University of Tasmania

Harmonic Based Extended Techniques and their Compositional Applications:

An Investigation in New String Techniques

An Exegesis Submitted to

Conservatorium of Music

in partial fulfilment of the requirements for the degree of

Bachelor of Music with Honours (or Bachelor of Music (Elite) with Honours)

Conservatorium of Music

by

Rhys Gray

Hobart, Tasmania

February 29, 2020

Declaration

I declare that all material in this exegesis is my own work except where there is clear acknowledgement or reference to the work of others and I have read the University statement on Academic misconduct (Plagiarism) on the University website at `www.utas.edu.au/plagiarism` or in the Student Information Handbook. I further declare that no part of this paper has been submitted for assessment in any other unit at this university or any other institution. I consent the authority of access to copying this exegesis. This authority is subject to any agreement entered into by the University concerning access to the exegesis.

Rhys Gray

February 29, 2020

Abstract

This exegesis explores compositional applications of the extended string techniques half-harmonics, subharmonics, and multiphonics. A review of the literature and resources that are readily available to composers will be made to assess what techniques require further investigation and refinement. By researching these techniques and the mechanics behind them, using document analysis, and analysing recordings made, a better understanding of how these techniques can be implemented in my practice will form. As part of both the analysis of techniques and my compositional practice, I assess not only the compositional potential, but also the practicality of techniques. Reviewing the feasibility and notational aspects of the techniques will render the exegesis a practical document to reference for performance and composition. The works that I compose accompanying the exegesis will show idiomatic treatment of the techniques and serve as references as such in the exegesis. The dissemination of the material I research will contribute to the accessibility of new sound possibilities for artists.

Thank you to my supervisor, Matthew Boden, and my teachers Dr. Maria Grenfell and Dr. Scott McIntyre for their help and guidance throughout my degree. I am indebted to my music teachers for inspiring my passion in music, and my peers and friends at UTas who have supported me in my research, and kept that passion alive.

My love and thanks go to my partner Claire Farrell*, my family, and my cats Buttercup and Millie for their unconditional support.

∗. Whose cakes, biscuits, and mugs of coffee nourished me, and whose support and words of encouragement kept me sane.

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Illustrations

Figures

Tables

Introduction

This is the bit where you put your introduction. Pretty self explanatory.

Chapter 1

Hello, world!

This first chapter is typically where one would see a literature review and methodology, at the start of the exegesis. Rather than bog the document down with irrelevant example material, this will be instructive text that can be used as a reference. Please note that it is *not* a tutorial, and is just example code that you can copy. When you're ready to write your *own* thesis, you can comment out these lines by highlighting them, and pressing ctrl (or cmd on a Mac) + / to comment it out.

LaTex

> '[...] LaTex is like the old printing presses, except it's on computer screens, so it's a lot faster'

LaTex was created in 1985, and is typesetting software designed to create beautiful documents. It is best known for its ability to handle complex mathematical equations, and do just about everything under the sun. It is *not* word processing software; it shares similar features to Word, but is notably different in that Word is a what-you-see-is-what-you-get (WYSIWYG) editor, whereas LaTex separates writing from the formatting. This means in practice that you deal with stuff that looks like *code* in LaTex, and compile it into the finished product.

Why use LaTex?

Many articles have been written about why you should use LaTex, and a few choice have been supplied for reference. Ultimately, LaTex produces beautiful documents, but whether it is worth the stress of learning a new system is up to the reader. This document has been created as an instructional tutorial as a starting point.

The Author's Reasons

My personal reasons were as follows:

- Stability: LaTex is a relic of the 1980s, but this works to its advantage when handling large documents, which are broken up into bite-sized chunks. This system means that you can shift sections around without any messy copy-pastes.
- Flexibility: I used LaTex for my Honours exegesis. It is able to not only insert PDFs, but even create uniform cover pages for my compositions.
- Variables: I can define a variable that might change and use that, obviating any find-and-replace-all issues.
- Integration: I am able to use Zotero to save a source to the works−cited.bib file, \autocite to automatically cite a source, and back it up to GitHub.
- Version control: A save button, combined with Time Machine- using GitHub to save my exegesis to the cloud, I can track **every** change made to the document. Version control works with plain text files (i.e. LaTex), but not proprietary formats such as .docx
- Comments: I can comment out sections, preserving it without it showing up on the finished document. This means that I can implement TODOs, make notes, and have people make changes.

New Section

Here we have started a new page to show how the headers work. The text in the header should be the last section title declared at the end of the current page.

This new paragraph shows how to setindex items and subindex items.

New Subsection

Here's a subsection with some simple maths $a^2 + b^2 = c^2$.

subsubsection

Here's asubsubsection. . .ooooooooohh wow wee!!!!!!

Some more text to check indent and show how references work

Chapter 2

Setup and Config

Rename this to your preferred chapter title.

Setup

In order to use this template, you will need to set up a method of compiling it. The simplest option is to use https://overleaf.com, an online LaTex editor. This is the fastest way to get it up and running, but comes with the disappointing disadvantage of locking Zotero integration behind a premium paywall. Don't bother trying to do references by hand. Pay the money, or go for my preferred option of using VSCode.

VSCode

VSCode (https://code.visualstudio.com/) is a source code editor, and includes Git version control. In order for it to be able to understand LaTex, we must first give it the required libraries; install TexLive at https://www.tug.org/texlive/acquire-netinstall.html You can untick the box for 'frontend'- since we're going to be writing in VSCode, we don't need it.

Download VSCode, install it, and boot it up. Then, grab the following:

https://marketplace.visualstudio.com/items?itemName=James-Yu.latex-workshop

I would also recommend:

https://marketplace.visualstudio.com/items?itemName=lkytal.pomodoro

https://marketplace.visualstudio.com/items?itemName=Gruntfuggly.todo-tree

Zotero

For Zotero integration, install Zotero: https://www.zotero.org/

Then, install the BetterBibTex extension in Zotero: https://retorque.re/zotero-better-bibtex/

Then, finally, install the Zotero LaTeX extension in VSCode: https://marketplace.visualstudio.com/items?itemName=bnavetta.zoterolatex

GitHub

For GitHub integration, install GitHub Desktop[1]: https://desktop.github.com/

Create an account on GitHub, and optionally register as a student for free private repositories here[2]: https://education.github.com/pack

Navigate to this

1. While not necessary, setting up a new GitHub repository is easiest through the user interface.

2. There's also some other great stuff in there, specifically the free domain registry, PomoDone, and pro TypeForm. Seriously, check it out.

Impact and Further Research

This is a nice way to do a quote.

— Somebody.[3]

You might want to break up your conclusion into several different sections, as I have done here.

Conclusion

With any luck, this will have been helpful. If you need any additional assistance, please contact me at contact@rhysgraymusic.com

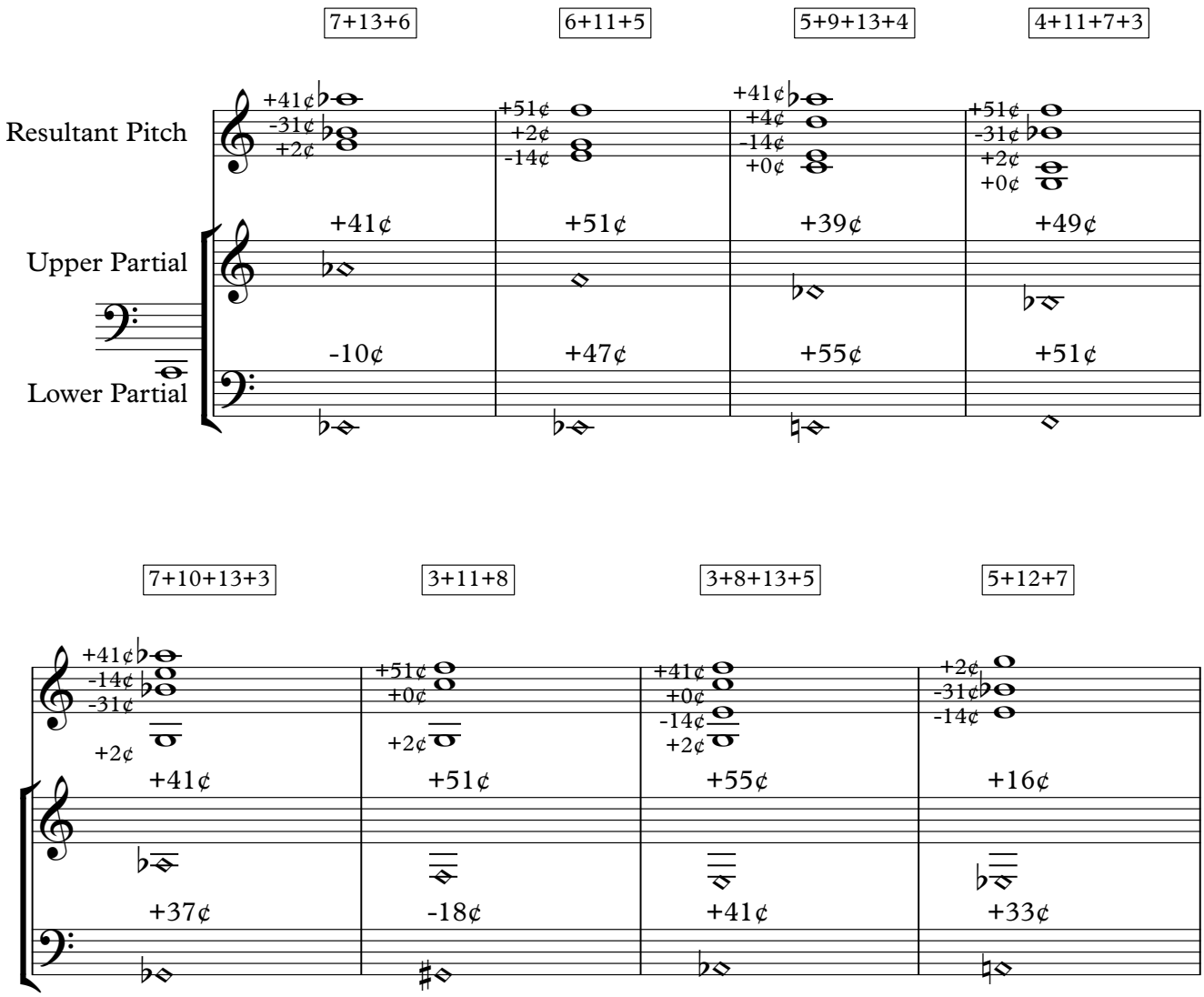
3. Gardner Read, *Compendium of Modern Instrumental Techniques*, 1st ed. (Westport, Connecticut: Greenwood Press, 1993), vii.

Appendices

Appendix A

Multiphonic Fingering Chart

This shows the two nodes where multiphonics can be produced, and the resultant pitch for both of them. It includes the tuning in cents, and the partial ratios (i.e. 7+13+6).


7+13+6
6+11+5
5+9+13+4
4+11+7+3
Resultant Pitch
Upper Partial
Lower Partial
+41¢
-31¢
+2¢
+51¢
+2¢
-14¢
+41¢
+4¢
-14¢
+0¢
+51¢
-31¢
+2¢
+0¢
+41¢
+51¢
+39¢
+49¢
-10¢
+47¢
+55¢
+51¢
7+10+13+3
3+11+8
3+8+13+5
5+12+7
+41¢
-14¢
-31¢
+2¢
+51¢
+0¢
+2¢
+41¢
+0¢
-14¢
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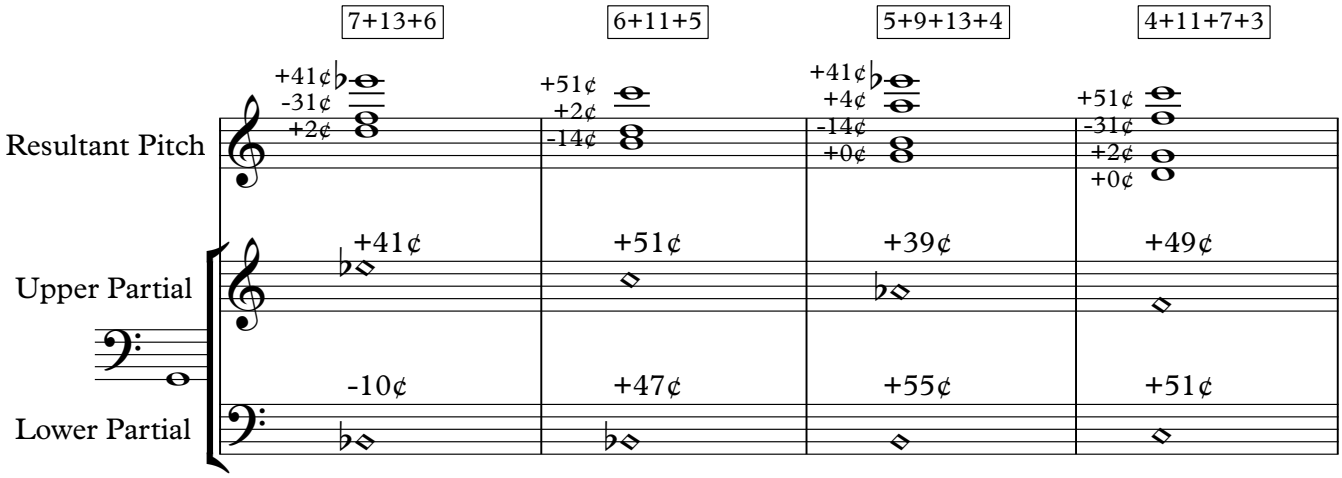
+37¢
-18¢
+41¢
+33¢


7+13+6
6+11+5
5+9+13+4
4+11+7+3
Resultant Pitch
+41¢
-31¢
+2¢
+51¢
+2¢
-14¢
+41¢
+4¢
-14¢
+0¢
+51¢
-31¢
+2¢
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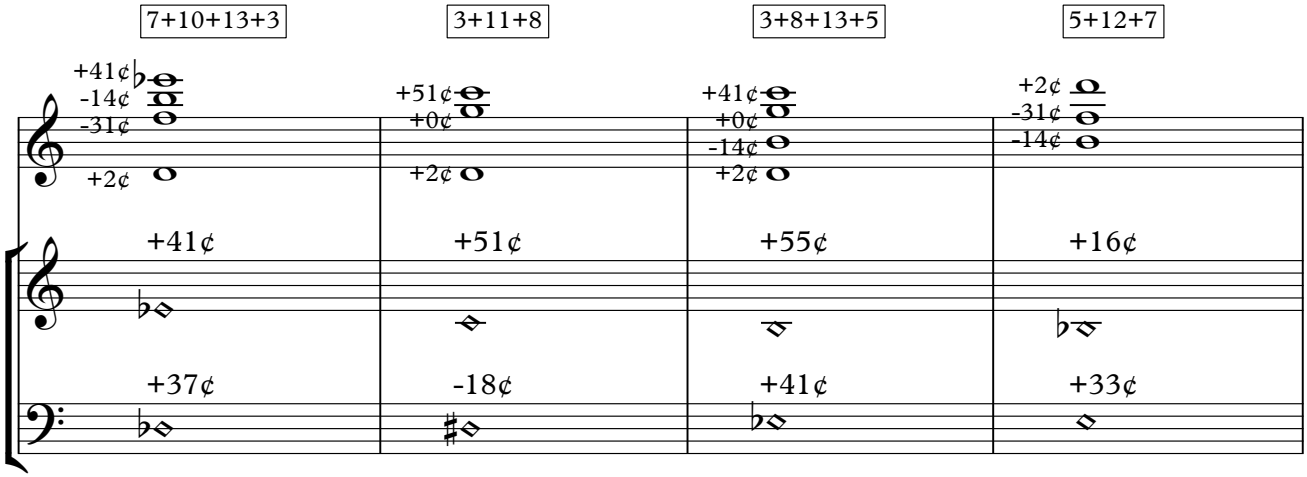
Upper Partial
+41¢
+51¢
+39¢
+49¢
Lower Partial
-10¢
+47¢
+55¢
+51¢


7+10+13+3
3+11+8
3+8+13+5
5+12+7
+41¢
-14¢
-31¢
+2¢
+51¢
+0¢
+2¢
+41¢
+0¢
-14¢
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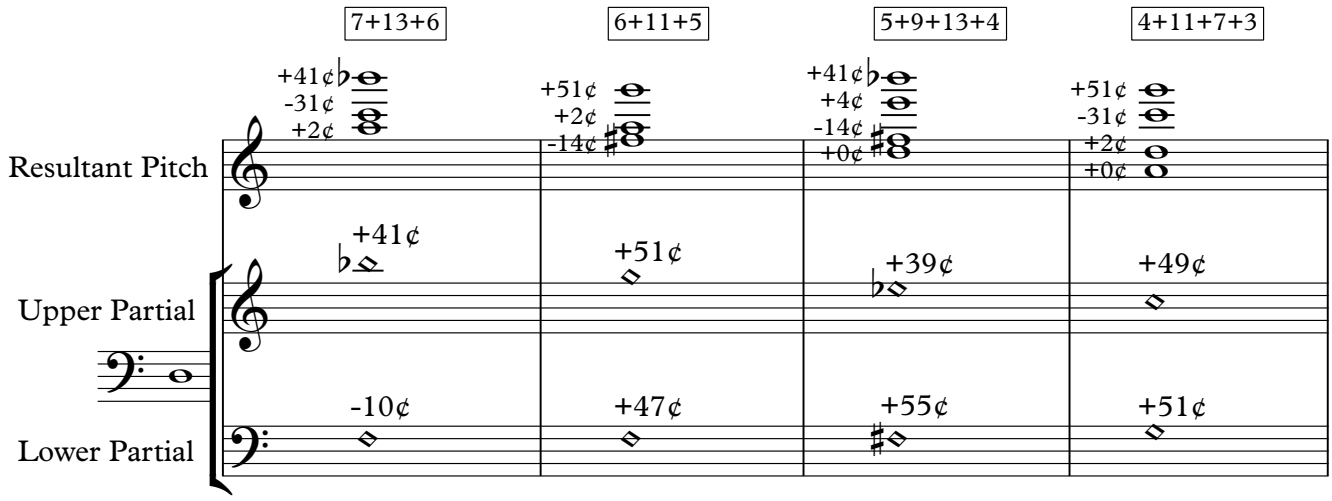
+55¢
+16¢
+37¢
-18¢
+41¢
+33¢


7+13+6
6+11+5
5+9+13+4
4+11+7+3
Resultant Pitch
Upper Partial
Lower Partial
+41¢
-31¢
+2¢
+51¢
+2¢
-14¢
+41¢
+4¢
-14¢
+0¢
+51¢
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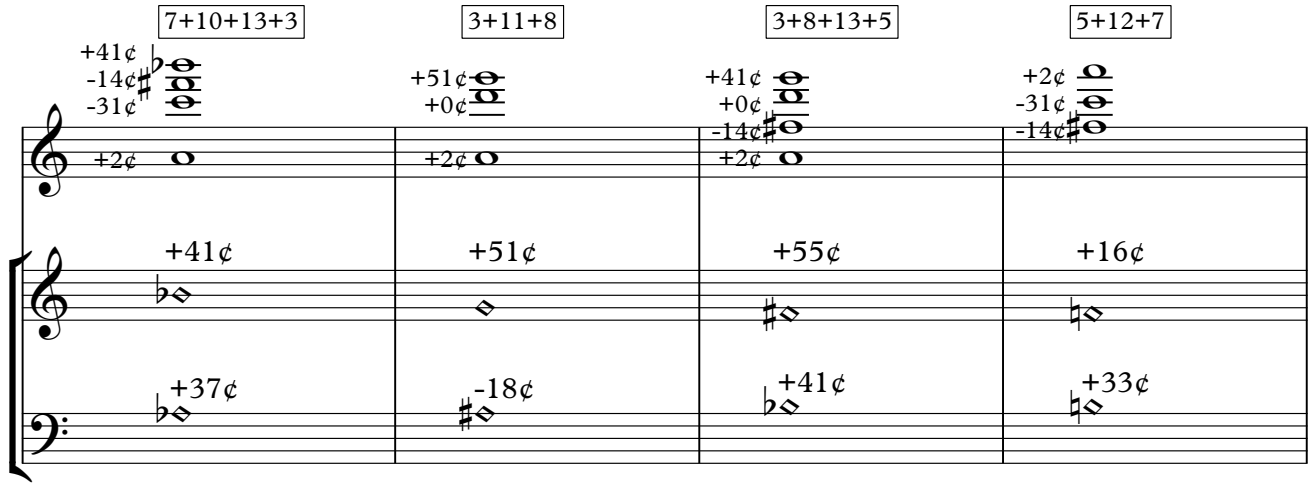
+39¢
+49¢
-10¢
+47¢
+55¢
+51¢


7+10+13+3
3+11+8
3+8+13+5
5+12+7
+41¢
-14¢
-31¢
+2¢
+51¢
+0¢
+2¢
+41¢
+0¢
-14¢
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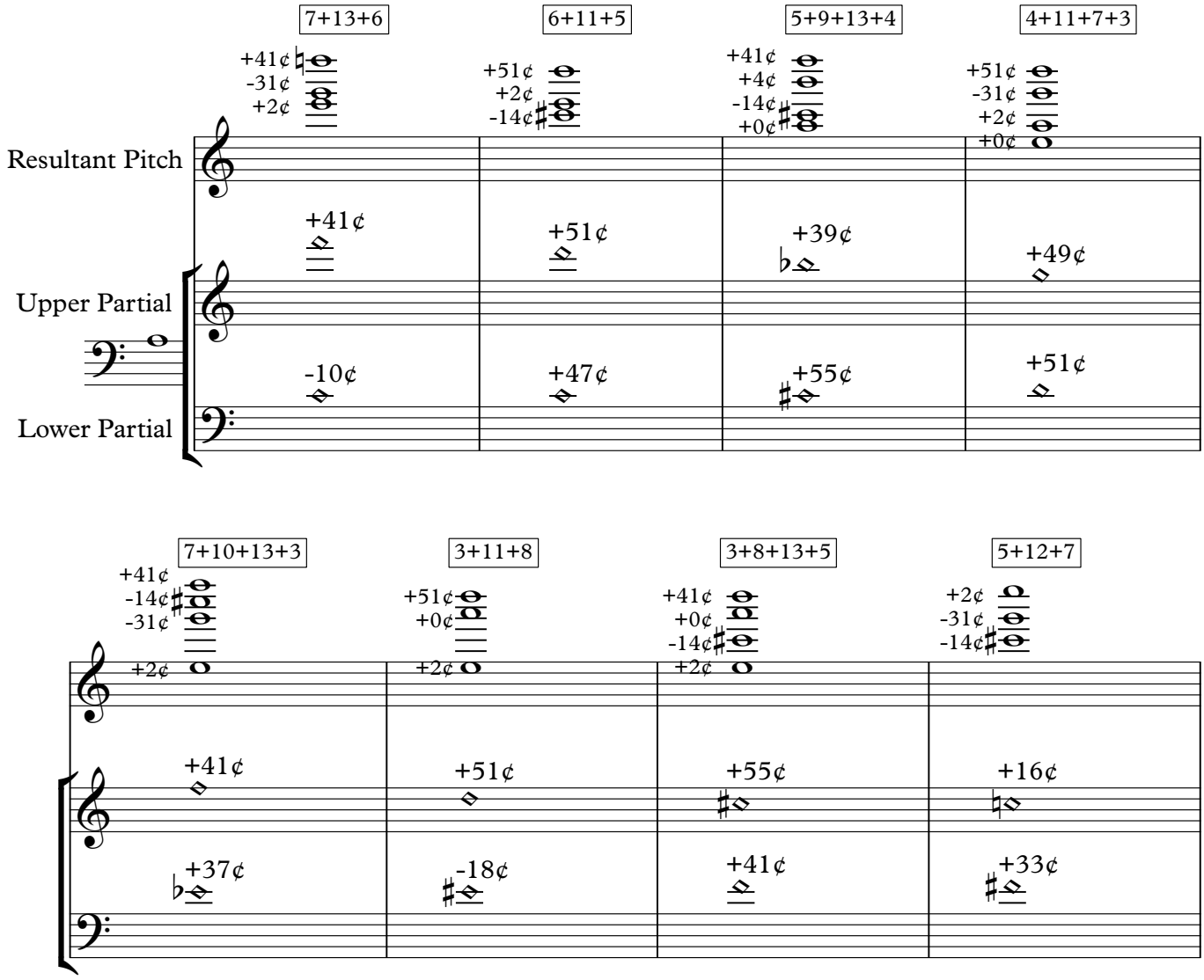
+16¢
+37¢
-18¢
+41¢
+33¢


7+13+6
6+11+5
5+9+13+4
4+11+7+3
Resultant Pitch
Upper Partial
Lower Partial
+41¢
-31¢
+2¢
+51¢
+2¢
-14¢
+41¢
+4¢
-14¢
+0¢
+51¢
-31¢
+2¢
+0¢
+41¢
+51¢
+39¢
+49¢
-10¢
+47¢
+55¢
+51¢
7+10+13+3
3+11+8
3+8+13+5
5+12+7
+41¢
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+2¢
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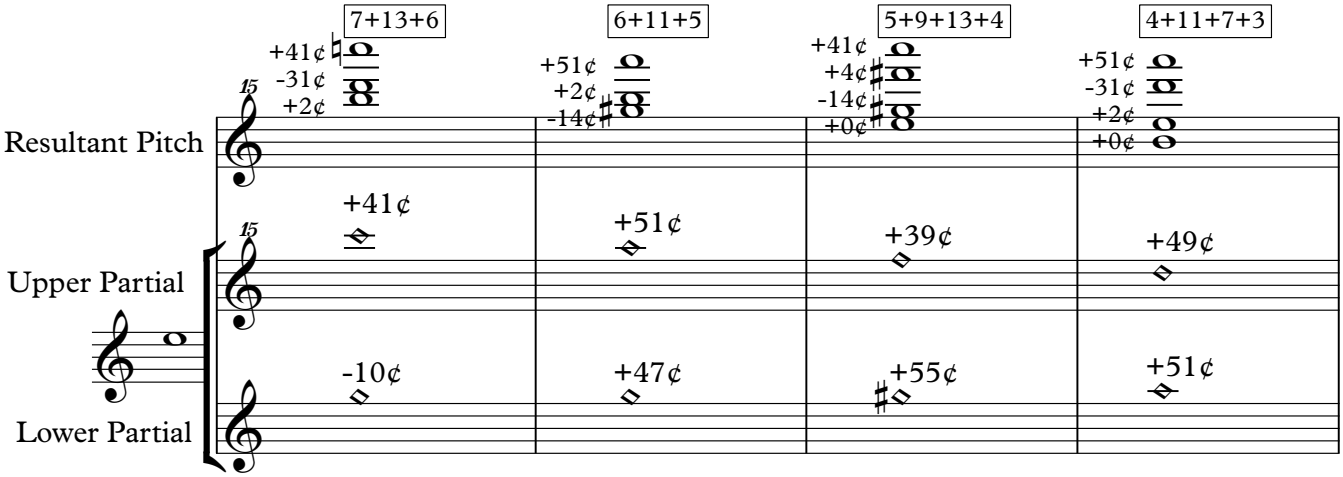
+55¢
+16¢
+37¢
-18¢
+41¢
+33¢


7+13+6
6+11+5
5+9+13+4
4+11+7+3
Resultant Pitch
Upper Partial
Lower Partial
+41¢
-31¢
+2¢
+51¢
+2¢
-14¢
+41¢
+4¢
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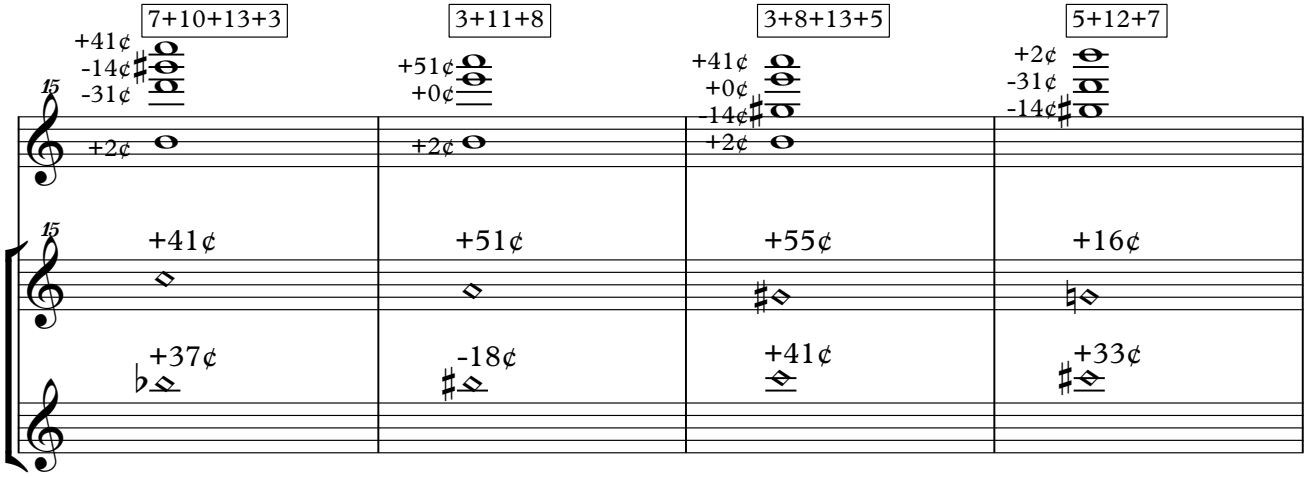
+39¢
+49¢
-10¢
+47¢
+55¢
+51¢


7+10+13+3
3+11+8
3+8+13+5
5+12+7
+41¢
-14¢
-31¢
+2¢
+51¢
+0¢
+41¢
+0¢
-14¢
+2¢
+2¢
-31¢
-14¢
+41¢
+51¢
+55¢
+16¢
+37¢
-18¢
+41¢
+33¢

Appendix B

FOR SOLO VIOLIN

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what are you doing with the humans

October, 2019

Rhys Gray

Program Notes

It is a non-programmatic work, and the title was inspired by a question that my supervisor posed to me while I sought ethics approval for my exegesis; a simple phrase laden with possible contexts, spurring the imagination to try and complete the meaning.

Half-harmonics are produced by applying left hand finger pressure halfway between that required to create a harmonic, and a *normale* sound. The sound that is produced should be a mixture of the stopped string pitch, the harmonic pitch, and a resistant, slightly noisy quality.

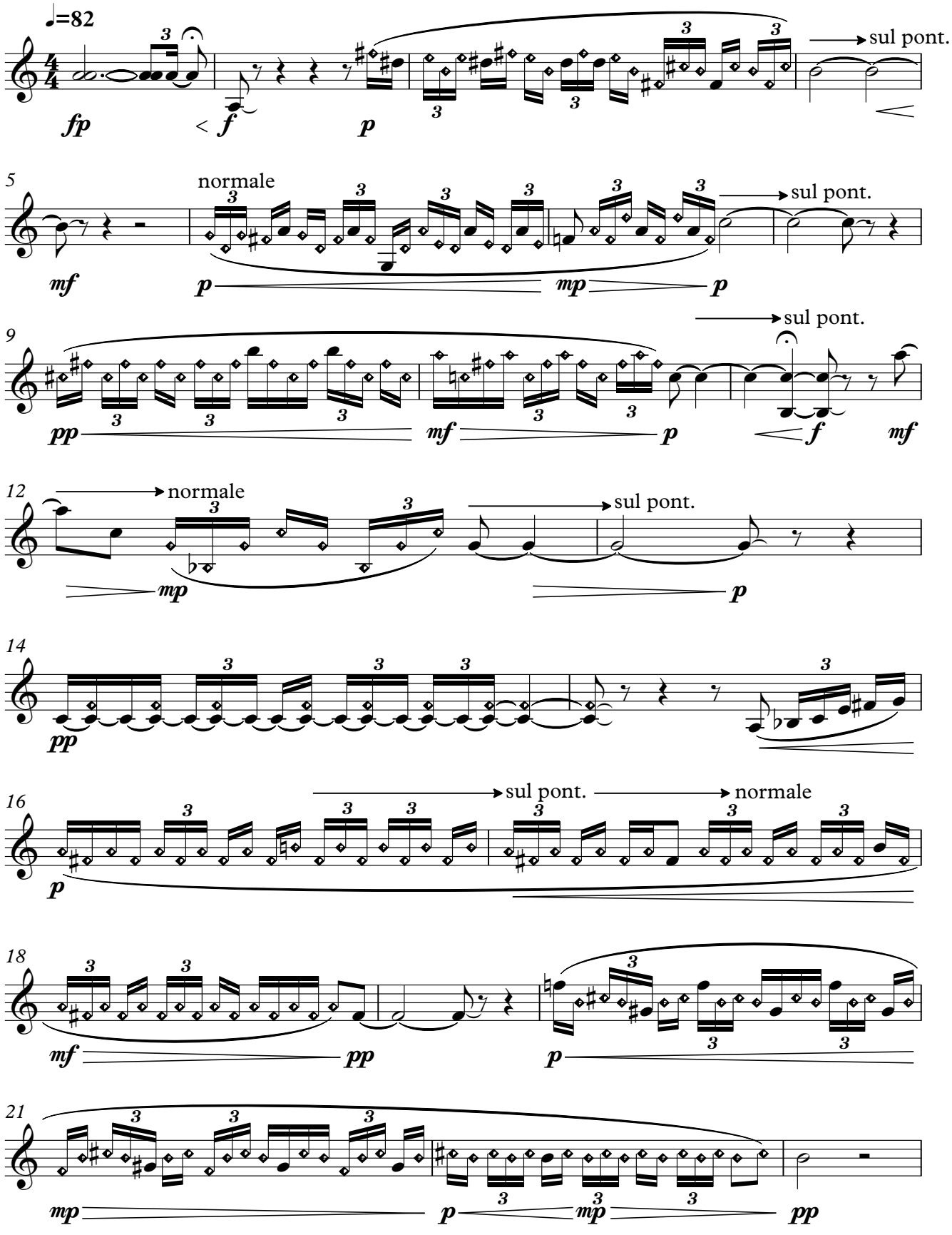
Notation

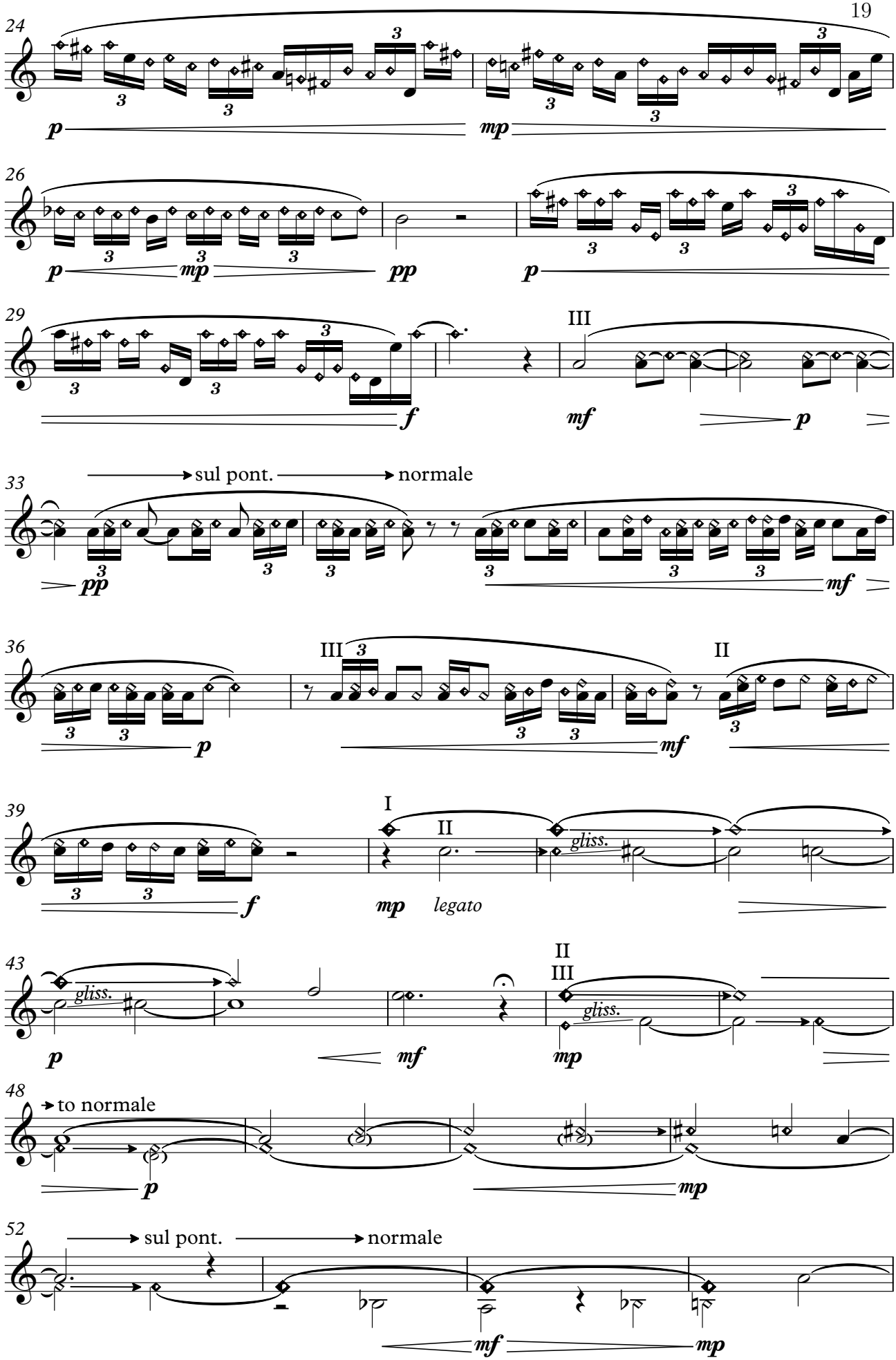
- Half-harmonics are notated in the score as a half-filled diamond notehead.
- Arrows denote gradual transitions to the technique that the arrow is pointing to.
    - Arrows between notes denote transitions between the types of notes (i.e. *normale* to harmonic finger pressure.)

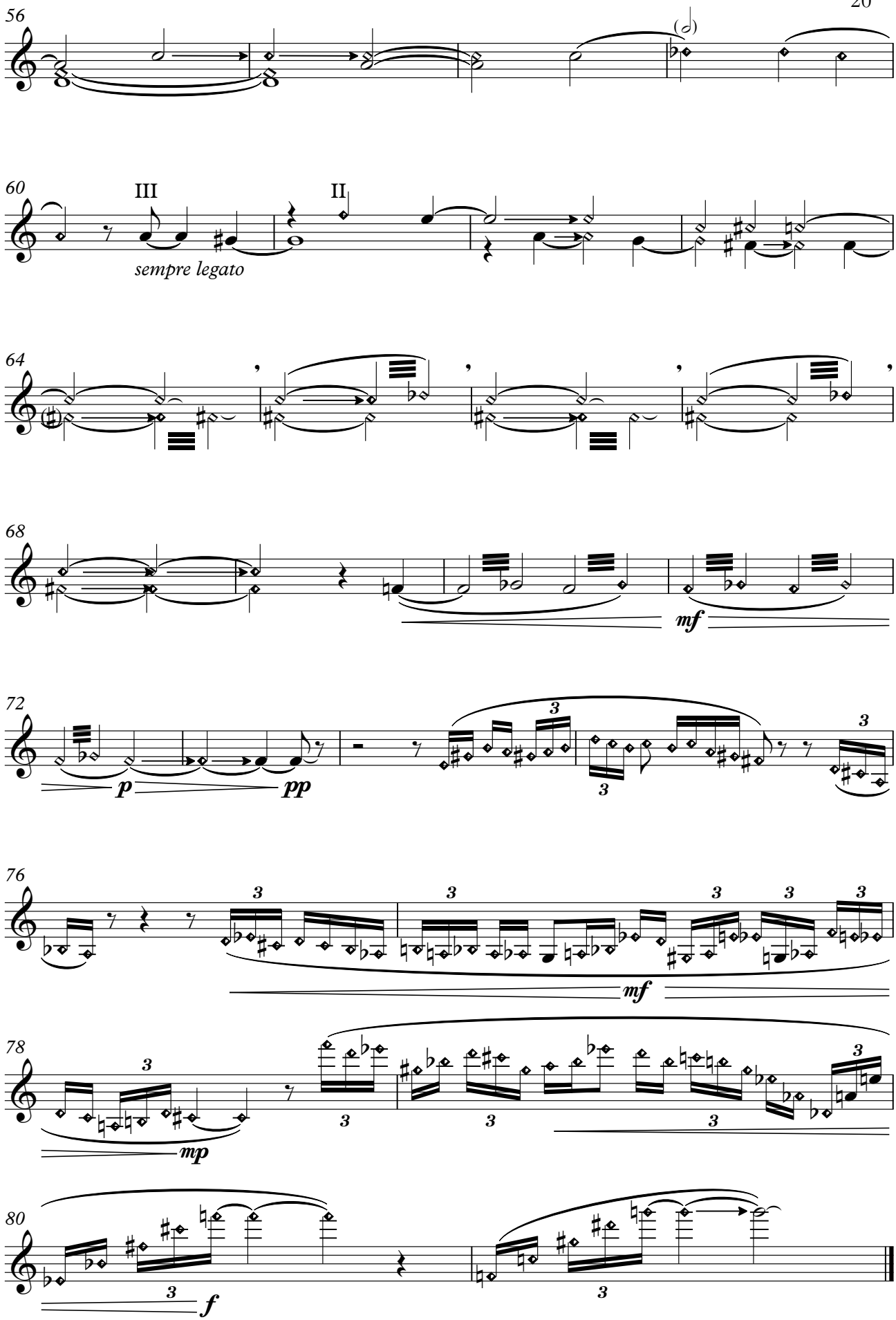
what are you doing with the humans?

for solo violin

Rhys Gray




24
p
mp
26
p
mp
pp
p
29
f
III
mf
p
33
sul pont.
normale
pp
mf
36
p
III
mf
II
39
f
I
II
mp
legato
gliss.
43
gliss.
p
mf
II
III
gliss.
mp
48
to normale
p
mp
52
sul pont.
normale
mf
mp


56
60
III
II
sempre legato
64
68
mf
72
p
pp
3
76
mf
78
mp
80
f

Bibliography

Read, Gardner. *Compendium of Modern Instrumental Techniques*. 1st ed. Westport, Connecticut: Greenwood Press, 1993.