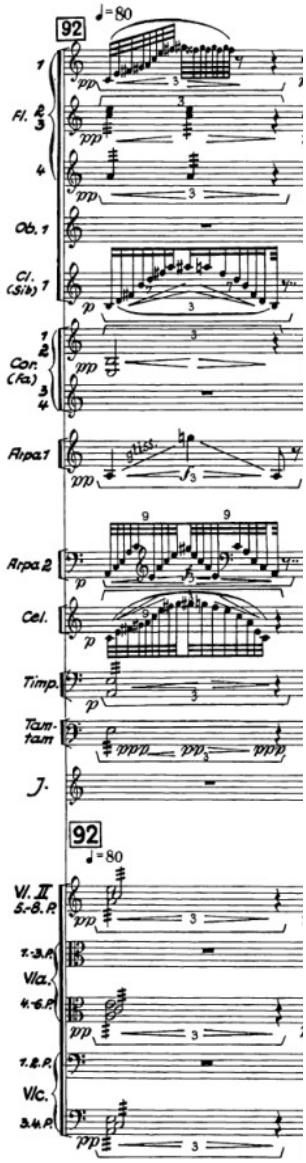

Illustration 30: Bluebeard's Castle, Door 6, part 1 by Béla Bartók

The ability of heterophonic time subdivisions to create fast and blurred textures, even in very slow tempos can be very useful when combined with the rich instrumental palette of the orchestra.

In his opera, *Bluebeard's castle* (1918), Béla Bartók creates an orchestral wave in the first part of the section of the door six[8].

In this example, the different instruments blend very well together, and it is hard to recognize any individual line. Many structural elements help creating this result.

First, most of the instruments playing are using very fast and different subdivisions of time which create a blurring effect. There is the string orchestra in short 16th triplets tremolos. The nested tuplet in the clarinet arpeggios and another one in the second harp's arpeggio. The arpeggio of the celesta with the 9:8 tuplets and 16th triplets notes on the second pulsation. The 16th triplets in the flute's tremolos and arpeggios.

The second structural element is the way the wave is split apart in the orchestra. Rather than having all the instruments playing the arpeggio, many instruments are supporting it with different articulations and motifs. The main element, the arpeggio, is split between the harps, the celesta and the clarinet. Despite having different notes during the arpeggio, they all arrive at a G sharp at the top of the arpeggio. To create more tension and to help the low and medium registers of the arpeggio resonate, the flutes, the strings and the percussion play an A minor chord in tremolo. It is interesting to note that these instruments do not play all the notes from the arpeggio, which helps the chord be more defined. The first flute plays the ascending part of the arpeggio but then plays a trill between the G sharp and G natural when arriving at the top. Having the flute stay in the high register creates a resonance of the culminating point of the wave main arpeggio

8 To listen to this exemple you can follow this link: https://www.youtube.com/watch?v=BtdmaREL3jo

and open the orchestra's register. Its trill helps blur this resonance. Finally, even if extremely quiet, the french horns long notes help to define the bass more clearly and create a more stable low register.

2.Second example : Frissement Anthracite

This second example analyzes a page from *Frissement Anthracite*, a short piece of 2 minutes for symphonic orchestra and viola solo that I wrote in 2019 for an orchestral workshop at the C*onservatoire National Supérieur de Musique et de Danse de Lyon* (CNSMDL). The piece has a tempo of 160bpm. The tempo was originally intended as 180bpm and ended up being played closer to this tempo. The piece has two sections and is currently incomplete as I plan to extend it into a full viola concerto.

In the following example my aim was to have multiple, independent layers in the orchestra and have these layers crossfade between two musical ideas.

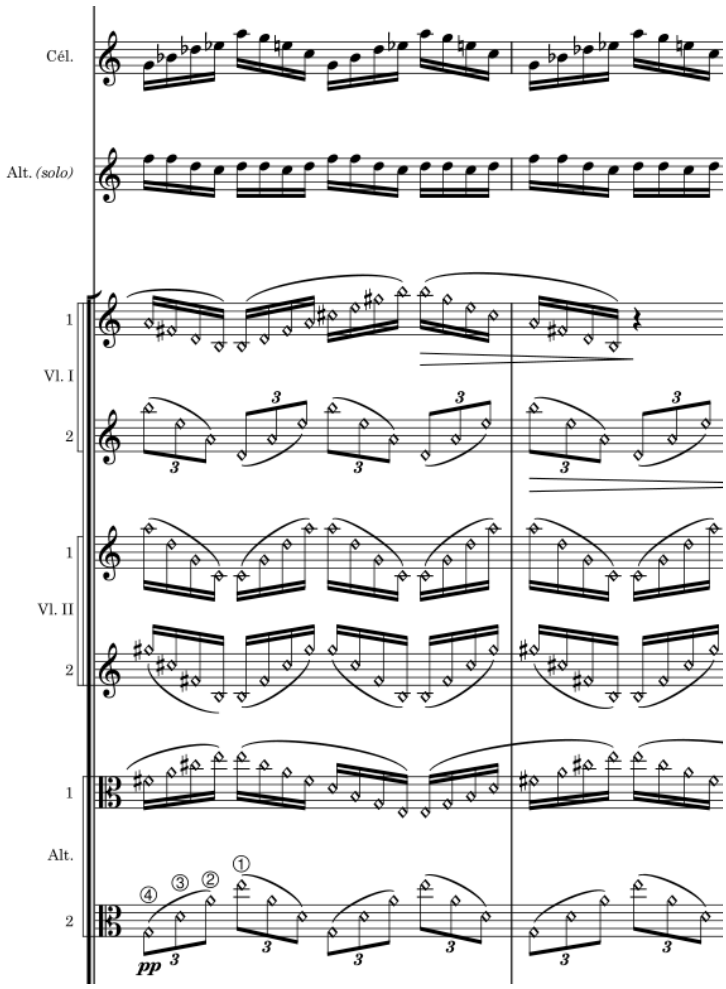

Illustration 31: Frissement Anthracite (2019), for symphonic orchestra

In the begining of the page, the string orchestra and the celesta are playing fast harmonic arpeggios. I made sure that the apreggios were offset, played different notes or were in a different time division to have a fast and chaotic result.

The solo viola plays an element that will be developed by the orchestra at the end of this page after the crossfade. Even if this motif is contained within the range of the string orchestra, its different timbres and the fact that it's not blended with other elements help it stand out from the rest.

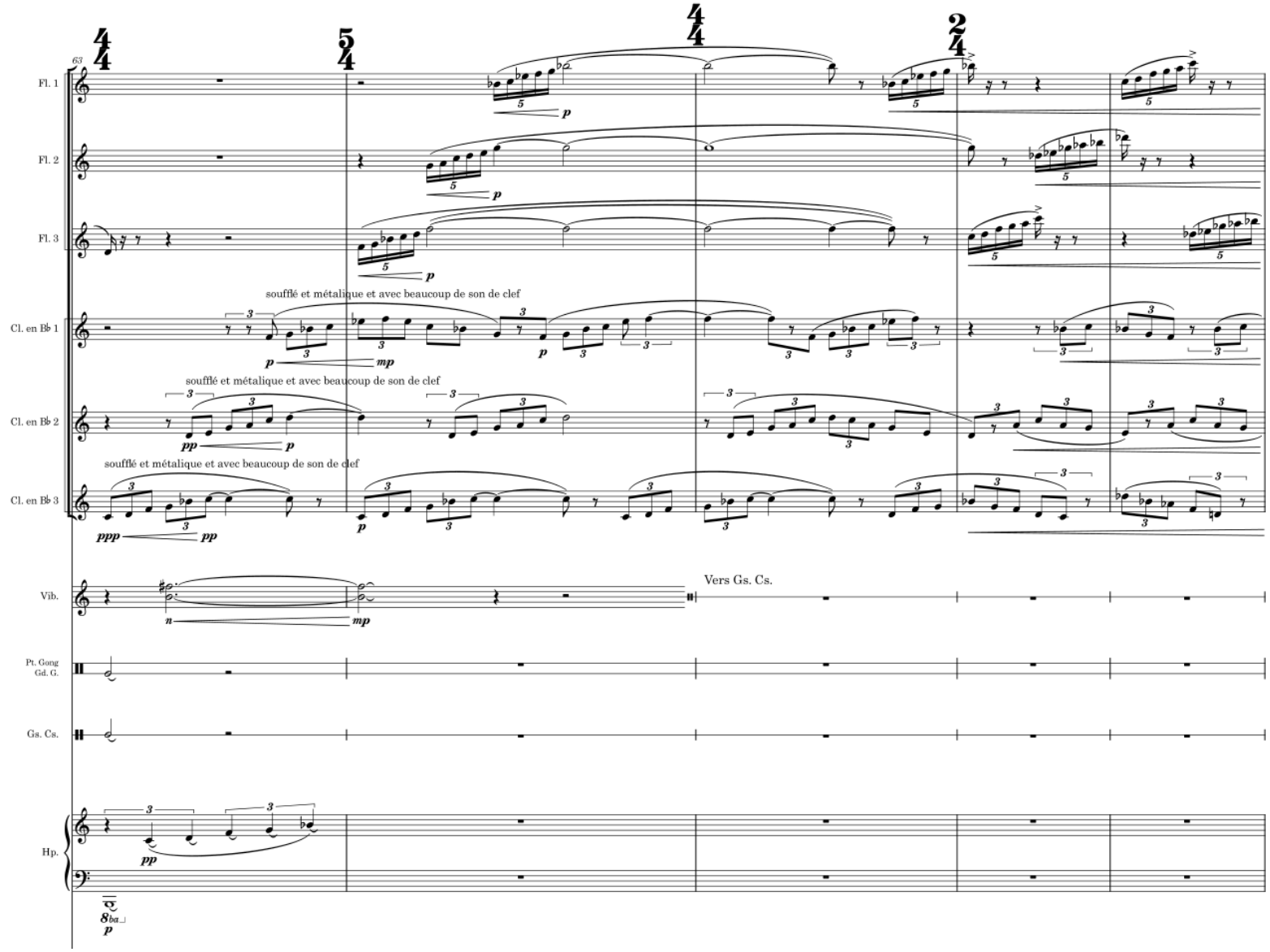

Illustration 32: Frissement Anthracite (2019), for symphonic orchestra

The second layer in the orchestra opens up with an orchestral wave. Different time divisions between the harp, the clarinets and the flutes help to create a chaotic color the first two bars. To help this section stand out from the string orchestra, the flutes and clarinets play in a lower register and in a different scale than the string orchestra. As the lower register of the string orchestra is in the same register as the clarinets, and to avoid having these two sections clashing too much, they play with the same time subdivision and in the same mode in this precise register. The flutes stand out more as they are in a higher register, and are the only ones who play long notes and have a unique time division.

While the winds are more and more active and play shorter notes, the string orchestra starts to crossfade to motifs coming from an earlier section of the piece.

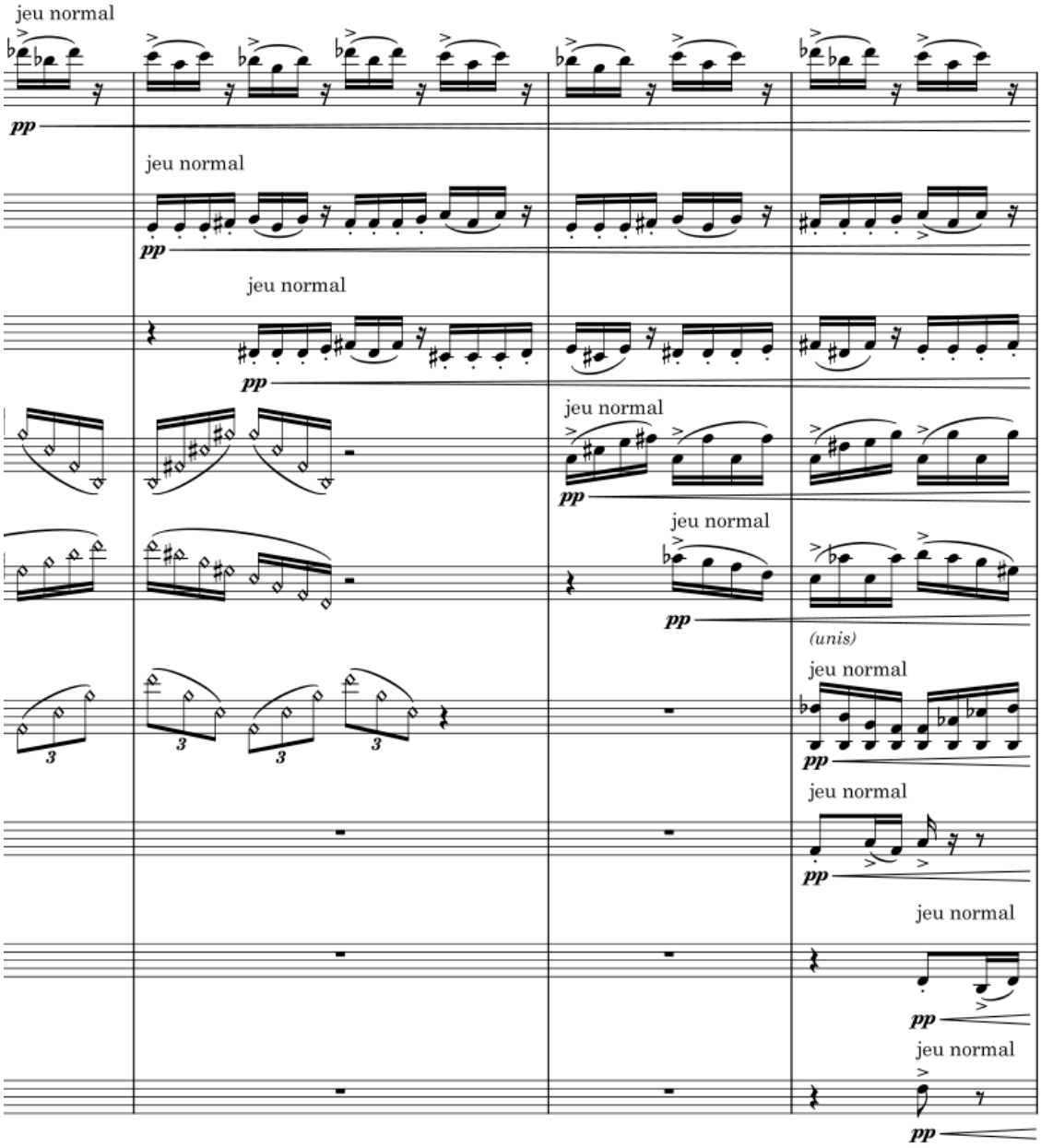

Illustration 33: Frissement Anthracite (2019), for symphonic orchestra

This section has a lower register, a different mode and a different tone and articulation than the previous section. To further differenciate between the two crossfading ideas, it also is in homophony while the last section is in heterophony. I chose to crossfade in this order as the second idea uses many more elements in the low register and also, to avoid a sudden drop in register to make the transition smoother.

As we saw in previous examples, heterophony can have many applications. Its uses have similarities with polytonality as they both allow a composer to blend or separate multiple motifs. In the same way polymeters are useful in pieces with fast tempos to create the impression of different pulsations, and can help to create a sense of speed in otherwise very slow pieces.

III.Make the music easier to play at high speed

For the last section of this essay, I would like to show multiple techniques that can help musicians decypher and play the music with very fast tempos.

A.Examples from *Danse de la Terre* by Igor Stravinsky

My firsts examples are quoted from *Danse de la Terre*, the last section of the first part from le *Sacre du printemps* composed by Igor Stravinsky. *Danse de la Terre* is an extremely fast paced section. The tempo is *Prestissimo* with the dotted quarter note indicated at 168bpm.

Here are the different ways by which Stravinsky makes the music easier for the players.

1.The tremolos

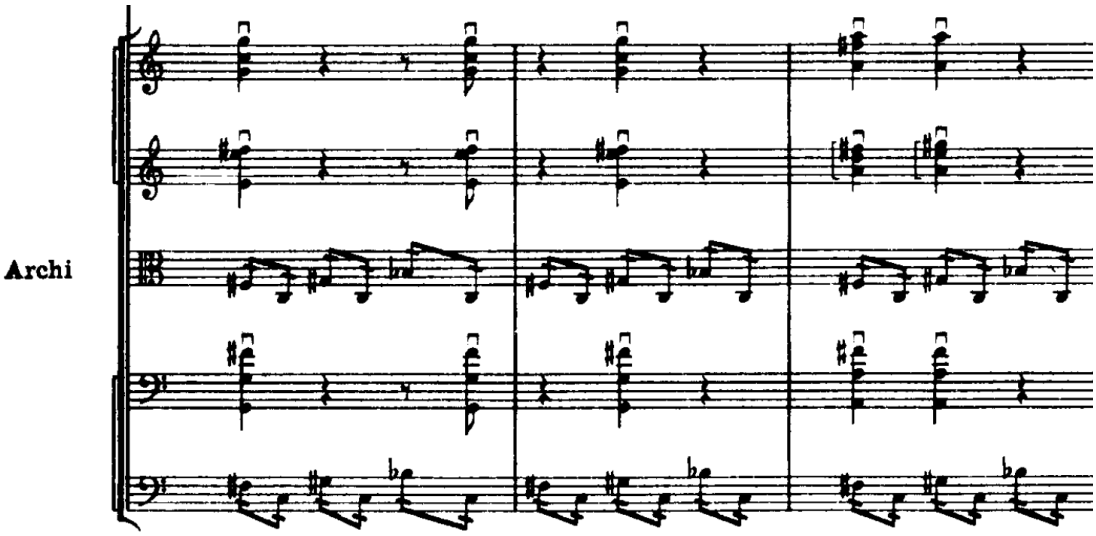

Illustration 34: Danse de la terre, Sacre du printemps (1913), Igor Stravinsky

In this example, the double basses and viola's tremolos make the section more readable for them. They also encourage them to think the rhythm as eight notes rather than sixteenth notes which is good for sight reeding as very fast subdivisions are very hard to picture mentally.

2.The breath and the bow

Illustration 35: Danse de la terre, Sacre du printemps (1913), Igor Stravinsky

Having a slower musical gesture to play multiple notes can also make a fast-paced music easier to play, especially if these notes are easy to play. Even with more difficult musical sequences, it can let the player focus on the fingering rather than the phrasing of each note.

3.The divisions

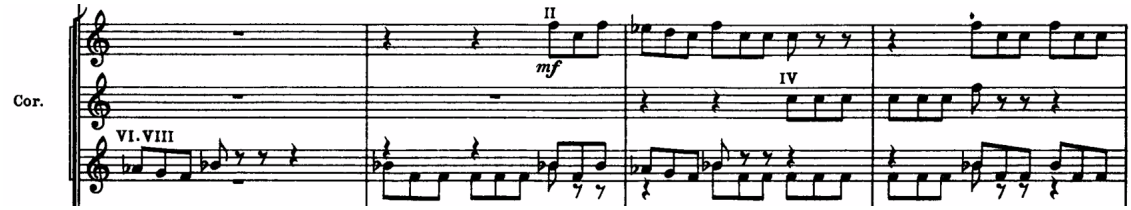

Illustration 36: Danse de la terre, Sacre du printemps (1913), Igor Stravinsky

Dividing a melody or a motif between multiple musicians can make it far easier to play. It is good practice to keep a note in common between both instruments as it helps the musicians play their own sections more regularly. In consequence, the transition seems more seamless between them. In a smaller ensemble, a part can also be effectively divided between two different instruments if their timbres blend well together (like the french horn and the bassoon).

B.Examples from other pieces

1.Loose indication of pitch

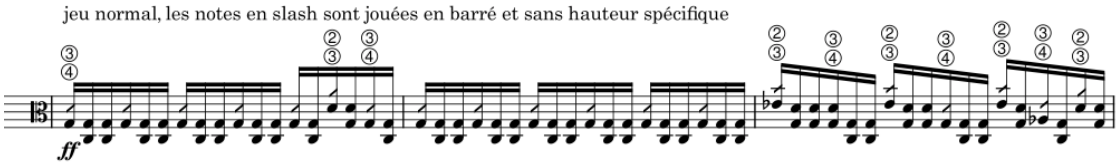

Illustration 37: Frissement Anthracite (2019), from the solo viola

In this example taken from the viola's solo in the second section of *Frissement Anthracite*, the pitch of the dashed notes is set loose with an indication asking to play them roughly a fifth higher than the note below them. This allows the player to focus on their bowing technique and nuance which are more important during this section of the piece.

2.Asynchronous sections

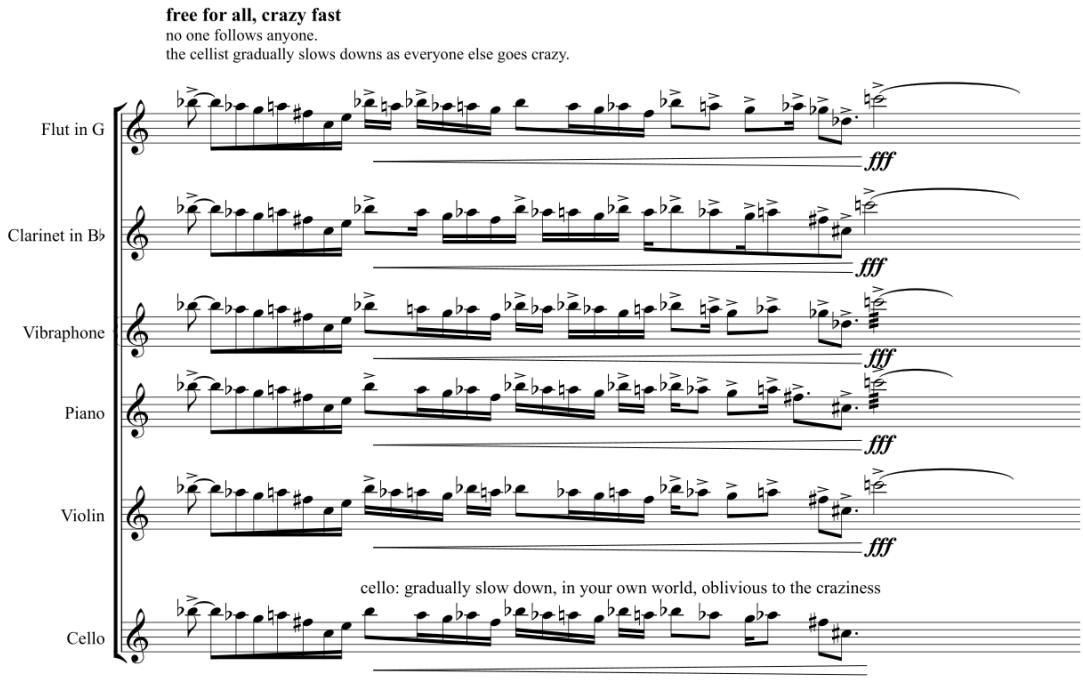

Illustration 38: MINE, MIME, MEME for chamber ensemble (2015), Andrew Norman

In the piece MINE, MIME, MEME for chamber orchestra, Andrew Norman lets the players be asynchronous. This allows them play much faster than if they had to follow each other on this section.

While there are many ways to make a piece easier to play after its main motifs are composed, a piece can also be composed from the start with the intent to make it as fast as possible. Then, the question can be: “what can be discarded to allow the musicians to play faster?”

Conclusion

Writing an extremely fast piece of music is an arduous challenge for any composer, requiring not only to think careful thought about the motifs, melodies, and orchestration but also making sure everything is legible and playable at the speed intended. Some forms of music don't even require a musician, which allows composers to write parts as fast as they desire without any risk of making the music impossible to play.

Conlon Nancarrow pioneered this style of music with his Studies for player piano. A series of 49 pieces for player piano, a mechanical piano that doesn't need a pianist, and so, can play pieces of any difficulty. Nancarrow took advantage of this aspect to experiment a lot with rhythm. For example, in the Study N°19, Nancarrow wrote three canons, each in a different tempo (one in 144 bpm, the second at 180 bpm, and the third at 240 bpm), all finishing at the exact same time or writing extremely fast and dense patterns in the study N° 36.

The technological advance of computers, MIDI and modern techniques of sequencing also open many doors for even faster tempos. In 1993, Moby released Thousand, a music which slowly accelerates to 1000bpm[9].

In 2021 and inspired by Thousand, I created a piece of music called Ecstasy[10]. At a tempo of 548bpm, the bondaries between rhythm, melody, harmony and timbre becomes less apparent. The same musical idea exposed using a different synthesizer can suddenly create completely different results.

9 To listen to Thousand: https://www.youtube.com/watch?v=k2ViG4vNj-M

10 To listen to Ecstasy: https://soundcloud.com/animal-108885741/ecstasy

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Annexes

The full partitions and recordings of my compositions referenced in this master degree are accessible with this link: https://drive.google.com/drive/folders/1YXD7lxWUq0IRjgWol0WefkjLfTKP-DX4?usp=sharing

The music can be listened at the following link: https://youtu.be/sSWdq0o2mPk

If they are no longer accessible, please contact me at /

Music references

Table of contents