LilyPond Contemporary Notation Cookbook: Snippets and Their Grammars

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Contents

Foreword

0.1 Preamble

This document houses all the codes I built on LilyPond since September 2024. Because I deal with contemporary notations in my compositional practice, I found myself creating codes and turning them into variables in order to repeatedly use them in my projects. I created a dedicated `.ly` file to store these codes for use, which quickly became very lengthy. I thought it would be useful to organize them into a document where I could easily consult and remind myself what they are and how to use them. This is that document.

Because I use LilyPond actively in my daily compositional and musical typesetting activities, this document is a work in progress.

0.2 README

This document and the codes contained herein are under the MIT License. So long as you include the copyright as well as the MIT License permission notices, please feel free to use my codes in your LilyPond files or modify them according to your specific need. Furthermore, crediting in the following manner is greatly appreciated:

```
% Original Code written by Yoshiaki Onishi
% https://github.com/yoshiakionishi/lilypond-snippets
```

I make this document public because I wish to return something useful to the LilyPond community, but also to seek and implement any improvements other users may find in my codes. Please feel free to reach out to the email address shown on the title page of this document.

In the interest of making the codes found in this document available to as many people as possible, I have avoided using copyrighted musical examples. However, wherever appropriate, I have provided bibliographical sources. Furthermore, I acknowledge that, just as academic work in humanities goes, my ideas are built on those that are formulated by others; as such, whenever there is a direct source of inspiration for formulating a code, I provide sources.

In creating this document, I make no claim that my notational choices represent an absolute standard that everyone should adhere to. Once the basic principles of notation and typesetting are established (e.g., avoiding collisions, etc.), notation becomes a personal decision for each composer, shaped by careful study of preexisting scores and an evaluation of their musical contexts.

For example, in his book *The Bass Clarinet – A Personal History*, Harry Sparnaay lists nine

variants of noteheads for the slap tongue technique.[1] In my work, I created two subcategories of the slap tongue technique: one followed by a pitch and another followed by an air sound (which produces the slap tongue effect that sounds "empty"). To distinguish between the two, I decided to use encircled noteheads—both filled and hollow—and attribute them to each subcategory. Again, this is a method that I have found works for my music, but I would be reluctant to suggest that others should follow the same.[2]

Readers are encouraged to modify my codes in order to suit their desired techniques. This document serves as a record of how I arrived at certain notational choices, because learning LilyPond meant that I would also need to become familiar with Scheme, which proved to be somewhat challenging—even though I have used Common Lisp before owing to programming in OpenMusic—because I had to make many guessworks as I navigated various Scheme codes in other snippets available online. I have also gained familiarity in PostScript language as I continued to familiarize myself with LilyPond.[3]

0.3 Background

After MakeMusic announced that they would cease development of the music notation software program Finale, which I had used for the past twenty-four years, I decided to explore a few other music notation programs to determine the best alternative. At the time of writing this document in late November 2024, a little under three months have passed since I started using LilyPond for my daily typesetting needs. I now open LilyPond more often than Finale and am committed to using it for the foreseeable future. LilyPond appears to me as the way forward both as a composer and a musical typesetter, as other proprietary notation programs, such as Dorico (which MakeMusic has claimed to be the leading program in the industry) and Sibelius, fall short of what I wish to accomplish.

While LilyPond is "just" a music notation software program that I happened to choose, it is, in a way, more than a toolkit for a composer. It appears that way to me, at least, because choosing an open-source platform with strong community support and engagement, rather than a proprietary program where desired functionality is subject to the priorities of a small group of salaried developers, reflects a critique of the capitalist/commercialist mindset that often pervades a composer's life.

For example, before transitioning to LilyPond, I briefly explored Dorico. However, as of late September 2024, its functionality for displaying straight flags was very limited; the angle of the straight flags provided by the software was too steep. I consulted the online forum and discovered that another user had posted a question similar to mine. The chief developer of Dorico responded to that post, noting that implementing improvements to this feature was possible but "not currently a high priority."[4] In this tiered structure typical of capitalism, composers may find themselves with increasingly limited creative "freedom."

MakeMusic has heavily advertised on social media platforms that Finale users should migrate to Dorico because it is the "next industry standard." However, this advertising seems to discourage

1. Harry Sparnaay, *The Bass Clarinet: A Personal History* (Periferia Sheet Music, 2012), 66.
2. This particular notation becomes quickly problematic in terms of rhythmic notation when a bar is longer than a half note (e.g. 1/2, 2/4, 4/8...) For this reason, I tend to favor time signatures that avoids the use of a half note, such as 3/8 or 5/16.
3. See Appendix A for some resources I referred to for Scheme- and PostScript-related matters.
4. See: https://forums.steinberg.net/t/straight-flags-angle/766503.

thoughtful consideration of alternatives, leaving little room for reflection or exploration. I became increasingly disillusioned as I witnessed the coercion to invest in a program—however exciting it may appear—with no definite promise of its long-term security and stability.

Of course, it is not my intent to claim that all composers should abandon their proprietary programs of choice, particularly those they have invested money in and/or have been using for many years. It is, however, important to note that:

1. All proprietary programs are at the mercy of the executives who run the companies behind them. "Oh, [insert the name of a proprietary program] is operated by [insert the name of its company], and I just don't see them closing the program down," someone might say. Yet, it happened to Finale.

2. All notation programs, owing to the ways they operate, exert some degree of influence on the way composers compose. As early as the 1980s, Finale's *Mass Mover*, *Note Mover*, and MIDI playback features were already influential in shaping the way composers worked on their music.[5] On the one hand, these features may have helped composers save time. On the other hand, their ready availability may have invited overuse.

3. The lack or underdevelopment of certain functionalities may also push composers to work in certain ways rather than others. Finale benefitted from having the flexibility to implement graphical notation, but even then, many of my composer friends found it practical to use external graphical editing programs to further refine their scores. Even from my personal experience using Finale, I encountered situations where I had to devise creative alternatives to meet my notational goals.

These points implicitly highlight the benefits of learning an additional notation program, ideally an open-source one, alongside the program one primarily uses. LilyPond resonated with me most because of its text-based interface, which I have become increasingly familiar with through my involvement in computer programming. As other users have remarked, I have also found it to be very flexible and extensible. All the snippets I list in this document can be reused with relative ease, allowing me to save time in the long run when using specialized notations in my music. This was not necessarily the case when working on the music notation of extended techniques in Finale.

0.4 How This Document Is Structured

Each chapter of this document addresses a specific element of music notation, such as noteheads, stems, beams, and so on. Some chapters, however, cover topics specific to LilyPond coding, such as Markups and Spanners. Snippets that use more than one snippet covered in earlier chapters, thus simulating practical applications of these snippets, are covered in the chapter *Combinations*. Snippets that do not appear to belong to earlier chapters find their home in the chapter *Miscellanies*.

Each snippet entry includes a musical example, a description, the relevant grammar, the code required for the snippet to function, and, whenever necessary, a "Discussion" section.

0.5 LilyPond Version Used

The version of LilyPond used to create these snippets is `2.24.4`.

5. For example, watch from 15:20 of https://youtu.be/T1IRlg87Qks.

0.6 Acknowledgements

I thank the supportive community of LilyPond users, whose exchanges on `lilypond-user` mailing list have inspired me greatly.

Even though I have not met him, I am grateful to Ben Lemon for his generosity in creating and sharing his LilyPond tutorial videos on YouTube. These videos were immensely helpful during the initial stages of learning LilyPond.

I also want to thank my friends who inspired me to start using LilyPond. It was Cole Ingraham who first introduced me to the program in 2016. My initial attempt at using it was not successful, but more recently, Santiago Beis composed and typeset his orchestral piece *Spletna* entirely in LilyPond, which compelled me to give it another try.

I extend my gratitude to my composition students at the University of Delaware School of Music, with whom I embarked on this journey of learning LilyPond. Even though they were not directly affected by Finale's discontinuation, they remained curious and enthusiastic about exploring this program. I hope that if the programs of their choice ever face a fate similar to Finale (though I sincerely hope they do not), they will be better equipped to adapt without the annoyance and arduous work often associated with transitioning to a new tool.

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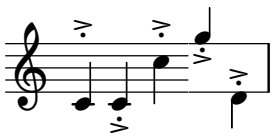
Chapter 1

Articulations

1.1 Accent-Staccato



1.1.1 Description

While *accent-staccato* is not specific to contemporary music, in LilyPond, specifying accent and staccato via `->-.` could cause the two articulation marks to be separated from each other. This happens because of the default setting for accents is to have them placed *outside* the staff line. For example, if you wrote `\stemUp g''->-.`, the following results:

This code implements a combination of the music glyphs `scripts.sforzato` and `scripts.staccato` as one entity.

1.1.2 Grammar

```
NOTE \accentStaccato
NOTE \accentStaccatoUp
NOTE \accentStaccatoDown
```

1.1.3 Code

```
1  \version "2.24.4"
2
3  #(append! default-script-alist
4             (list
5              `(accentStaccatoUp
```

```
               . (
                  (stencil . ,ly:text-interface::print)
                  (text . ,#{ \markup


                              \center-align
                              \combine \musicglyph "scripts.sforzato"
                              \translate #'(0 . -0.75)
                              \musicglyph "scripts.staccato" #})
                  ; any other properties
                  (toward-stem-shift-in-column . 1.0)
                  (outside-staff-priority . #t)
                  (padding . 0.5)
                  (avoid-slur . around)
                  (direction . ,UP))))

           (list
            `(accentStaccatoDown
              . (
                  (stencil . ,ly:text-interface::print)
                  (text . ,#{ \markup \center-align
                              \combine \musicglyph "scripts.staccato"
                              \translate #'(0 . -0.75)
                              \musicglyph "scripts.sforzato" #})
                  ; any other properties
                  (toward-stem-shift-in-column . 1.0)
                  (outside-staff-priority . #t)
                  (padding . 0.5)
                  (avoid-slur . around)
                  (direction . ,DOWN)))))

accentStaccato =  #(make-articulation 'accentStaccatoUp)
accentStaccatoUp = #(make-articulation 'accentStaccatoUp)
accentStaccatoDown = #(make-articulation 'accentStaccatoDown)


{
 \override Staff.TimeSignature.stencil = ##f
 \time 5/4

 c'4\accentStaccato c'4 \accentStaccatoDown c''\accentStaccatoUp
 \stopStaff
 \override Staff.StaffSymbol.line-positions = #'(4 -4)
 \startStaff

 \stemUp g'' \tweak Y-offset #1.5 \accentStaccatoDown
 \stemDown d' \tweak Y-offset #-0.5 \accentStaccatoUp
}
```

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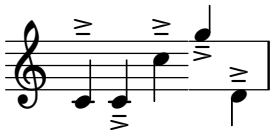
1.2 Accent-Tenuto



1.2.1 Description

For the same rationale as explained in the Accent-Staccato entry, this code implements a combination of the music glyphs `scripts.sforzato` and `scripts.tenuto` as one entity.

1.2.2 Grammar

```
NOTE \accentTenuto
NOTE \accentTenutoUp
NOTE \accentTenutoDown
```

1.2.3 Code

```
\version "2.24.4"

#(append! default-script-alist
          (list
           `(accentTenutoUp
             . (
                (stencil . ,ly:text-interface::print)
                (text . ,#{ \markup


                            \center-align
                            \combine \musicglyph "scripts.sforzato"
                            \translate #'(0 . -0.75)
                            \musicglyph "scripts.tenuto" #})
                ; any other properties
                (toward-stem-shift-in-column . 1.0)
                (outside-staff-priority . #t)
                (padding . 0.5)
                (avoid-slur . around)
                (direction . ,UP))))

          (list
           `(accentTenutoDown
             . (
                (stencil . ,ly:text-interface::print)
                (text . ,#{ \markup \center-align
                            \combine \musicglyph "scripts.tenuto"
                            \translate #'(0 . -0.75)
```

```
                                \musicglyph "scripts.sforzato" #})
                  ; any other properties
                  (toward-stem-shift-in-column . 1.0)
                  (outside-staff-priority . #t)
                  (padding . 0.5)
                  (avoid-slur . around)
                  (direction . ,DOWN)))))

accentTenuto =  #(make-articulation 'accentTenutoUp)
accentTenutoUp = #(make-articulation 'accentTenutoUp)
accentTenutoDown = #(make-articulation 'accentTenutoDown)


{
 \override Staff.TimeSignature.stencil = ##f
 \time 5/4

 c'4\accentTenuto c'4 \accentTenutoDown c''\accentTenutoUp
 \stopStaff
 \override Staff.StaffSymbol.line-positions = #'(4 -4)
 \startStaff

 \stemUp g'' \tweak Y-offset #1.5 \accentTenutoDown
 \stemDown d' \tweak Y-offset #-0.5 \accentTenutoUp
}
```

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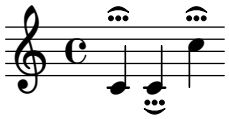
1.3 Jeté (Ricochet)



1.3.1 Description

I use this notation to designate jeté/ricochet for string instruments, adding that the number of bounces are undetermined.[1]

I apply this indication *above* the note regardless of how high or low the note is; however, in case of need, I have supplied the version to be used *under* the note.

1.3.2 Grammar

```
NOTE \jete
NOTE \jeteUp
NOTE \jeteDown
```

1.3.3 Code

```
\version "2.24.4"

jeteDesign =
\markup
\center-align
\combine \combine \combine
\override #'(filled . #t)
\path  #0.1
#'((moveto    -0.25 0.5)
   (curveto   0.35 1.1 0.85 1.1 1.45 0.5)
   (curveto   0.85 0.8 0.35 0.8 -0.25 0.5)
   (closepath))
\draw-circle #0.2 #0 ##t
\translate #'(0.6 . 0) \draw-circle #0.2 #0 ##t
\translate #'(1.2 . 0)\draw-circle #0.2 #0 ##t
#(append! default-script-alist
    (list
     `(jetelistUp
       . (
           (stencil . ,ly:text-interface::print)
           (text . ,#{ \markup \jeteDesign #})
           ; any other properties
           (toward-stem-shift-in-column . 1.0)
```

1. Concerning the technique of adding articulation designs to an internal alist, I was inspired by the following thread on `lilypond-user` mailing list: https://lists.gnu.org/archive/html/lilypond-user/2015-04/msg00105.html

```
            (outside-staff-priority . #t)
            (padding . 0.5)
            (avoid-slur . around)
            (direction . ,UP))))

    (list
     `(jetelistDown
       . (
            (stencil . ,ly:text-interface::print)
            (text . ,#{ \markup \rotate #180 \jeteDesign #})
            ; any other properties
            (toward-stem-shift-in-column . 1.0)
            (outside-staff-priority . #t)
            (padding . 0.5)
            (avoid-slur . around)
            (direction . ,DOWN)))))

jete =  #(make-articulation 'jetelistUp)
jeteUp = #(make-articulation 'jetelistUp)
jeteDown = #(make-articulation 'jetelistDown)


{c'4\jete c'4 \jeteDown c''\jeteUp }
```

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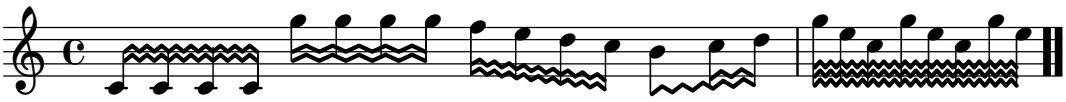
Chapter 2

Beams

2.1 Wiggle Beam (zig-zag shaped beam)



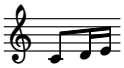
2.1.1 Description

Ordinary beams are replaced with zig-zag beams. A set of forward then backward beams are printed in the amount specified in the argument. I use this notation in such pieces as *jeux enjeux* (2022) for brass quintet, in order to designate somewhat uneven rhythmic figures, which are nonetheless to be played within the time frame indicated.

`\wiggleBeamOne` replaces an 8^{th}-note beam.

`\wiggleBeamTwo` replaces a 16^{th}-note beam.

`\wiggleBeamThree` replaces a 32^{nd}-note beam.

`\wiggleBeam_markup` adds a zig-zag beam at will. This allows beaming of mixed note durations, such as: 

`\wiggleBeamStemAdjust` allows the adjustment of a stem length, in the event the wiggle beam and the stem do not touch each other.

2.1.2 Grammar

```
\wiggleBeamOne #vOffset #howMany #width #rotation
\wiggleBeamTwo #vOffset #howMany #width #rotation
\wiggleBeamThree #vOffset #howMany #width #rotation
```

NB

- `hOffset` = (`\wiggleBeam_markup` only) the horizontal offset value originating from where the ordinary beam is placed.

- `vOffset` = the vertical offset value originating from where the ordinary beam is placed.
- `howMany` = how many "wiggles" to print. It only accepts integers.
- `width` = how wide each "wiggle" should appear. When in doubt, start with `#1`.
- `rotation` = a positive value would rotate the beam upward, and the negative value would rotate the beam downward.

`NOTE \wiggleBeam_markup #hOffset #vOffset #howMany #width #rotation`

NB

- `hOffset` = the horizontal offset value originating from where the ordinary beam is placed.
- `vOffset` = the vertical offset value originating from where an above-staff markup is placed. Thus, `#0` would place a wiggle beam above the staff line.
- `howMany` = how many "wiggles" to print. It only accepts integers.
- `width` = how wide each "wiggle" should appear. When in doubt, start with `#1`.
- `rotation` = a positive value would rotate the beam upward, and the negative value would rotate the beam downward.
- More than one `\wiggleBeam_markup` may be added in sequence, provided that for each instance all the arguments are defined.

`\wiggleBeamStemAdjust #fromMiddleLine #howFar NOTE`

NB

- `fromMiddleLine` = (`\wiggleBeamStemAdjust` only) = determines one end of the stem, `#0` being the middle line of an ordinary 5-line staff.
- `howFar` = (`\wiggleBeamStemAdjust` only) = computes how long the stem should be extended. A positive value would draw the stem upward, and a negative value would draw the stem downward. An integer corresponds to the distance between two staff lines of an ordinary 5-line staff.

2.1.3 Code

```
wiggleBeamOne =
#(define-music-function (vOffset howMany howWide howTilted)
   (number? number? number? number?) #{
     \once \override Voice.Beam.stencil = #ly:text-interface::print
     \once \override Voice.Beam.text = \markup {
       \translate #(cons 0 vOffset)
       \postscript #(string-append
             "newpath
              1 setlinejoin
              1 setlinecap
```

```
                0.35 setlinewidth
                0.13 0 moveto "
               (number->string howMany)
               " {" (number->string (* 0.6 howWide))  " "
               (number->string (+ 0.5 howTilted)) " rlineto "
               (number->string (* 0.6 howWide))
               " -0.5 rlineto} repeat
                stroke"
                     )

      }
    #})

wiggleBeamTwo =
#(define-music-function (vOffset howMany howWide howTilted )
   (number? number? number? number?) #{
     \once \override Voice.Beam.stencil = #ly:text-interface::print
     \once \override Voice.Beam.text = \markup {
       \translate #(cons 0 vOffset)
       \postscript #(string-append
             "newpath
              1 setlinejoin
              1 setlinecap
              0.35 setlinewidth
              0.13 0 moveto "
             (number->string howMany)
             " {" (number->string (* 0.6 howWide)) " "
             (number->string (+ 0.5 howTilted)) " rlineto "
             (number->string (* 0.6 howWide))
             " -0.5 rlineto} repeat
              stroke newpath
              0.35 setlinewidth
              1 setlinejoin
              0.13 -0.75 moveto "
             (number->string howMany)
             " {" (number->string (* 0.6 howWide))  " "
             (number->string (+ 0.5 howTilted)) " rlineto "
             (number->string (* 0.6 howWide))
             " -0.5 rlineto} repeat
              stroke"
                    )
     }
   #})

wiggleBeamThree =
#(define-music-function (vOffset howMany howWide howTilted )
   (number? number? number? number?)
   #{
```

```
      \once \override Voice.Beam.stencil = #ly:text-interface::print
      \once \override Voice.Beam.text = \markup         {
        \translate #(cons 0 vOffset)
        \postscript #(string-append
              "newpath
               1 setlinejoin
               1 setlinecap
               0.35 setlinewidth
               0.13 0 moveto "
                (number->string howMany) " {"
                (number->string (* 0.6 howWide))  " "
                (number->string (+ 0.5 howTilted)) " rlineto "
                (number->string (* 0.6 howWide))
              " -0.5 rlineto} repeat
               stroke
               newpath
               0.35 setlinewidth
               1 setlinejoin
               0.13 -0.75 moveto "
                (number->string howMany) " {"
                (number->string (* 0.6 howWide))  " "
                (number->string (+ 0.5 howTilted)) " rlineto "
                (number->string (* 0.6 howWide))
                " -0.5 rlineto} repeat
               stroke
               newpath
               0.35 setlinewidth
               1 setlinejoin
               0.13 -1.5 moveto "
                (number->string howMany) " {"
                (number->string (* 0.6 howWide)) " "
                (number->string (+ 0.5 howTilted)) " rlineto "
                (number->string (* 0.6 howWide))
                " -0.5 rlineto} repeat
               stroke"
                     )
      }
    #})

wiggleBeam_markup =
#(define-music-function (hOffset vOffset howMany howWide howTilted )
   (number? number? number? number? number?)
   #{
     ^\markup         {
       \translate #(cons hOffset vOffset)
       \postscript #(string-append
             "newpath
              1 setlinejoin
```

```
               1 setlinecap
               0.35 setlinewidth
               0.17 0 moveto "
              (number->string howMany) " {"
              (number->string (* 0.6 howWide))  " "
              (number->string (+ 0.5 howTilted)) " rlineto "
              (number->string (* 0.6 howWide))
              " -0.5 rlineto} repeat
               stroke"
                     )

    }
   #})

wiggleBeamStemAdjust =
#(define-music-function (fromMiddleLine howFar)
   (number? number?)
   #{
     \once \override Stem.stencil = #ly:text-interface::print
     \once \override Stem.text = \markup {
       \postscript #(string-append
             "newpath
              0.12 setlinewidth
              0 " (number->string fromMiddleLine) " moveto
              0 " (number->string howFar) " rlineto
              stroke"
                     )
     }
   #})

{
  \wiggleBeamTwo #0 #9 #1.01 #0 c'16 c'
  \wiggleBeamStemAdjust #-3 #3.4 c' c'
  \wiggleBeamTwo #0 #5 #1.82 #0 g''
  \wiggleBeamStemAdjust #2.5 #-3 g''
  \wiggleBeamStemAdjust #2.5 #-3 g'' g''
  \wiggleBeamTwo #-1 #9 #1.01 #-0.15 f''
  \wiggleBeamStemAdjust #1.5  #-3.5 e''
  \wiggleBeamStemAdjust #1 #-3.5 d''
  \wiggleBeamStemAdjust #0.5 #-3.5 c''
  \wiggleBeamOne #-3.5 #5 #1.4 #0.15 b'8
  c''16 \wiggleBeam_markup #0 #-4.8 #2 #1.4 #0.15 d''
  \wiggleBeamThree #-1.3 #19 #0.73 #0  g''32
  \wiggleBeamStemAdjust #1.5  #-4 e''
  \wiggleBeamStemAdjust #0.5  #-3 c'' g'' e''
  \wiggleBeamStemAdjust #0.5  #-3  c''
  \wiggleBeamStemAdjust #2.5  #-5 g'' e''
  \bar ".."
```

```
155 }
```

2.1.4 Discussion

1. Admittedly, while the current setup allows great flexibility in making the wiggle beams appear, it is entirely possible that some of the parameters be automated.
2. When using many wiggle beams, it may be easier to make the score proportionally notated, in order to avoid the micromanagement of the parameters.

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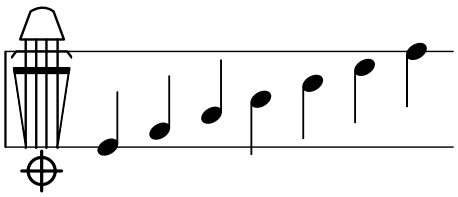
Chapter 3

Clefs

3.1 String Position Clef



3.1.1 Description

String position clef to indicate bowing position. See Discussion for the associated command, `\normalClef`.

3.1.2 Grammar

`\stringPositionClef`

3.1.3 Code

```
stringPositionClefDesign = #(ly:make-stencil (list 'embedded-ps
"gsave
currentpoint translate
/fingboardpath
{
newpath

-0.55 7.5 moveto
0 -3 rlineto
1 -6.5 rlineto
-1 -1 rlineto
0 -3 rlineto
```

```
4.1 0 rlineto
0 3 rlineto
-1 1 rlineto
1 6.5 rlineto
0 3 rlineto
closepath

} def

fingboardpath clip
newpath
0.15 setlinewidth
0.5 4.75 moveto
0 -6.8 rlineto
-0.75 5 rlineto
3.5 0 rlineto
-0.75 -5 rlineto
0. 6.8 rlineto
stroke
0.35 setlinewidth
-0.4 2.75 moveto
3.75 0 rlineto
stroke

%inner two line
newpath
0.15 setlinewidth
1.16 4.75 moveto
0. -6.8 rlineto
1.8 4.75 moveto
0. -6.8 rlineto
stroke

%bridge
newpath
-0.4 3.6 moveto
0.3 0.4 rlineto
3.2 0 rlineto
0.3 -0.4 rlineto
stroke

%tailpiece
0.15 4.75 moveto
1 setlinecap
1 setlinejoin
2.75 0 rlineto
-0.65 1.75 rlineto
-0 -0  -0.6 0.55 -1.45 0  rcurveto
```

```
61  closepath
62  stroke
63
64  %mutesign
65  newpath
66  0.2 setlinewidth
67  1 setlinecap
68  1.5 -2.25 moveto
69  0 -2.5 rlineto
70  0.25 -3.5 moveto
71  2.5 0 rlineto
72  stroke
73  newpath
74  1.5 -3.5 0.85 0 360 arc
75  stroke
76  grestore")
77          (cons 0 3)
78          (cons 0 1))
79
80  stringPositionClefSize =
81  #(lambda (grob)
82     (let* ((sPCS (ly:grob-property grob 'font-size 0.0))
83            (mult (magstep sPCS)))
84       (ly:stencil-scale
85        stringPositionClef
86        mult mult)))
87
88  stringPositionClef = {
89    \override Staff.Clef.stencil = \stringPositionClefDesign
90  }
91
92  normalClef = {
93    \revert Staff.Clef.stencil
94  }
95
96  {
97    \override Staff.StaffSymbol.line-positions = #'(6  -6)
98    \override Staff.LedgerLineSpanner.stencil = ##f
99    \override Staff.TimeSignature.stencil = ##f
100   \override Staff.BarLine.stencil = ##f
101   \stringPositionClef c'4 e' g' b' d'' f'' a''
102 }
```

3.1.4 Discussion

1. With the current design, `c'` would place a note at the lower end of the fingerboard. `a''` would place a note on the same line as the bridge.

2. The current design comes with the mute sign. If the mute sign is not needed, remove the following portion of the code above:

```
%mutesign
newpath
0.2 setlinewidth
1 setlinecap
1.5 -2.25 moveto
0 -2.5 rlineto
0.25 -3.5 moveto
2.5 0 rlineto
stroke
newpath
1.5 -3.5 0.85 0 360 arc
stroke
```

3. Once `\stringPositionClef` is used, in order to revert back to the normal clef, `\normalClef` must be used.

4. See Prescriptive Notation for String Instruments for a possible use of this clef.

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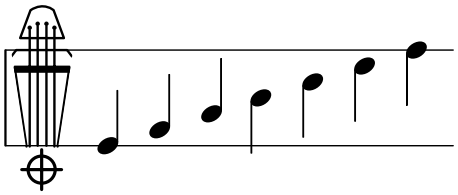
3.2 String Position Clef (revised)



3.2.1 Description

This is a revised version of the String Position Clef, where the fine-tuner pins are graphically represented, as well as the four strings are arranged tighter than the previous version.

3.2.2 Grammar

```
\stringPositionClef
```

3.2.3 Code

```
1
2  % revision june 24 2025
3
4  stringPositionClefDesignRev = #(ly:make-stencil (list 'embedded-ps
5                                                        "gsave
6  currentpoint translate
7  /fingboardpath
8  {
9
10 newpath
11 %0 1 .7 0 setcmykcolor
12 -0.5 7.5 moveto
13 0 -3 rlineto
14 1 -6.5 rlineto
15 -1 -1 rlineto
16 0 -3 rlineto
17 4.05 0 rlineto
18 0 3 rlineto
19 -1 1 rlineto
20 1 6.5 rlineto
21 0 3 rlineto
22 closepath
23
24 } def
25
26 % fingboardpath
27  fingboardpath clip
```

```
28
29 newpath
30 0.15 setlinewidth
31 0.75 5.25 moveto
32 0 -7.3 rlineto
33 -0.2 0 rmoveto
34 -0.75 5 rlineto
35 3.45 0 rlineto
36 -0.75 -5 rlineto
37 -0.2 0 rmoveto
38 0. 7.3 rlineto
39 stroke
40 0.35 setlinewidth
41 -0.4 2.75 moveto
42 3.75 0 rlineto
43 stroke
44
45 %inner two lines
46 newpath
47 0.15 setlinewidth
48 1.25 5.5 moveto
49 0. -7.5 rlineto
50 1.8 5.5 moveto
51 0. -7.5 rlineto
52 stroke
53
54
55 %finetuner pins
56 0.75 5.4 0.14 0 360 arc
57 fill
58 1.25 5.65 0.14 0 360 arc
59 fill
60 1.8 5.65 0.14 0 360 arc
61 fill
62 2.3 5.4 0.14 0 360 arc
63 fill
64
65
66
67 %bridge
68 newpath
69 -0.4 3.6 moveto
70 0.3 0.4 rlineto
71 3.2 0 rlineto
72 0.3 -0.4 rlineto
73 stroke
74
75 %tailpiece
```

```
0.15 4.75 moveto
1 setlinecap
1 setlinejoin
2.75 0 rlineto
-0.65 1.75 rlineto
-0 -0  -0.6 0.55 -1.45 0  rcurveto
closepath
stroke

%mute sign, delete if not needed
newpath
0.2 setlinewidth
1 setlinecap
1.5 -2.25 moveto
0 -2.5 rlineto
0.25 -3.5 moveto
2.5 0 rlineto
stroke
newpath
1.5 -3.5 0.85 0 360 arc
stroke

grestore")
                                                    (cons 0 3)
                                                    (cons 0 1))

strPosClefSize =
#(lambda (grob)
  (let* ((sPCS (ly:grob-property grob 'font-size 0.0))
         (mult (magstep sPCS)))
   (ly:stencil-scale
    strPosClef
    mult mult)))

stringPositionClefDesignRev = {
 \override Staff.Clef.stencil = \stringPositionClefDesignRev
}

normalClef = {
 \revert Staff.Clef.stencil
}

{
 \override Staff.StaffSymbol.line-positions = #'(6  -6)
 \override Staff.LedgerLineSpanner.stencil = ##f
 \override Staff.TimeSignature.stencil = ##f
 \override Staff.BarLine.stencil = ##f
 \stringPositionClefDesignRev c'4 e' g' b' d'' f'' a''
```

```
124 }
```

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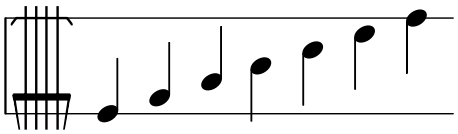
3.3 String Position Clef 2



3.3.1 Description

String position clef to indicate bowing position, but this one provides more space between bridge and the edge of the fingerboard, allowing the visual-timbre correspondence between *sul ponticello* and *sul tasto*.

3.3.2 Grammar

```
\stringPositionClef_two
```

3.3.3 Code

```
\version "2.24.4"

stringPositionClefDesign_two = #(ly:make-stencil (list 'embedded-ps
                                                       "gsave
currentpoint translate
/fingboardpath
{

newpath
-0.45 4.75 moveto
0 -5 rlineto
0.5 -2.75 rlineto
2.9 0 rlineto
0.5 2.75 rlineto
0 5 rlineto
closepath
} def

fingboardpath clip
newpath
0.15 setlinewidth
0.5 8 moveto
0 -13.8 rlineto
-0.75 5 rlineto
3.5 0 rlineto
-0.75 -5 rlineto
```

```
0 11 rlineto
stroke
0.35 setlinewidth
-0.4 -1 moveto
3.75 0 rlineto
stroke

%inner two line
newpath
0.15 setlinewidth
1.16 4.75 moveto
0. -7.75 rlineto
1.8 4.75 moveto
0. -7.75 rlineto
stroke

%bridge
newpath
-0.4 3.6 moveto
0.3 0.4 rlineto
3.2 0 rlineto
0.3 -0.4 rlineto
stroke

grestore")
        (cons 0 3)
        (cons 0 1))

stringPositionClef_two = {
 \override Staff.Clef.stencil = \stringPositionClefDesign_two
}

normalClef = {
 \revert Staff.Clef.stencil
}

{
 \override Staff.StaffSymbol.line-positions = #'(6  -6)
 \override Staff.LedgerLineSpanner.stencil = ##f
 \override Staff.TimeSignature.stencil = ##f
 \override Staff.BarLine.stencil = ##f
 \stringPositionClef_two c'4^\markup {
  \translate #'(-3 . 2)
  \musicglyph "space"
 }
 _\markup {
  \translate #'(-3 . -3)
  \musicglyph "space"
```

```
75   }
76   e' g' b' d'' f'' a''
77  }
```

3.3.4 Discussion

1. With the current design, `c'` would place a note at the lower end of the fingerboard. `a''` would place a note on the same line as the bridge.
2. Once `\stringPositionClef_two` is used, in order to revert back to the normal clef, `\normalClef` must be used.

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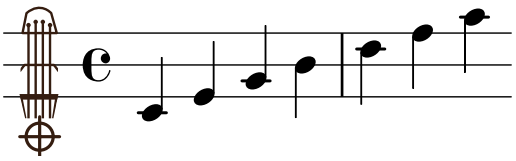
3.4 String Position Clef 3a



3.4.1 Description

In contrast to the two types of String Position Clefs introduced earlier, this clef helps facilitate the showing of the positions between the edge of the fingerboard and bridge, as well as between the bridge and the edge of the tailpiece.

3.4.2 Grammar

`\stringPositionClef_three`

3.4.3 Code

```
1
2  stringPositionClef_three_Design = #(ly:make-stencil (list 'embedded-ps
3                                                           "gsave
4  currentpoint translate
5  /fingboardpath
6  {
7  newpath
8  0 1 .7 0 setcmykcolor
9  0.3 4.75 moveto
10 0 -4.5 rlineto
11 -0.2 -0.5 rlineto
12 0.5 -2.15 rlineto
13 -1 0 rlineto
14 0 -3 rlineto
15 3.75 0 rlineto
16 0 3 rlineto
17 -1 0 rlineto
18 0.45 2.15 rlineto
19 -0.15 0.5 rlineto
20 0 4.5 rlineto
21 closepath
22 %stroke
23 .1 .4 .5 .9 setcmykcolor
24 } def
25
26 %fingboardpath
27
```

```
fingboardpath clip
newpath
0.15 setlinewidth
0.8 3.5 moveto
0 -5.85 rlineto
-0.2 0 rmoveto
-0.25 1.3 rlineto
2.2 0 rlineto
-0.2 -1.3 rlineto
-0.2 0 rmoveto
0. 5.85 rlineto
stroke
0.35 setlinewidth
0.15 -1 moveto
3.2 0 rlineto
stroke

%inner two line
newpath
0.15 setlinewidth
1.25 3.6 moveto
0. -5.95 rlineto
1.7 3.6 moveto
0. -5.95 rlineto
stroke

0.8 3.5 0.14 0 360 arc
fill
2.1525 3.5 0.14 0 360 arc
fill
1.25 3.7 0.14 0 360 arc
fill
1.7 3.7 0.14 0 360 arc
fill



%bridge
newpath
0.25 0.6 moveto
0.3 0.4 rlineto
1.85 0 rlineto
0.3 -0.4 rlineto
stroke

%tailpiece
0.425 3 moveto
1 setlinecap
```

```
1 setlinejoin
2.15 0 rlineto
-0.35 1.25 rlineto
-0 -0  -0.65 0.75 -1.55 0  rcurveto
closepath
stroke

%%% mute sign; commentify if not needed %%%
newpath
0.2 setlinewidth
1 setlinecap
1.5 -2.25 moveto
0 -2.5 rlineto
0.25 -3.5 moveto
2.5 0 rlineto
stroke
newpath
1.5 -3.5 0.85 0 360 arc
stroke
%%% end of mute sign for commenting/uncommenting %%%

grestore

")
                                                    (cons 0 3)
                                                    (cons 0 1))

stringPositionClefSize =
#(lambda (grob)
  (let* ((bCS (ly:grob-property grob 'font-size 0.0))
         (mult (magstep bCS)))
   (ly:stencil-scale
    stringPositionClef
    mult mult)))

stringPositionClef_three = {
 \override Staff.Clef.stencil = \stringPositionClef_three_Design
}

{
 \override Staff.StaffSymbol.line-positions = #'(4 0  -4)
 \stringPositionClef_three
 c'4 e' g' b' d'' f'' a''
}
```

3.4.4 Discussion

1. With the current design, `e'` places a note at the lower end of the fingerboard. `b'` places a note at the bridge line, and `f''` places a note on the line indicating the edge of the tailpiece.

2. The current design comes with the mute sign. If the mute sign is not needed, remove the following portion of the code above:

```
%%% mute sign; commentify if not needed %%%
newpath
0.2 setlinewidth
1 setlinecap
1.5 -2.25 moveto
0 -2.5 rlineto
0.25 -3.5 moveto
2.5 0 rlineto
stroke
newpath
1.5 -3.5 0.85 0 360 arc
stroke
%%% end of mute sign for commenting/uncommenting %%%
```

3. If you do not wish the ledger lines to appear within the staff line, consider using `\override Staff.NoteHead.` `ledgers = ##t`.

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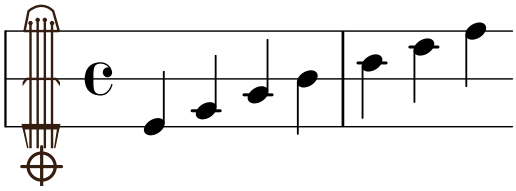
3.5 String Position Clef 3b (Longer Span)



3.5.1 Description

The design of this clef is similar to String Position Clef 3a; however, here the distance among the edge of the fingerboard, bridge, and the edge of the tailpiece is set wider.

3.5.2 Grammar

`\stringPositionClef_three`

3.5.3 Code

```
1
2  stringPositionClef_three_longer_Design = #(ly:make-stencil (list 'embedded-ps
3                                                               "gsave
4  currentpoint translate
5  /fingboardpath
6  {
7  newpath
8  0 1 .7 0 setcmykcolor
9  0.3 5.75 moveto
10 0 -6.5 rlineto
11 -0.2 -0.5 rlineto
12 0.5 -2.15 rlineto
13 -0.5 0 rlineto
14 0 -2.5 rlineto
15 2.75 0 rlineto
16 0 2.5 rlineto
17 -0.5 0 rlineto
18 0.45 2.15 rlineto
19 -0.15 0.5 rlineto
20 0 6.5 rlineto
21 closepath
22 %stroke
23 .1 .4 .5 .9 setcmykcolor
24 } def
25
26 %fingboardpath
27
```

```
fingboardpath clip
newpath
0.15 setlinewidth
0.8 4.5 moveto
0 -7.85 rlineto
-0.2 0 rmoveto
-0.25 1.3 rlineto
2.2 0 rlineto
-0.2 -1.3 rlineto
-0.2 0 rmoveto
0. 7.85 rlineto
stroke
0.35 setlinewidth
0.15 -2 moveto
3.2 0 rlineto
stroke

%inner two line
newpath
0.15 setlinewidth
1.25 4.6 moveto
0. -7.95 rlineto
1.7 4.6 moveto
0. -7.95 rlineto
stroke

0.8 4.5 0.14 0 360 arc
fill
2.1525 4.5 0.14 0 360 arc
fill
1.25 4.7 0.14 0 360 arc
fill
1.7 4.7 0.14 0 360 arc
fill



%bridge
newpath
0.25 0.6 moveto
0.3 0.4 rlineto
1.85 0 rlineto
0.3 -0.4 rlineto
stroke

%tailpiece
0.425 4 moveto
1 setlinecap
```

```
1 setlinejoin
2.15 0 rlineto
-0.35 1.25 rlineto
-0 -0  -0.65 0.75 -1.55 0  rcurveto
closepath
stroke

%%% mute sign; commentify if not needed %%%
newpath
0.2 setlinewidth
1 setlinecap
1.5 -3.25 moveto
0 -2.5 rlineto
0.25 -4.5 moveto
2.5 0 rlineto
stroke
newpath
1.5 -4.5 0.85 0 360 arc
stroke
%%% end of mute sign for commenting/uncommenting %%%

grestore

")
                                                    (cons 0 3)
                                                    (cons 0 1))

stringPositionClefSize =
#(lambda (grob)
  (let* ((bCS (ly:grob-property grob 'font-size 0.0))
         (mult (magstep bCS)))
   (ly:stencil-scale
    stringPositionClef
    mult mult)))

stringPositionClef_three_longer = {
 \override Staff.Clef.stencil = \stringPositionClef_three_longer_Design
}

{
 \override Staff.StaffSymbol.line-positions = #'(6 0  -6)
 \stringPositionClef_three_longer
 c'4 e' g' b' d'' f'' a''
}
```

3.5.4 Discussion

1. With the current design, `c'` places a note at the lower end of the fingerboard. `b'` places a note at the bridge line, and `a''` places a note on the line indicating the edge of the tailpiece.

2. The current design comes with the mute sign. If the mute sign is not needed, remove the following portion of the code above:

```
%%% mute sign; commentify if not needed %%%
newpath
0.2 setlinewidth
1 setlinecap
1.5 -3.25 moveto
0 -2.5 rlineto
0.25 -4.5 moveto
2.5 0 rlineto
stroke
newpath
1.5 -4.5 0.85 0 360 arc
stroke
%%% end of mute sign for commenting/uncommenting %%%
```

3. If you do not wish the ledger lines to appear within the staff line, consider using `\override Staff.NoteHead.` `ledgers = ##t`.

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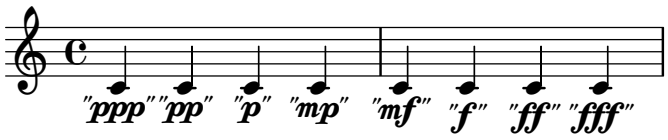
Chapter 4

Dynamics

4.1 Dynamics in Quotation Marks



4.1.1 Description

Dynamics in quotation marks, also known as *effort dynamics*, indicate those with which certain techniques must be carried on, understanding that the perceived dynamics will be quieter than what are indicated. Examples abound in scores by Helmut Lachenmann and others for such techniques as air sound, bowing directly on the bridge, etc..

4.1.2 Grammar

```
NOTE \qppp
NOTE \qpp
NOTE \qp
NOTE \qmp
NOTE \qmf
NOTE \qf
NOTE \qff
NOTE \qfff
```

4.1.3 Code

```
1  \version "2.24.4"
2
3  qmp = #(make-dynamic-script
4          (markup #:combine
5                  #:combine
6                  #:translate '(-0.85 . -0.1)
```

```
                #:normal-text (#:italic #:fontsize 0.75 "\"")
                #:dynamic "mp"
                #:translate '(3.25 . -0.1)
                #:normal-text (#:italic #:fontsize 0.75 "\"")))
qp = #(make-dynamic-script
       (markup #:combine
               #:combine
               #:translate '(-0.95 . -0.1)
               #:normal-text (#:italic #:fontsize 0.75 "\"")
               #:dynamic "p"
               #:translate '(1.35 . -0.1)
               #:normal-text (#:italic #:fontsize 0.75 "\"")))
qpp = #(make-dynamic-script
        (markup #:combine
                #:combine
                #:translate '(-0.95 . -0.1)
                #:normal-text (#:italic #:fontsize 0.75 "\"")
                #:dynamic "pp"
                #:translate '(2.75 . -0.1)
                #:normal-text (#:italic #:fontsize 0.75 "\"")))
qppp = #(make-dynamic-script
         (markup #:combine
                 #:combine
                 #:translate '(-0.95 . -0.1)
                 #:normal-text (#:italic #:fontsize 0.75 "\"")
                 #:dynamic "ppp"
                 #:translate '(4.25 . -0.1)
                 #:normal-text (#:italic #:fontsize 0.75 "\"")))

qmf = #(make-dynamic-script
        (markup #:combine
                #:combine
                #:translate '(-0.85 . 0)
                #:normal-text (#:italic #:fontsize 0.75 "\"")
                #:dynamic "mf"
                #:translate '(3.25 . 0)
                #:normal-text (#:italic #:fontsize 0.75 "\"")))
qf = #(make-dynamic-script
       (markup #:combine
               #:combine
               #:translate '(-0.75 . 0)
               #:normal-text (#:italic #:fontsize 0.75 "\"")
               #:dynamic "f"
               #:translate '(1.65 . 0)
               #:normal-text (#:italic #:fontsize 0.75 "\"")))
qff = #(make-dynamic-script
        (markup #:combine
                #:combine
```

```
                  #:translate '(-0.75 . 0)
                  #:normal-text (#:italic #:fontsize 0.75 "\"")
                  #:dynamic "ff"
                  #:translate '(2.75 . 0)
                  #:normal-text (#:italic #:fontsize 0.75 "\"")))
qfff = #(make-dynamic-script
          (markup #:combine
                  #:combine
                  #:translate '(-0.75 . 0)
                  #:normal-text (#:italic #:fontsize 0.75 "\"")
                  #:dynamic "fff"
                  #:translate '(3.85 . 0)
                  #:normal-text (#:italic #:fontsize 0.75 "\"")))

{

  c'4\qppp
  c'4\qpp
  c'4\qp
  c'4\qmp

  c'4\qmf
  c'4\qf
  c'4\qff
  c'4\qfff

}

\layout {
  \context {
    \Score    proportionalNotationDuration = #(ly:make-moment 1/9)
  }
}
```

4.1.4 Discussion

In scores by Lachenmann, in concordance with German quotation marks (*Anführungszeichen*), the opening quotation mark points left, and placed on the bottom line, and the closing quotation mark points right and sits at the top of the last character. It would be possible to achieve this by adjusting the parameters in the Scheme code.[1]

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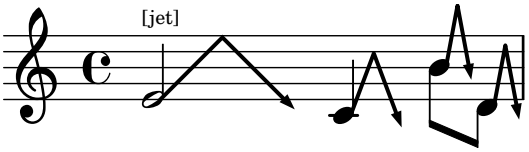
1. See: https://lilypond.org/doc/v2.24/Documentation/extending/markup-construction-in-scheme

Chapter 5

Noteheads

5.1 Jet Whistle (for flute)



5.1.1 Description

Implementation of the jet whistle, as described in *The Techniques of Flute Playing* by Carin Levine and Christina Mitropoulos-Bott.[1]

NB: (Aug. 10 2025) There is now a new version of the jet whistle implementation.

5.1.2 Grammar

```
\jet NOTE #X-length
```

5.1.3 Code

```
jet = #(define-music-function (pitchthing width) (ly:music? number?)
          (define p1 (ly:music-property pitchthing 'pitch))
          (define steps (+ -6 (ly:pitch-steps p1)))
          (define radToDeg (* 180 (/ 1 3.141592653589793)))
          #{ #pitchthing ^\markup {
            \postscript
            #(string-append "gsave newpath 0.2 setlinewidth 1.15 "
                            (number->string
                                    (+ -2.5 (* 0.5 steps))) " moveto "
                            (number->string
```

1. Carin Levine and Christina Mitropoulos-Bott, *The techniques of flute playing = Die Spieltechnik der Flöte* (Kassel ; New York: Bärenreiter, 2003), 18.

```
                                    (* 0.5 width)) " 4 rlineto "
                            (number->string
                                    (* 0.5 width)) " -4 rlineto
                    stroke
                    newpath
                    0.1 setlinewidth "
                            (number->string (+ 1.15 width)) " "
                            (number->string (+ -2.55 (* 0.5 steps)))
                            " moveto "
                            (number->string
                             (* radToDeg (atan (/ (* width 0.5) 4))))
                            " rotate
                    0 -1 rlineto
                    -0.35 1 rlineto
                    0.7 0 rlineto
                    -0.35 -1 rlineto
                    closepath
                    fill
                    grestore
                    ")
          } #})

\score {
  {
    \jet e'2^\markup {\fontsize #-5 {[jet]}} #8
    \jet c'4 #3
    \stemDown  \jet b'8 #1.5
    \jet d'8 #1.5
  }

  \layout {
    \context {
      \Score proportionalNotationDuration = #(ly:make-moment 1/10)
      \override SpacingSpanner.uniform-stretching = ##t
    }
  }
}
```

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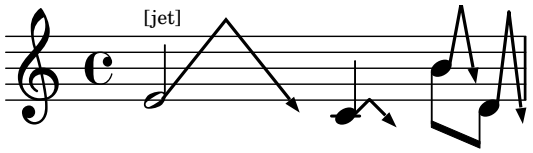
5.2 Jet Whistle (for flute) (Version 2)



5.2.1 Description

This is an improved version of the original version of the jet whistle implementation. This version adds the functionality to adjust the height, as well as the width of the jet whistle sign.

5.2.2 Grammar

```
\jet NOTE #Y-length #X-length
```

5.2.3 Code

```
jet =  #(define-music-function (pitchthing height width) (ly:music? number? number?)
          (define p1 (ly:music-property pitchthing 'pitch))
          (define steps (+ -6 (ly:pitch-steps p1)))
          (define radToDeg (* 180 (/ 1 3.141592653589793)))


          #{ #pitchthing ^\markup {
           \postscript #(string-append
                         "gsave
newpath
0.2 setlinewidth
1.15 " (number->string (+ -2.5 (* 0.5 steps))) " moveto "

                         (number->string (* 0.5 width)) " "
                         (number->string height) " rlineto "
                         (number->string (* 0.5 width)) " "
                         (number->string (* height -1))
                         " rlineto
stroke
newpath
0.1 setlinewidth
 "
                         (number->string (+ 1.15 width))
                         " " (number->string (+ -2.55 (* 0.5 steps)))
                         " moveto "
                         (number->string
                          (* radToDeg (atan (/ (* width 0.5) height))))
                         " rotate
0 -1 rlineto
-0.35 1 rlineto
```

```
0.7 0 rlineto
-0.35 -1 rlineto
closepath
fill
grestore
")
          } #})


\score {
 {
  \jet e'2^\markup {\fontsize #-5 {[jet]}} #5 #8
  \jet c'4 #1 #2
  \stemDown
  \jet b'8  #4 #1.5
  \jet d'8  #6 #1.5
 }

 \layout {
  \context {
   \Score proportionalNotationDuration = #(ly:make-moment 1/10)
   \override SpacingSpanner.uniform-stretching = ##t
  }
 }
}
```

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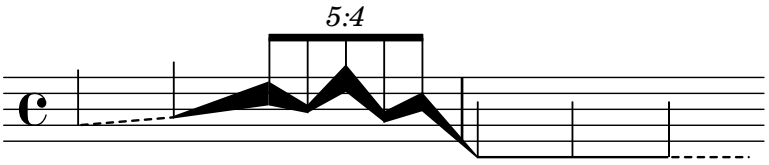
5.3 Line as a Notehead



5.3.1 Description

These functions replace an ordinary notehead with a dashed or a continuous line. For the continuous line, it is possible to adjust the beginning and ending thicknesses.

5.3.2 Grammar

```
\dashedLineNotehead NOTE1 PITCH #x-dist
\modularLineNotehead NOTE1 PITCH #beginningThick #endingThick #x-dist
```

NB

1. `NOTE1` specifies with which note the line starts. If necessary, the duration must be set, as well.
2. `PITCH` specifies with which pitch the line ends. Enter only the pitch; this information is used to determine the angle of the line, and it has no effect in displaying the rhythm.
3. `x-dist` specifies how long the line is.
4. `beginningThick` (for `modularLineNotehead` only) specifies how thick the beginning part of the line should be. `#15` gives a thin line, similar to the `\dashedLineNotehead` line. `#100` is as thick as a space between two neighboring lines of a staff.
5. `endingThick` (for `modularLineNotehead` only) specifies how thick the ending part of the line should be. `#15` gives a thin line, similar to the `\dashedLineNotehead` line. `#100` is as thick as a space between two neighboring lines of a staff.

5.3.3 Code

```
1
2  % See the entry on "Noteheadless" for its code;
3  % it is required for the snippet to run properly.
4
5  dashedLineNotehead =
6  #(define-music-function
7    (beginning end x-distance) (ly:music? ly:music? number?)
8    (let*
9     (
10      (p1 (ly:music-property beginning 'pitch))
11      (p2 (ly:music-property end 'pitch))
12      (steps
13       (-
14        (+ (* 7 (ly:pitch-octave p2)) (ly:pitch-notename p2))
15        (+ (* 7 (ly:pitch-octave p1)) (ly:pitch-notename p1))
```

```
        )
       )
      )
    #{
      {

        \once \override Voice.NoteHead.stencil = #ly:text-interface::print
        \once \override Voice.NoteHead.stem-attachment = #'(0 . 0)
        \once \override Staff.LedgerLineSpanner.stencil = ##f
        \once \override Voice.NoteHead.text = \markup         {
          % \translate #(cons 0 0)
          \postscript
          #(string-append
            "newpath 1 setlinecap
               0.15 setlinewidth
               0 0 moveto
               [.4 .4 .4 .4] 3 setdash "
            (number->string x-distance)  " " (number->string (* steps 0.5))
            " rlineto stroke"
            )
        }
        #beginning
        \revert Voice.NoteHead.stencil
        \revert Staff.LedgerLineSpanner.stencil
      }
    #})
   )


modularLineNotehead =
#(define-music-function
   (beginning end beginningThickness endingThickness x-distance)
   (ly:music? ly:music? number? number? number?)
   (let*
    (
      (p1 (ly:music-property beginning 'pitch))
      (p2 (ly:music-property end 'pitch))
      (steps
       (-
        (+ (* 7 (ly:pitch-octave p2)) (ly:pitch-notename p2))
        (+ (* 7 (ly:pitch-octave p1)) (ly:pitch-notename p1))
        )
       )
      )
    #{
      {

        \once \override Voice.NoteHead.stencil = #ly:text-interface::print
```

```
64          \once \override Voice.NoteHead.stem-attachment = #'(0 . 0)
65          \once \override Voice.LedgerLineSpanner.transparent = ##t
66          \once \override Voice.NoteHead.text = \markup         {
67            \postscript
68            #(string-append
69              "newpath 1 setlinecap 0.1 setlinewidth -0.05 0 moveto 0 "
70              (number->string (* beginningThickness 0.005)) " rlineto "
71              (number->string x-distance) " "
72              (number->string (+ (- (* endingThickness 0.005)
73                                    (* beginningThickness 0.005) )
74                                 (* steps 0.5)))
75              " rlineto 0 "
76              (number->string  (* endingThickness -0.01))  " rlineto "
77              (number->string (* -1 x-distance))  " "
78              (number->string (- (* endingThickness 0.005)
79                                 (* beginningThickness 0.005)
80                                 (* steps 0.5)))
81              " rlineto
82                 closepath
83                 fill"
84              )
85          }
86          #beginning
87          \revert Voice.NoteHead.stencil
88          \revert Staff.LedgerLineSpanner.stencil
89        }
90      #})
91    )
92
93
94  \score {
95    {
96      \omit Staff.Clef
97      \dashedLineNotehead g'4 a' #6
98      \modularLineNotehead a' d'' #15 #150 #6
99      \override TupletNumber.text = #tuplet-number::calc-fraction-text
100
101     \stemUp  \tuplet 5/4 {
102       \modularLineNotehead d''8 b' #150 #50 #2.5
103       \modularLineNotehead b' f'' #50 #175 #2.5
104       \modularLineNotehead f'' a' #175 #70 #2.5
105       \modularLineNotehead a' c'' #70 #120 #2.5
106       \modularLineNotehead c'' c' #120 #15 #3.5
107     }
108     |
109     \modularLineNotehead c'4 c' #15 #15 #12
110     \noteheadless c'
111     \dashedLineNotehead c' c' #5
```

```
112     }
113
114     \layout {
115       \context {
116         \Score proportionalNotationDuration = #(ly:make-moment 1/10)
117         \override SpacingSpanner.uniform-stretching = ##t
118       }
119     }
120   }
121
122
```

5.3.4 Discussion

See Prescriptive Notation for String Instruments for a possible use of this notehead.

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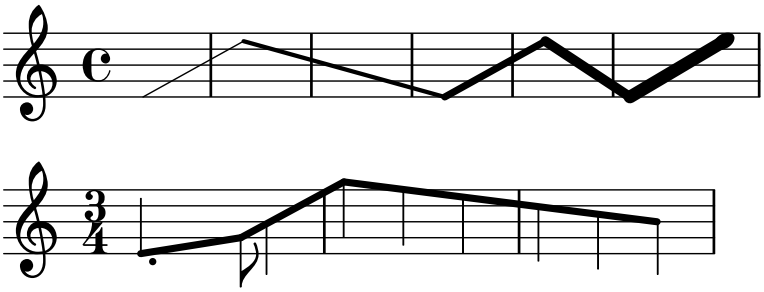
5.4 Line as a Notehead 2



5.4.1 Description

These functions replace ordinary noteheads with a dashed or a continuous line. However, unlike the **First Version**, these functions use `\glissando` as the basis for drawing the line.

5.4.2 Grammar

```
\lineNotehead #THICKNESS NOTE
\lineNoteheadOn #THICKNESS STARTING_NOTE NOTES...
\lineNoteheadOff ARRIVING_NOTE
\lineNoteheadWithRhythm #THICKNESS NOTE
\lineNoteheadWithRhythmOn #THICKNESS STARTING_NOTE NOTES...
\lineNoteheadWithRhythmOff ARRIVING_NOTE
```

NB

1. `\lineNotehead` only shows the line on the staff.
2. `\lineNoteheadWithRhythm` retains the rhythmic information.
3. `\lineNotehead` and `\lineNoteheadWithRhythm` applies the line from one note to another, without the line spanning multiple notes.
4. If the line must span over more than a note, use `\lineNoteheadOn` or `\lineNoteheadWithRhythmOn`.
5. In order to exit the line-as-a-notehead mode, use `\lineNoteheadOff` for both `\lineNotehead` and `\lineNoteheadWithRhythm`. In case the notehead must be disguised at the arrival, you may reduce the font size of the Notehead very drastically. See the Code for an example of this.
6. When using `\lineNoteheadWithRhythm` and `\lineNoteheadWithRhythmOn`, cautions must be paid to the placements of the augmentation dots and the intermediate stems. In the Code, I use:
   `\once \override Voice.Dots.extra-offset = #'(0 . -1)`
   And place this *before* the `\lineNoteheadWithRhythmOn`.

5.4.3 Code

```
1 \version "2.24.4"
2
```

```
% revised on January 25 2025

lineNotehead =
#(define-music-function (thickness note) (number? ly:music? )
  #{
   \once \override NoteHead.stencil = #ly:text-interface::print
   \once \override NoteHead.text = \markup{  \char ##x200A }
   \once \override Dots.stencil = ##f
   \once \override Glissando.breakable = ##t
   \once \override Glissando.after-line-breaking = ##t
   \once \override Glissando.thickness = #thickness
   \once \override Glissando.bound-details =
   #'(
      (left (padding . 0))
      (right (padding . 0))
      )
   #note
   \glissando

  #})

lineNoteheadOn =
#(define-music-function (thickness note) (number? ly:music?)
  #{
   \override Stem.stencil = ##f
   \override Flag.stencil = ##f
   \override TupletBracket.stencil = ##f
   \override TupletNumber.stencil = ##f
   \override Beam.stencil = ##f
   \override NoteHead.stencil = #ly:text-interface::print
   \override NoteHead.text = \markup{  \char ##x200A }
   \override Dots.stencil = ##f
   \override Glissando.breakable = ##t
   \override Glissando.after-line-breaking = ##t
   \override Glissando.thickness = #thickness
   \override Glissando.bound-details =
   #'(
      (left (padding . 0))
      (right (padding . 0))
      )
   #note
   \glissando
   \override NoteColumn.glissando-skip = ##t
  #})


lineNoteheadWithRhythm =
#(define-music-function (thickness note) (number? ly:music?)
```

```
  #{
   \once \override NoteHead.stencil = #ly:text-interface::print
   \once \override NoteHead.text = \markup{  \char ##x200A }
   \once \override Glissando.breakable = ##t
   \once \override Glissando.after-line-breaking = ##t
   \once \override Glissando.thickness = #thickness
   \once \override Glissando.bound-details =
   #'(
      (left (padding . 0))
      (right (padding . 0))
      )
   #note
   \glissando

  #})

lineNoteheadWithRhythmOn =
#(define-music-function (thickness note) (number? ly:music?)
  #{
   \override NoteHead.stencil = #ly:text-interface::print
   \override NoteHead.text = \markup{  \char ##x200A }
   \override Glissando.breakable = ##t
   \override Glissando.after-line-breaking = ##t
   \override Glissando.thickness = #thickness
   \override Glissando.bound-details =
   #'(
      (left (padding . 0))
      (right (padding . 0))
      )
   #note
   \glissando
   \override NoteColumn.glissando-skip = ##t
  #})


lineNoteheadOff =
{
 \revert Stem.stencil
 \revert Flag.stencil
 \revert Beam.stencil
 \revert NoteHead.stencil
 \revert Dots.stencil
 \revert Glissando.breakable
 \revert Glissando.after-line-breaking
 \revert Glissando.thickness
 \revert Glissando.bound-details
 \revert NoteColumn.glissando-skip
 \revert TupletBracket.stencil
```

```
 \revert TupletNumber.stencil
 \revert Beam.stencil
}


{

 \lineNotehead #1  e'1
 \lineNoteheadOn #3
 e''1
 b'1
 \lineNoteheadOff
 \lineNotehead #5
 e'1
 \lineNotehead #7
 e''1
 \lineNoteheadOn #9 e'4
 e''4.   e'8
 \lineNoteheadOff
 \omit Stem
 e''4

}

\score {
 {
  \time 3/4
  \once \override Voice.Dots.extra-offset = #'(0 . -1)
  \lineNoteheadWithRhythm #5  e'4.
  \stemDown
  \lineNoteheadWithRhythmOn #5

  g'8
  b'4
  \lineNoteheadOff
  \lineNoteheadWithRhythmOn #5
  g''4
  f''4
  e''4
  d''4
  c''4
  \lineNoteheadOff
  \once \override NoteHead.font-size = #-30
  b'4
 }
 \layout {
  \context{
   \Score   proportionalNotationDuration = #(ly:make-moment 1/8)
```

```
147     }
148   }
149 }
```

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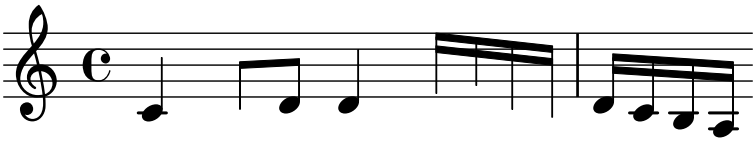
5.5 Noteheadless



5.5.1 Description

This snippet is hardly my own idea, as I largely quoted this technique from one of the snippets available on LSR.[2] However, I list it here because:

1. it took a while for me to find the workaround for maintaining the musical spacing as a result of omitting noteheads. It is worth noting that because merely disabling `NoteHead.stencil` will render the spacing to be squished, the approach of specifying `##t` for `NoteHead.transparent` (which itself will *not* eliminate the ledger lines) then `##t` for `NoteHead.no-ledgers` is effective in maintaining the general spacing.
2. I use this in conjunction with other notehead alterations, e.g. Line as a notehead.

5.5.2 Grammar

```
\noteheadless NOTE
\noteheadlessOn NOTE
\noteheadlessOff
```

NB

1. `\noteheadless` affects only one note immediately following.
2. For a group of notes, use `\noteheadlessOn` to toggle on the function. `\noteheadlessOff` will toggle off the function.

5.5.3 Code

```
1
2  %% Inspired by:
3  %% http://lsr.di.unimi.it/LSR/Item?id=796
4
5
6  noteheadless = {
7    \once \override Voice.NoteHead.transparent = ##t
8    \once \override Voice.NoteHead.no-ledgers = ##t
9  }
10
11 noteheadlessOn = {
12   \override Voice.NoteHead.transparent = ##t
13   \override Voice.NoteHead.no-ledgers = ##t
14 }
15 noteheadlessOff = {
```

2. See: http://lsr.di.unimi.it/LSR/Item?id=796

```
16    \revert Voice.NoteHead.transparent
17    \revert Voice.NoteHead.no-ledgers
18  }
19
20
21  {
22    c'4 \noteheadless c'8 d' d'4
23    \noteheadlessOn e'16 f' c' b |
24    \noteheadlessOff d' c' b a
25  }
26
```

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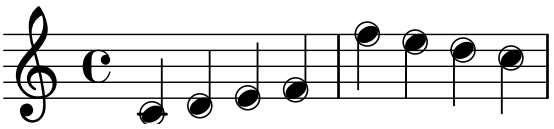
5.6 Slap Tongue, Type A



5.6.1 Description

In my music, I use encircled noteheads to denote slap tongues. Type A, encircled filled notehead, is used for a slap tongue with a regular note immediately following.

5.6.2 Grammar

`\slapA NOTE`

NB It only affects one note, owing to the `\once \override` functions within the code.

5.6.3 Code

```
slapA = #(define-music-function (note)   (ly:music?)
            #{ \once \override Voice.NoteHead.stencil =
               #ly:text-interface::print
               \once \override Voice.NoteHead.text =
               \markup {
                 \concat {
                   \musicglyph "noteheads.s2"
                   \postscript "newpath
                   -0.675 0.025 0.75 0 360 arc
                   closepath stroke"
                 }
               }
               $note #})

{
  \slapA c'4 \slapA d' \slapA e' \slapA f'
  \slapA f'' \slapA e'' \slapA d'' \slapA c''
}

```

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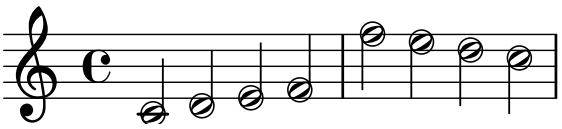
5.7 Slap Tongue, Type B



5.7.1 Description

In my music, I use encircled noteheads to denote slap tongues. Type B, encircled hollow notehead, is used for a slap tongue with an air sound immediately following.

5.7.2 Grammar

`\SlapB NOTE`

NB It only affects one note, owing to the `\once \override` functions within the code.

5.7.3 Code

```
slapB = #(define-music-function (note)   (ly:music?)
            #{ \once \override Voice.NoteHead.stencil =
               #ly:text-interface::print
               \once \override Voice.NoteHead.text =
               \markup {
                 \concat {
                   \musicglyph "noteheads.s1"
                   \postscript "newpath
                   -0.675 0.025 0.75 0 360 arc
                   closepath stroke"
                 }
               }
               $note #})
{
  \SlapB c'4 \SlapB d' \SlapB e' \SlapB f'
  \SlapB f'' \SlapB e'' \SlapB d'' \SlapB c''
}

```

5.7.4 Discussion

As the musical example shows, when the Type B Slap Tongue notehead is applied to a quarter note, it could invite confusion in terms of rhythm. As a slap tongue itself is a short sound, I only use the slap tongue noteheads on eighth notes or shorter note durations.

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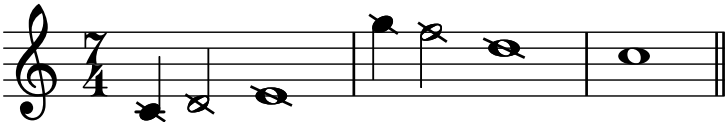
5.8 Slashed Notehead



5.8.1 Description

Noteheads with backslashes applied.[3] I use this notehead to indicate, for example, notes on the piano whose strings are prepared, thus producing pitch/sound different from what is expected normally.

5.8.2 Grammar

```
\slashNote NOTE
\slashNoteOn NOTE
\slashNoteOff
```

NB `\slashNote` only affects one note, owing to the `\once \override` functions within the code. For a group of notes to have slashes applied, use `\slashNoteOn`. `\slashNoteOff` cancels the application.

5.8.3 Code

```
1
2  % Inspired by the code provided by Jean Abou Samra
3  % https://lists.gnu.org/archive/html/lilypond-user/2022-11/msg00333.html
4
5  slashNote =
6  \once \override Voice.NoteHead.stencil =
7  #(grob-transformer
8    'stencil
9    (lambda (grob original)
10     (let* ((added-markup
11             #{
12               \markup \general-align #Y #CENTER
13               #(case (ly:grob-property grob 'duration-log)
14                  ((0) #{ \markup \concat {
15                    \musicglyph "noteheads.s0"
16                    \postscript
17                    "gsave
18                     0.17 setlinewidth
19                     -2.3 0.6 moveto
20                     0.3 -0.6 lineto
21                     stroke
22                     grestore"
23                       } #})
```

3. The code provided by Jean Abou Samra in the following discussion thread on lilypond-user was very helpful in creating this code: https://lists.gnu.org/archive/html/lilypond-user/2022-11/msg00333.html

```
24
25                  ((1) #{ \markup \concat {
26                    \musicglyph "noteheads.s1"
27                    \postscript
28                    "gsave
29                     0.17 setlinewidth
30                     -1.5 0.6 moveto
31                     0.3 -0.6 lineto
32                     stroke
33                     grestore"
34                       } #})
35
36                  ((2) #{ \markup \concat {
37                    \musicglyph "noteheads.s2"
38                    \postscript
39                    "gsave
40                     0.17 setlinewidth
41                     -1.5 0.6 moveto
42                     0.3 -0.6 lineto
43                     stroke
44                     grestore"
45                       } #}))
46              #})
47             (added-stencil (grob-interpret-markup grob added-markup)))
48       (if (ly:stencil? original)
49           (ly:stencil-add original added-stencil)
50           added-stencil))))
51
52
53
54  slashNoteOn =
55  \override Voice.NoteHead.stencil =
56  #(grob-transformer
57    'stencil
58    (lambda (grob original)
59      (let* ((added-markup
60              #{
61                \markup \general-align #Y #CENTER
62                #(case (ly:grob-property grob 'duration-log)
63                   ((0) #{ \markup \concat {
64                     \musicglyph "noteheads.s0"
65                     \postscript
66                     "gsave
67                      0.17 setlinewidth
68                      -2.3 0.6 moveto
69                      0.3 -0.6 lineto
70                      stroke
71                      grestore"
```

```
                        } #})
                    ((1) #{ \markup \concat {
                      \musicglyph "noteheads.s1"
                      \postscript
                      "gsave
                       0.17 setlinewidth
                       -1.5 0.6 moveto
                       0.3 -0.6 lineto
                       stroke
                       grestore"
                        } #})
                    ((2) #{ \markup \concat {
                      \musicglyph "noteheads.s2"
                      \postscript
                      "gsave
                       0.17 setlinewidth
                       -1.5 0.6 moveto
                       0.3 -0.6 lineto
                       stroke
                       grestore"
                        } #}))
               #})
              (added-stencil (grob-interpret-markup grob added-markup)))
        (if (ly:stencil? original)
            (ly:stencil-add original added-stencil)
            added-stencil))))


slashNoteOff = \revert Voice.NoteHead.stencil

{
  \time 7/4
  \slashNote c'4
  \slashNote d'2
  \slashNote e'1
  \slashNoteOn g''4 f''2 d''1
  \slashNoteOff c''1 \bar "||"
}
```

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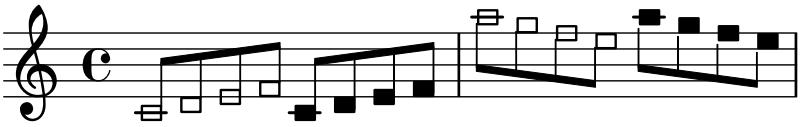
5.9 Square Notehead



5.9.1 Description

Filled and hollow square noteheads.

5.9.2 Grammar

```
\squareHollowNotehead NOTE
\squareHollowNoteheadOn NOTES
\squareHollowNoteheadOff
\squareFilledNotehead NOTE
\squareFilledNoteheadOn NOTES
\squareFilledNoteheadOff

\slashNoteOn NOTE
\slashNoteOff
```

NB `\squareHollowNotehead` and `\squareFilledNotehead` only affect one note, owing to the `\once \override` functions within the code. For a group of notes, use `\squareHollowNoteheadOn` or `\squareFilledNoteheadOn`. `\squareHollowNoteheadOff` and `\squareFilledNoteheadOff` cancel the application.

5.9.3 Code

```
\version "2.24.4"

% See also: https://lsr.di.unimi.it/LSR/Item?id=516
% UPDATED June 13 2025

squareHollowNoteheadDesign =
#(ly:make-stencil '(path 0.15 (moveto  0.0 0.425
                                       rlineto 1.2 0
                                       rlineto 0 -0.875
                                       rlineto -1.2 0
                                       closepath)
                          )
                  (cons -0.15 1.275)
                  (cons -1 1))

squareHollowNotehead =
#(define-music-function (note) (ly:music?)
   #{\once \override Voice.NoteHead.stencil =
     \squareHollowNoteheadDesign $note #})
```

```
20
21  squareHollowNoteheadOn =
22  #(define-music-function (note) (ly:music?)
23     #{\override Voice.NoteHead.stencil =
24       \squareHollowNoteheadDesign $note #})
25
26  squareHollowNoteheadOff = \revert Voice.NoteHead.stencil
27
28  squareFilledNoteheadDesign =
29  #(ly:make-stencil '(path 0.15  (moveto  0.0 0.425
30                                          rlineto 1.2 0
31                                          rlineto 0 -0.875
32                                          rlineto -1.2 0
33                                          closepath)
34
35                           round
36                           round
37                           #t)
38                    (cons -0.15 1.275)
39                    (cons -1 0))
40
41  squareFilledNotehead =
42  #(define-music-function (note) (ly:music?)
43     #{\once \override Voice.NoteHead.stencil =
44       \squareFilledNoteheadDesign $note #})
45  squareFilledNoteheadOn =
46  #(define-music-function (note) (ly:music?)
47     #{\override Voice.NoteHead.stencil =
48       \squareFilledNoteheadDesign $note #})
49
50  squareFilledNoteheadOff = \revert Voice.NoteHead.stencil
51
52  {
53    \squareHollowNotehead c'8
54    \squareHollowNoteheadOn d' e' f'
55    \squareHollowNoteheadOff
56    \squareFilledNotehead c'8
57    \squareFilledNoteheadOn d' e' f'
58    \squareFilledNoteheadOff
59    \squareHollowNotehead a''8
60    \squareHollowNoteheadOn g'' f'' e''
61    \squareHollowNoteheadOff
62    \squareFilledNotehead a''8
63    \squareFilledNoteheadOn g'' f'' e''
64    \squareFilledNoteheadOff
65  }
```

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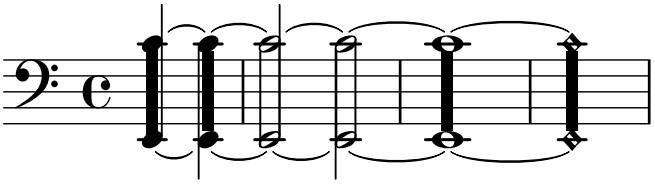
5.10 Tone Cluster



5.10.1 Description

Inspired by the tone cluster notation of Henry Cowell and others. See **Discussion**.

5.10.2 Grammar

```
\toneClusterBar NOTE1 NOTE2 yOffset yLengthAdjust
\toneClusterBarHollow NOTE1 NOTE2 yOffset yLengthAdjust
\toneClusterBarWhole NOTE1 NOTE2 yOffset yLengthAdjust
```

NB

1. The order of pitch boundaries as shown by `NOTE1` and `NOTE2` does not matter; `NOTE1` can be upper or lower pitch boundary, and vice versa for `NOTE2`. See **Code**.
2. `yOffset` indicates where the upper part of the cluster sign begins. When set to `#0`, it starts right at the top line of the ordinary 5-line staff. Each positive/negative integer will bring the beginning point up/down by a space of two neighboring lines of the staff.
3. `yLengthAdjust` indicates any value by which the cluster bar may be extended or reduced. When set to `#0`, the cluster bar will be as long as the distance between the lower boundary of the upper notehead and upper boundary of the lower notehead. Each positive/negative integer will add/reduce the length of the bar by a space of two neighboring lines of the staff.

   For this reason, when the tone cluster sign is applied to a quarter-note dyad, you may wish to set the upper part of the cluster bar right in the middle of the notehead. In the snippet shown, the first cluster's `yOffset` is set to `#1`. `yLengthAdjust` is also set to `#1`, meaning that the cluster bar will go down to the center of the lower notehead. The second cluster intentionally shows what happens when the bar only touches the two boundaries of the noteheads.
4. `\toneClusterBarHollow` shows the notation (quite à la Cowell) specifically for hollowed noteheads. Some people may prefer this notation, instead.
5. `\toneClusterBarWhole` is specifically for the tone cluster notation as applied to a whole-note dyad, owing to width being wider than the quarter or half noteheads.
6. These functions may be used in tandem with other noteheads, as well as ties. See **Code**.

5.10.3 Code

```
1
2  toneClusterBar =
3  #(define-music-function (note1 note2 yOffset yLengthAdjust)
4     (ly:music? ly:music? number? number?)
5     (let* (
```

```
            (note1p (ly:music-property note1 'pitch))
            (note2p (ly:music-property note2 'pitch))
            (note1pnumber (+ (* 7 (ly:pitch-octave note1p))
                             (ly:pitch-notename note1p)))
            (note2pnumber (+ (* 7 (ly:pitch-octave note2p))
                             (ly:pitch-notename note2p)))
            (pitchDistance (abs (- note1pnumber note2pnumber)))
            )
      #{
        < #note1
        #note2 > ^\markup {
          \postscript
          #(string-append
            "gsave
             newpath
             0.3 " (number->string (- yOffset 0.5)) " moveto
             0.7 0 rlineto
             0 " (number->string (- (* -0.5 pitchDistance)
                                    (- yLengthAdjust 1))) " rlineto
             -0.7 0 rlineto
             closepath
             fill
             grestore")
        }
      #}
      )
    )


toneClusterBarHollow =
#(define-music-function (note1 note2 yOffset yLengthAdjust)
   (ly:music? ly:music? number? number?)
   (let* (
            (note1p (ly:music-property note1 'pitch))
            (note2p (ly:music-property note2 'pitch))
            (note1pnumber (+ (* 7 (ly:pitch-octave note1p))
                             (ly:pitch-notename note1p)))
            (note2pnumber (+ (* 7 (ly:pitch-octave note2p))
                             (ly:pitch-notename note2p)))
            (pitchDistance (abs (- note1pnumber note2pnumber)))
            )
      #{
        < #note1
        #note2 > ^\markup {
          \postscript
          #(string-append
            "gsave
             newpath
```

```
54              0.1 " (number->string (- yOffset 0.5)) " moveto
55              0 " (number->string (- (* -0.5 pitchDistance)
56                                     (+ 0.5 yLengthAdjust))) " rlineto
57              0.125 setlinewidth
58              1.3 "(number->string (+ 0.75 (- yOffset 0.5))) " moveto
59              0 " (number->string (- (* -0.5 pitchDistance)
60             (+ 0.75 yLengthAdjust))) " rlineto
61              stroke
62              grestore")
63         }
64       #}
65       )
66     )
67
68
69  toneClusterBarWhole =
70  #(define-music-function (note1 note2 yOffset yLengthAdjust)
71     (ly:music? ly:music? number? number?)
72     (let* (
73             (note1p (ly:music-property note1 'pitch))
74             (note2p (ly:music-property note2 'pitch))
75             (note1pnumber (+ (* 7 (ly:pitch-octave note1p))
76                              (ly:pitch-notename note1p)))
77             (note2pnumber (+ (* 7 (ly:pitch-octave note2p))
78                              (ly:pitch-notename note2p)))
79             (pitchDistance (abs (- note1pnumber note2pnumber)))
80             )
81       #{
82         < #note1
83         #note2 > ^\markup {
84           \postscript
85           #(string-append
86             "gsave
87              newpath
88              0.125 setlinewidth
89              0.55 " (number->string (- yOffset 0.5)) " moveto
90              0 " (number->string (- (* -0.5 pitchDistance)
91                                     (- yLengthAdjust 1))) " rlineto
92              0.75 0 rlineto
93              0 " (number->string (abs (- (* -0.5 pitchDistance)
94                  (- yLengthAdjust 1)))) " rlineto
95              closepath fill
96              grestore")
97         }
98       #}
99       )
100    )
101
```

```
{
  \time 4/4
  \partial 2
  \clef "F"
  \stemUp \toneClusterBar c'4~ e,~ #1 #1
  \stemDown \toneClusterBar e,~ c'4~ #0.5 #0
  \stemUp \toneClusterBarHollow c'2~ e,~ #0.5 #-0.5
  \stemDown \toneClusterBarHollow c'2~ e,~ #0.5 #-0.5
  \toneClusterBarWhole c'1~ e,~ #0.5 #0
  \toneClusterBar c'1~\harmonic e,~\harmonic #0.5 #0
}
```

5.10.4 Discussion

There have been some discussions on `lilypond-user` mailing list in the past that readers may consult for further ideas on implementing different types of tone cluster notation:

- https://lists.gnu.org/archive/html/lilypond-user/2008-10/msg00484.html (This one in particular lists other notational conventions established by other composers)
- https://lists.gnu.org/archive/html/lilypond-user/2020-12/msg00130.html

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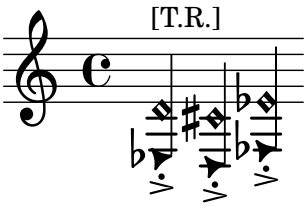
5.11 Tongue Ram (for flute)



5.11.1 Description

Implementation of the tongue ram notation, as described in *The Techniques of Flute Playing* by Carin Levine and Christina Mitropoulos-Bott.[4]

5.11.2 Grammar

```
\tgrWithIndication NOTE
\tgr NOTE
```

NB

1. `\language "english"` needs to be specified.
2. `\tgr` and `\tgrWithIndication` are followed by a pitch to be fingered on the instrument. The code will copy and reproduce a resultant pitch a major seventh down. Use `\tgrWithIndication` for showing the markup with the indication "T.R." (tongue ram). For more details, see: FluteXpansions.

5.11.3 Code

```
tgrWithIndication = #(define-music-function (note1) (ly:music?)
        (let*         (
                (p1 #{ #(ly:music-deep-copy note1) \harmonic #})
                (p2 #{ \transpose c df, #(ly:music-property note1 'pitch)#})
                (d1  (ly:music-property note1 'duration))
                )
          #{ < $p1
             \single \override NoteHead.stencil = #ly:text-interface::print
             \single \override NoteHead.text =
             \markup \musicglyph "noteheads.s2triangle"
             %\single \override Stem.stencil
             $p2 > $d1 ^\markup {\override #'(font-size . -2) {[T.R.]} }  #}
          ))
tgr = #(define-music-function (note1) (ly:music?)
          (let*         (
                  (p1 #{ #(ly:music-deep-copy note1) \harmonic #})
                  (p2 #{ \transpose c df, #(ly:music-property note1 'pitch)#})
                  (d1  (ly:music-property note1 'duration))
                  )
```

4. Levine and Mitropoulos-Bott, *The techniques of flute playing = Die Spieltechnik der Flöte*, 28.

```
            #{ < $p1
               \single \override NoteHead.stencil = #ly:text-interface::print
               \single \override NoteHead.text =
               \markup \musicglyph "noteheads.s2triangle"
               %\single \override Stem.stencil
               $p2 > $d1  #}
            ))

 {\language "english" \tgrWithIndication d'4-.-> \tgr cs'4-.-> \tgr ef'4-.->}
```

5.11.4 Discussion

I want to improve this code so that I can add markups to the note. It is slightly awkward at the moment.

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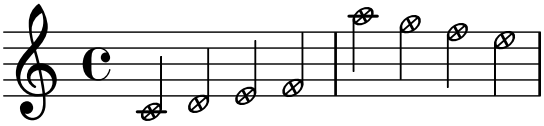
5.12 X In A Hollow Notehead



5.12.1 Description

While LilyPond Notation Reference provides an example of an X-in-a-circle notehead, its shape differs from the regular notehead.[5] This implementation simulates a hollow notehead with which the X notehead is combined.

5.12.2 Grammar

```
\cirX NOTE
```

5.12.3 Code

```
% Stem attachment function inspired by:
% https://lsr.di.unimi.it/LSR/Snippet?id=518
cirX = #(define-music-function (note) (ly:music?)
          #{
            \temporary \override NoteHead.stencil =
            #ly:text-interface::print
            \temporary \override NoteHead.text =
            \markup
            \translate #'(0.6 . 0)
            \pad-x #-0.22
            \rotate #35
            \scale #'(1 . 0.65)
            \combine \combine \combine \combine
            \override #'(thickness . 2)
            \draw-line #'(0.05 . 0.6)
            \override #'(thickness . 2)
            \draw-line #'(-0.05 . -0.6)
            \override #'(thickness . 2)
            \draw-line #'(0.6 . 0.1 )
            \override #'(thickness . 2)
            \draw-line #'(-0.6 . -0.1 )
            \draw-circle #0.65 #0.175 ##f

            \temporary \override NoteHead.stem-attachment =
            #(lambda (grob)
               (let* ((stem (ly:grob-object grob 'stem))
                      (dir (ly:grob-property stem 'direction UP))
                      (is-up (eqv? dir UP)))
                 (cons dir (if is-up 0.2 -0.2))))
```

5. https://lilypond.org/doc/v2.24/Documentation/notation/modifying-stencils

```
            #note
            \revert NoteHead.stencil
            \revert NoteHead.text
            \revert NoteHead.stem-attachment
          #})
{
  \cirX c'4 \cirX d' \cirX e' \cirX f'
  \cirX a''4 \cirX g'' \cirX f'' \cirX  e''
}
```

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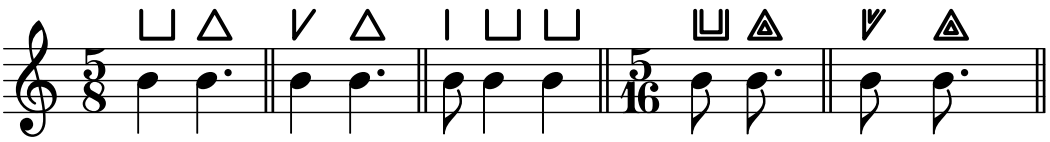
Chapter 6

Markups

6.1 Conducting Patterns



6.1.1 Description

Conducting patterns. While there are several examples of conducting patterns available on LSR,[1] the conducting shapes in my implementation are not affected by the horizontal length of given durations.

6.1.2 Grammar

```
NOTE \condOne
NOTE \condTwoA
NOTE \condTwoB
NOTE \condThree
NOTE \condDoubleTwoA
NOTE \condDoubleTwoB
NOTE \condDoubleThree
```

6.1.3 Code

```
1
2  condOnePattern =
3  #'((moveto 0.25 1.75)
4     (rlineto 0 -1.75))
5
```

1. See: https://lsr.di.unimi.it/LSR/Item?id=523 and https://lsr.di.unimi.it/LSR/Item?id=259

```
condTwoPatternA =
#'((moveto 0.25 1.75)
   (rlineto 0 -1.75)
   (rlineto 2 0)
   (rlineto 0 1.75))

condDoubleTwoPatternA =
#'((moveto 0.25 1.75)
   (rlineto 0 -1.75)
   (rlineto 2 0)
   (rlineto 0 1.75)
   (moveto 0.65 1.75)
   (rlineto 0 -1.35)
   (rlineto 1.2 0)
   (rlineto 0 1.35))

condTwoPatternB =
#'((moveto 0.25 1.75)
   (rlineto 0 -1.75)
   (rlineto 1.25 1.75))

condDoubleTwoPatternB =
#'((moveto 0.25 1.75)
   (rlineto 0 -1.75)
   (rlineto 1.25 1.75)
   (moveto 0.6 1.75)
   (rlineto 0 -0.7)
   (rlineto 0.5 0.7))

condThreePattern =
#'((moveto 1.15 1.75)
   (rlineto -1 -1.75)
   (rlineto 2 0)
   (closepath))

condDoubleThreePattern =
#'((moveto 1.15 1.75)
   (rlineto -1 -1.75)
   (rlineto 2 0)
   (closepath)
   (moveto 1.15 1.05)
   (rlineto -0.385 -0.7)
   (rlineto 0.75 0)
   (closepath))


condOne = ^\markup {
  \override #'(line-join-style . round)
```

```
    \path #0.25 #condOnePattern
}

condTwoA = ^\markup {
    \override #'(line-join-style . round)
    \path #0.25 #condTwoPatternA
}
condTwoB = ^\markup {
    \override #'(line-join-style . round)
    \path #0.25 #condTwoPatternB
}
condDoubleTwoA = ^\markup {
    \override #'(line-join-style . round)
    \path #0.25 #condDoubleTwoPatternA
}

condDoubleTwoB = ^\markup {
    \override #'(line-join-style . round)
    \path #0.25 #condDoubleTwoPatternB
}

condThree = ^\markup {
    \override #'(line-join-style . round)
    \path #0.25 #condThreePattern
}

condDoubleThree = ^\markup {
    \override #'(line-join-style . round)
    \path #0.25 #condDoubleThreePattern
}

%% Source inspired by
%% and adapted from: http://lsr.di.unimi.it/LSR/Item?id=629
spacerVoice = \new Voice {
    \override MultiMeasureRest.transparent = ##t
    \override MultiMeasureRest.minimum-length = #14
    R16*5
}


\score {
    {
        \time 5/8
        b'4 \condTwoA b'4. \condThree \bar "||"
        b'4 \condTwoB b'4. \condThree \bar "||"
        b'8 \condOne b'4 \condTwoA b'4 \condTwoA \bar "||"
        \time 5/16
        << {b'8 \condDoubleTwoA b'8. \condDoubleThree}
```

```
102             \spacerVoice >> \bar "||"
103     << {b'8 \condDoubleTwoB b'8. \condDoubleThree}
104             \spacerVoice >> \bar "||"
105   }
106
107 }
108
```

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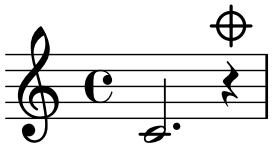
6.2 Mute Sign



6.2.1 Description

Implementation of the mute sign, used to indicate that vibrating strings must be dampened at a specified moment. Its provenance can be traced back to Carlos Salzedo's *Modern Study of the Harp*.[2]

6.2.2 Grammar

```
NOTE/REST^\mutesign
```

6.2.3 Code

```
mutesign = \markup {
  \translate #'(0.5 . 0)
  \postscript

  "newpath
0.2 setlinewidth
1 setlinecap
0 0 moveto
0 2.5 rlineto
-1.25 1.25 moveto
2.5 0 rlineto
stroke
newpath
0 1.25 0.85 0 360 arc
stroke"

{ c'2. r4^\mutesign }

```

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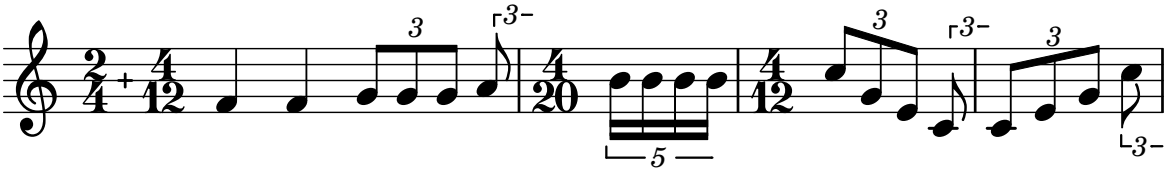
2. Carlos Salzedo, *L'étude moderne de la harpe... Modern study of the harp* (New York - Boston, G. Schirmer, 1921), 19.

Chapter 7

Rhythm

7.1 Incomplete Tuplet Bracket for Irrational Time Signatures



7.1.1 Description

This entry implements the irrational time signatures[1] as seen on LSR.[2]. Concerning the irrational time signatures, in her *Behind Bars: the Definitive Guide to Music Notation*, Elaine Gould suggests the use of denominator as any division of the semibreve/whole note..[3] However, in these pages there has not been a mention of the use of tuplet brackets while the non-conventional time signature is in place. There are examples, such as *Asyla* for large orchestra by Thomas Adès„[4] where tuplet brackets are placed atop ”incomplete” tuplets.

While it is still prudent to spend a paragraph explaining the nature of the irrational time signatures in the preface, my preference has also been to utilize incomplete tuplet brackets, in order to allow the reading of the rhythm consistent and smooth from bars with ordinary time signatures. It is also helpful to have the brackets shown in cases of compound time signatures that use irrational time signatures in part (see the first measure of the example).

7.1.2 Grammar

```
\incompleteTupletBracket \tuplet ...
\incompleteSmallTupletBracket \tuplet ...
```

NB

1. For incomplete tuplets with two or more notes, use `\incompleteTupletBracket`.

1. See Chapter **Time Signatures** for discussion on the variants of the irrational/fractional time signatures.
2. https://lsr.di.unimi.it/LSR/Snippet?id=552
3. Elaine Gould, *Behind bars : the definitive guide to music notation* (London: Faber Music, 2011), 180–181, Book.
4. Thomas Adès, *Asyla : for large orchestra* (Faber Music, 1997).

2. For incomplete tuplets with one note, use `\incompleteSmallTupletBracket`. This was created specifically to ensure that the brackets appear properly in tight space that one-note tuplet customarily gives.

7.1.3 Code

```
\version "2.24.4"

%% "suppressWarning" function comes from:
%% http://lsr.di.unimi.it/LSR/Item?id=552

% Warnings may be suppressed using 'ly:expect-warning'
% Or use the here defined 'suppressWarning'-function, working since 2.20.

suppressWarning =
#(define-void-function (amount message)(number? string?)
   (for-each
    (lambda (warning)
      (ly:expect-warning message))
    (iota amount 1 1)))

\suppressWarning 3 "strange time signature found"

incompleteTupletBracket =  {
  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
  \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
  \once \override Voice.TupletBracket.bracket-visibility = ##t
  \once \override Voice.TupletNumber.X-offset =
  #(lambda (grob)
     (if (= UP (ly:grob-property grob 'direction))
         2.2
         1.2))

  \once \override Voice.TupletBracket.shorten-pair =
  #(lambda (grob)
     (if (= UP (ly:grob-property grob 'direction))
         '(-0.7 . 0.15)
         '(-0.3 . 0.8)))
  \once \override Voice.TupletBracket.X-positions =
  #(lambda (grob)
     (if (= UP (ly:grob-property grob 'direction))
         '(1.8 . 3)
         '(0.3 . 2.7)))
}
```

```
43
44
45  {
46    \compoundMeter #'((2 4) (4 12))
47    f'4 f'
48    \tuplet 3/2 {g'8[ g' g']}
49    \incompleteSmallTupletBracket
50    \tuplet 3/2 {a'8 }|
51
52    \time 4/20
53    \incompleteTupletBracket
54    \tuplet 5/4 {b'16[ b' b' b']} |
55    \time 4/12
56    \tuplet 3/2 {c''8[ g' e']}
57    \incompleteSmallTupletBracket
58    \tuplet 3/2 {c'8} |
59    \tuplet 3/2 {c'8[ e' g']}
60    \incompleteSmallTupletBracket
61    \tuplet 3/2 {c''8} |
62  }
```

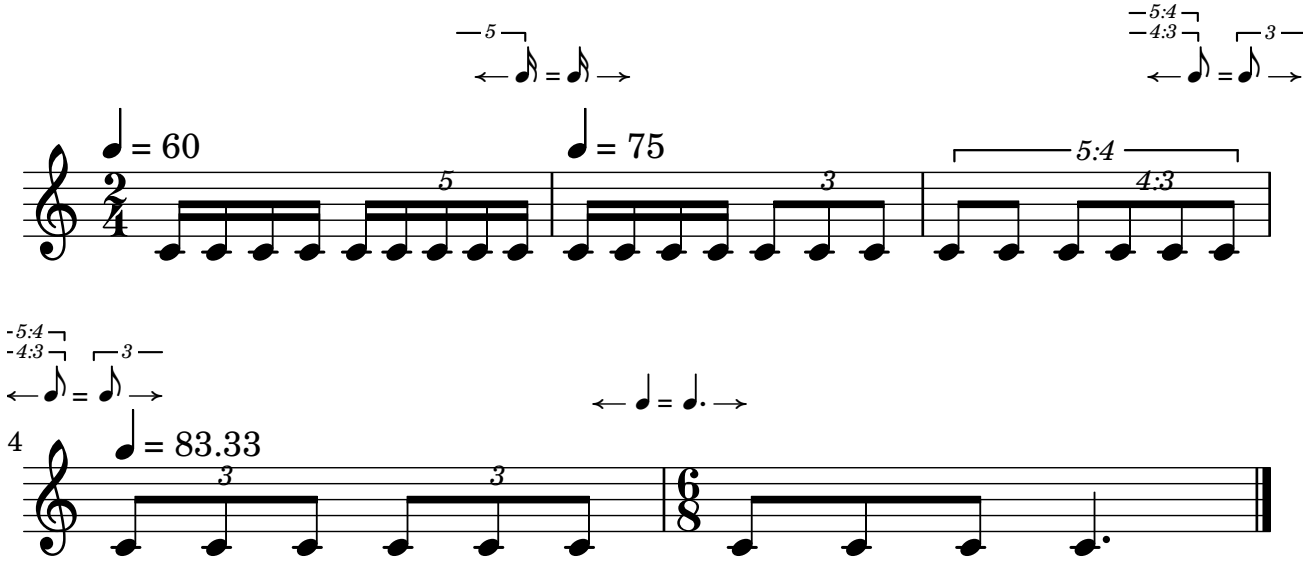
7.1.4 Discussion

In the preceding code, I have opted to notate the tuplets within the bars with irrational time signatures in an ordinary manner, using `\tuplet`. This is to ensure that the incomplete tuplet bracket appears. Compare this with the quoted LSR No. 552, which has a different way of reducing the note duration in order to fit them into the bar with irrational time signature. Observe the way duration is multiplied by fractions, e.g. Line 6.

```
1   {
2     \time 4/4
3     \tempo 4 = 60
4     fis4 fis fis fis
5     \time 2/6
6     g4*2/3 g |
7     g4*2/3 g |
8     \time 4/5
9     as4*4/5 as as as8*4/5 g |
10    \tuplet 3/2 { as4*4/5 as as } as4*4/5 as8*4/5 g |
11    \time 3/7
12    fis4*4/7 fis fis |
13    fis4*4/7 fis fis |
14  }
```

Table of Contents

7.2 Metric Modulation Equation (Regular Flag)



7.2.1 Description

This entry implements a metric modulation formula that indicates a note value of one measure being equal to another note value of the subsequent measure. While this notation has existed for a very long time, it was in the twentieth century where composers such as Elliott Carter used them extensively in their works. This code follows the convention commonly seen in Carter's scores, where the formula is accompanied by the right and left arrows to state explicitly that the note value on the left refers to that of the preceding measure, while the one on the right refers to that of the subsequent measure.[5]

Another version with notes with straight flags can be found **here**.

7.2.2 Grammar

```
\MModEquation
  LEFT_NOTE_DURATION #'((LEFT_TUPLET_1)(LEFT_TUPLET_2))
  RIGHT_NOTE_DURATION #'((RIGHT_TUPLET_1)(RIGHT_TUPLET_2))
  #V_OFFSET #H_OFFSET
\MModEquationBegin
  LEFT_NOTE_DURATION #'((LEFT_TUPLET_1)(LEFT_TUPLET_2))
  RIGHT_NOTE_DURATION #'((RIGHT_TUPLET_1)(RIGHT_TUPLET_2))
  #V_OFFSET
```

NB

5. While it may be beyond the scope of this Cookbook, stating the orientation of the note value clarifies any ambiguities, as the convention in the classical period had the two note values flipped, where the note on the left indicated the note value of the forthcoming measure, and the one on the right, that of the preceding measure. See Arthur Weisberg, *Performing twentieth-century music : a handbook for conductors and instrumentalists* (New Haven: Yale University Press, 1996), 52.

1. `\MModEquation` utilizes LilyPond's `\textEndMark` functions. It is therefore meant to be used at the end of a measure where the metric modulation is about to take place. Then you may use `\tempo` function on LilyPond to indicate the new tempo in the subsequent measure.

2. `\MModEquationBegin`, on the other hand, uses LilyPond's `\textMark` functions, which places texts at the beginning of a measure. It is meant to be used as part of the editing process. Because `\MModEquation` places the formula at the end of a measure, when that measure is at the end of a system, requiring another formula at the beginning of the subsequent measure (i.e. at the beginning of a new system) may be plausible. Using `\MModEquationBegin` may be the solution.

3. For `LEFT_NOTE_DURATION` and `RIGHT_NOTE_DURATION`, use a numerical value *without* `#`. You may add dot(s) to indicate augmentation dot(s).

4. For the variables 2 and 4, you may put up to two instances of tuplet values, in the form of list(s) within a list. At the minimum, you will need to supply an empty list, i.e. `#'()`.

   For example, if it is a simple triplet you wish to implement, you would write:

   ```
   #'( ( 3 ) )
   ```

   If you wish to indicate tuplet in ratio, e.g. quintuplet in the span of 4 of the note values, you would create a list with two items, i.e.:

   ```
   #'( ( 5 4 ) )
   ```

   You may set another tuplet instance *above* the initial tuplet, so the following list:

   ```
   #'( ( 4 3 ) ( 5 4 ) )
   ```

   ...would produce the tuplet indication at the end of measure 3 in the example shown above.

5. For `#V_OFFSET` and `#H_OFFSET` (only for `\MModEquation`), enter numbers preceded by `#`. These numbers adjust the placement of the formula. When in doubt, start with `#0`.

7.2.3 Code

```
\version "2.24.4"

MModEquation =
#(define-music-function
  (notevalue1 ratio1 notevalue2 ratio2 verticaloffset horizontaloffset)
  (ly:duration? list? ly:duration? list? number? number?)
  (let* (
         (noteone notevalue1)
         (notetwo notevalue2)
         (ratioone ratio1)
         (ratiotwo ratio2)
         )
   #{
    \tweak X-offset #(- horizontaloffset 0.35)
    \tweak Y-offset #verticaloffset
```

```
\textEndMark  \markup \right-align {
 \hspace #-0.5
 \raise #0
 \fontsize #-4.5
 \override #'(self-alignment . LEFT)
 {
  {
   \note { $noteone } #(if (= (ly:duration-log noteone) 4) 1 1 )
  }
  {
   \hspace #(if (< (ly:duration-log noteone) 3) -4.15
                (+ (* (ly:duration-dot-count noteone) -0.5) -4.5))
   \concat {
    \combine
    \musicglyph "arrowheads.open.0M1"
    \draw-line #'(2 . 0) \fontsize #-5 \musicglyph "space"
   }
  }
  {
   \hspace #(cond ((<= (ly:duration-log noteone) 2) 0.75)
                  ((> (ly:duration-log noteone) 2) 0.25) )
   \raise #(cond
            ((= (ly:duration-log noteone) 0) -2)
            ((and (> (ly:duration-log noteone) 0)
                  (<= (ly:duration-log noteone) 4) ) -.5)
            ((> (ly:duration-log noteone) 4)
             (+ (* (- (ly:duration-log noteone) 5) 0.6) 0))
            )
   #(cond
     ((= (length ratioone) 1)
      (markup
       #:line
       (#:hspace
        -4.5
        #:raise
        2.75
        (#:center-column
         (#:concat
          (#:translate
           (cons 3.5 0.5)
           (#:override
            (cons 'thickness 1.5)
            (#:translate
             (cons -3.5 0)
             (#:draw-line (cons -4.25 0))))
           #:hspace
           -0.1
           #:override
```

```
                (cons 'thickness 1.5)
                (#:translate
                 (cons 0 0.5)
                 (#:draw-line (cons 0 -0.5))))
               #:vspace
               -0.45
               #:whiteout
               (#:halign
                1.75
                (#:concat
                 (#:fontsize
                  -1
                  (#:italic (#:fontsize -5 (#:musicglyph "space")))
                  #:fontsize
                  -1
                  #:italic
                  (if (= (length (car ratioone)) 2)
                      (begin (string-append
                              (number->string (car (car ratioone)))
                              ":"
                              (number->string (cadr (car ratioone))))  )
                      (number->string (car (car ratioone)))
                      )

                  (#:italic (#:fontsize -5 (#:musicglyph "space"))))))))

          ((= (length ratioone) 2)
           (markup
            #:line
            (#:hspace
             -4.5
             #:raise
             2.75
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
                  (cons -3.5 0)
                  (#:draw-line (cons -4.25 0))))
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons 0 0.5)
```

```
                (#:draw-line (cons 0 -0.5))))
              #:vspace
              -0.45
              #:whiteout
              (#:halign
               1.75
               (#:concat
                (#:fontsize
                 -1
                 (#:italic (#:fontsize -5 (#:musicglyph "space")))
                 #:fontsize
                 -1
                 #:italic
                 (if (= (length (car ratioone)) 2)
                     (begin (string-append
                             (number->string (car (car ratioone)))
                             ":"
                             (number->string (cadr (car ratioone))))  )
                     (number->string (car (car ratioone)))
                     )
                 (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
            #:line
            (#:hspace
             -4.8
             #:raise
             4
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
                  (cons -3.5 0)
                  (#:draw-line (cons -4.25 0))))
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons 0 0.5)
                 (#:draw-line (cons 0 -0.5))))
               #:vspace
               -0.45
               #:whiteout
               (#:halign
                1.75
                (#:concat
```

```
                (#:fontsize
                 -1
                 (#:italic (#:fontsize -5 (#:musicglyph "space")))
                 #:fontsize
                 -1
                 #:italic
                 (if (= (length (cadr ratioone)) 2)
                     (begin (string-append
                             (number->string (car (cadr ratioone)))
                             ":"
                             (number->string (cadr (cadr ratioone))))  )
                     (number->string (car (cadr ratioone)))
                     )
                 (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
           ))
         )
      }
     }
    }
    \tweak self-alignment-X #CENTER
    \tweak Y-offset #(- verticaloffset 0.4)
    \tweak X-offset #(- horizontaloffset 0.35)
    \textEndMark \markup {  \fontsize #-3 "="}

    \tweak Y-offset #verticaloffset
    \tweak self-alignment-X #RIGHT
    \tweak X-offset #(- horizontaloffset 0.35)
    \tweak self-alignment-Y -1
    \textEndMark \markup \left-align {
     \hspace #1.9
     \raise #0
     \fontsize #-4.5
     \concat {
      {
       \hspace #(cond ((<= (ly:duration-log notetwo) 2) 4)
                      ((> (ly:duration-log notetwo) 2) 3.75) )
       \raise #(cond
                ((= (ly:duration-log notetwo) 0) -2)
                ((and (> (ly:duration-log notetwo) 0)
                      (<= (ly:duration-log notetwo) 4) ) -.5)
                ((> (ly:duration-log notetwo) 4)
                 (+ (* (- (ly:duration-log notetwo) 5) 0.6) 0))
                )
       #(cond
         ((= (length ratiotwo) 1)
          (markup
           #:line
           (#:hspace
```

```
208              -4.5
209              #:raise
210              3.25
211              (#:center-column
212               (#:concat
213                (#:translate
214                 (cons 3.5 0.5)
215                 (#:override
216                  (cons 'thickness 1.5)
217                  (#:translate
218                   (cons 0 -0.5 )
219                   (#:draw-line (cons 0 -0.5)))
220                  )
221                 #:hspace
222                 -0.1
223                 #:override
224                 (cons 'thickness 1.5)
225                 (#:translate
226                  (cons -3.5 0)
227                  (#:draw-line (cons -4.25 0))))
228                #:vspace
229                -0.35
230                #:whiteout
231                (#:halign
232                 1.75
233                 (#:concat
234                  (#:fontsize
235                   -1
236                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
237                   #:fontsize
238                   -1
239                   #:italic
240                   (if (= (length (car ratiotwo)) 2)
241                       (begin (string-append
242                               (number->string (car (car ratiotwo)))
243                               ":"
244                               (number->string (cadr (car ratiotwo))))  )
245                       (number->string (car (car ratiotwo)))
246                       )
247                   (#:italic
248                    (#:fontsize -5
249                                (#:musicglyph "space")))))))))
250             ((= (length ratiotwo) 2)
251              (markup
252               #:line
253               (#:hspace
254                -4.5
255                #:raise
```

```
256              3.25
257              (#:center-column
258               (#:concat
259                (#:translate
260                 (cons 3.5 0.5)
261                 (#:override
262                  (cons 'thickness 1.5)
263
264                  (#:translate
265                   (cons 0 -0.5 )
266                   (#:draw-line (cons 0 -0.5)))
267                  )
268                 #:hspace
269                 -0.1
270                 #:override
271                 (cons 'thickness 1.5)
272                 (#:translate
273                  (cons -3.5 0)
274                  (#:draw-line (cons -4.25 0))))
275                #:vspace
276                -0.35
277                #:whiteout
278                (#:halign
279                 1.75
280                 (#:concat
281                  (#:fontsize
282                   -1
283                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
284                   #:fontsize
285                   -1
286                   #:italic
287                   (if (= (length (car ratiotwo)) 2)
288                       (begin (string-append
289                               (number->string (car (car ratiotwo)))
290                               ":"
291                               (number->string (cadr (car ratiotwo))))  )
292                       (number->string (car (car ratiotwo)))
293                       )
294                    (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
295             #:line
296             (#:hspace
297              -4.8
298              #:raise
299              4.5
300              (#:center-column
301               (#:concat
302                (#:translate
303                 (cons 3.5 0.5)
```

```
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
                  (cons 0 -0.5 )
                  (#:draw-line (cons 0 -0.5)))
                 )
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons -3.5 0)
                 (#:draw-line (cons -4.25 0)))
                )
               #:vspace
               -0.35
               #:whiteout
               (#:halign
                1.75
                (#:concat
                 (#:fontsize
                  -1
                  (#:italic (#:fontsize -5 (#:musicglyph "space")))
                  #:fontsize
                  -1
                  #:italic
                  (if (= (length (cadr ratiotwo)) 2)
                      (begin (string-append
                              (number->string (car (cadr ratiotwo)))
                              ":"
                              (number->string (cadr (cadr ratiotwo)))))
                      (number->string (car (cadr ratiotwo)))
                      )

                 (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
           ))
      )
    }
    {
     \hspace #-4.25
     \note { $notetwo } #(if (= (ly:duration-log notetwo) 4) 1 1 )
    }
    {
     \hspace #0.5
     \combine
     \draw-line #'(-2 . 0)
     \musicglyph "arrowheads.open.01"
    }
```

```
      }
     }
    #})
   )



MModEquationBegin =
#(define-music-function
  (notevalue1 ratio1 notevalue2 ratio2 verticaloffset )
  (ly:duration? list? ly:duration? list? number? )
  (let* (
         (noteone notevalue1)
         (notetwo notevalue2)
         (ratioone ratio1)
         (ratiotwo ratio2)
         )
   #{

    \tweak Y-offset #verticaloffset
    \textMark  \markup \left-align {

     \raise #0
     \fontsize #-4.5
     \override #'(self-alignment . LEFT)
     {
      {
       \hspace #(if (< (ly:duration-log noteone) 3) -4.15
                    (+ (* (ly:duration-dot-count noteone) -0.5) -4.5))
       \concat {
        \combine
        \musicglyph "arrowheads.open.0M1"
        \draw-line #'(2 . 0) \fontsize #-5 \musicglyph "space"
       }
      }

      {
       \hspace #-0.5
       \note { $noteone } #(if (= (ly:duration-log noteone) 4) 1 1 )
      }


      {
       \hspace #(cond
                 ((<= (ly:duration-dot-count noteone) 1) -0.5)
                 ((> (ly:duration-dot-count noteone) 1)
                  (+ (* (ly:duration-dot-count noteone) -0.5) -0.25)))
       \right-align
```

```
\raise #(cond
         ((= (ly:duration-log noteone) 0) -2)
         ((and (> (ly:duration-log noteone) 0)
               (<= (ly:duration-log noteone) 4) ) -.5)
         ((> (ly:duration-log noteone) 4)
          (+ (* (- (ly:duration-log noteone) 5) 0.6) 0))
         )

#(cond
  ((= (length ratioone) 1)
   (markup
    #:line
    (#:hspace
     -4.5
     #:raise
     2.75
     (#:center-column
      (#:concat
       (#:translate
        (cons 3.5 0.5)
        (#:override
         (cons 'thickness 1.5)
         (#:translate
          (cons -3.5 0)
          (#:draw-line (cons -4.25 0))))
        #:hspace
        -0.1
        #:override
        (cons 'thickness 1.5)
        (#:translate
         (cons 0 0.5)
         (#:draw-line (cons 0 -0.5))))
       #:vspace
       -0.45
       #:whiteout
       (#:halign
        1.75
        (#:concat
         (#:fontsize
          -1
          (#:italic (#:fontsize -5 (#:musicglyph "space")))
          #:fontsize
          -1
          #:italic
          (if (= (length (car ratioone)) 2)
              (begin (string-append
                      (number->string (car (car ratioone)))
                      ":"
```

```
                            (number->string (cadr (car ratioone))))  )
                    (number->string (car (car ratioone)))
                    )

                (#:italic
                 (#:fontsize -5
                             (#:musicglyph "space")))))))))))

          ((= (length ratioone) 2)
           (markup
            #:line
            (#:hspace
             -4.5
             #:raise
             2.75
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
                  (cons -3.5 0)
                  (#:draw-line (cons -4.25 0))))
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons 0 0.5)
                 (#:draw-line (cons 0 -0.5))))
               #:vspace
               -0.45
               #:whiteout
               (#:halign
                1.75
                (#:concat
                 (#:fontsize
                  -1
                  (#:italic (#:fontsize -5 (#:musicglyph "space")))
                  #:fontsize
                  -1
                  #:italic
                  (if (= (length (car ratioone)) 2)
                      (begin (string-append
                              (number->string (car (car ratioone)))
                              ":"
                              (number->string (cadr (car ratioone)))))
```

```
                    (number->string (car (car ratioone)))
                    )
                (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))

          #:line
          (#:hspace
           -4.8
           #:raise
           4
           (#:center-column
            (#:concat
             (#:translate
              (cons 3.5 0.5)
              (#:override
               (cons 'thickness 1.5)
               (#:translate
                (cons -3.5 0)
                (#:draw-line (cons -4.25 0))))
              #:hspace
              -0.1
              #:override
              (cons 'thickness 1.5)
              (#:translate
               (cons 0 0.5)
               (#:draw-line (cons 0 -0.5))))
             #:vspace
             -0.45
             #:whiteout
             (#:halign
              1.75
              (#:concat
               (#:fontsize
                -1
                (#:italic (#:fontsize -5 (#:musicglyph "space")))
                #:fontsize
                -1
                #:italic
                (if (= (length (cadr ratioone)) 2)
                    (begin (string-append
                            (number->string (car (cadr ratioone)))
                            ":"
                            (number->string (cadr (cadr ratioone))))  )
                    (number->string (car (cadr ratioone)))
                    )

                (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
          ))
        )
```

```
544
545         }
546         {
547          \hspace #(+ (* (ly:duration-dot-count noteone) 0.35) -0.2)
548          \fontsize #2 \lower #0.5  "="
549         }
550         \concat {
551
552          {
553           \hspace #(cond ((<= (ly:duration-log notetwo) 2) 4.15 )
554                          ((> (ly:duration-log notetwo) 2) 4.15) )
555           \raise #(cond
556                    ((= (ly:duration-log notetwo) 0) -2)
557                    ((and (> (ly:duration-log notetwo) 0)
558                          (<= (ly:duration-log notetwo) 4) ) -.5)
559                    ((> (ly:duration-log notetwo) 4)
560                     (+ (* (- (ly:duration-log notetwo) 5) 0.6) 0))
561                    )
562
563           #(cond
564             ((= (length ratiotwo) 1)
565              (markup
566               #:line
567               (#:hspace
568                -4.5
569                #:raise
570                3.25
571                (#:center-column
572                 (#:concat
573                  (#:translate
574                   (cons 3.5 0.5)
575                   (#:override
576                    (cons 'thickness 1.5)
577
578                    (#:translate
579                     (cons 0 -0.5 )
580                     (#:draw-line (cons 0 -0.5)))
581                    )
582
583                   #:hspace
584                   -0.1
585
586                   #:override
587                   (cons 'thickness 1.5)
588                   (#:translate
589                    (cons -3.5 0)
590                    (#:draw-line (cons -4.25 0))))
591
```

```
592
593                 #:vspace
594                 -0.35
595                 #:whiteout
596                 (#:halign
597                  1.75
598                  (#:concat
599                   (#:fontsize
600                    -1
601                    (#:italic (#:fontsize -5 (#:musicglyph "space")))
602                    #:fontsize
603                    -1
604                    #:italic
605                    (if (= (length (car ratiotwo)) 2)
606                        (begin (string-append
607                                (number->string (car (car ratiotwo)))
608                                ":"
609                                (number->string (cadr (car ratiotwo)))))
610                        (number->string (car (car ratiotwo)))
611                        )
612                    (#:italic
613                     (#:fontsize -5
614                                 (#:musicglyph "space")))))))))))
615
616               ((= (length ratiotwo) 2)
617                (markup
618                 #:line
619                 (#:hspace
620                  -4.5
621                  #:raise
622                  3.25
623                  (#:center-column
624                   (#:concat
625                    (#:translate
626                     (cons 3.5 0.5)
627                     (#:override
628                      (cons 'thickness 1.5)
629                      (#:translate
630                       (cons 0 -0.5 )
631                       (#:draw-line (cons 0 -0.5)))
632                      )
633                     #:hspace
634                     -0.1
635                     #:override
636                     (cons 'thickness 1.5)
637                     (#:translate
638                      (cons -3.5 0)
639                      (#:draw-line (cons -4.25 0))))
```

```
                #:vspace
                -0.35
                #:whiteout
                (#:halign
                 1.75
                 (#:concat
                  (#:fontsize
                   -1
                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
                   #:fontsize
                   -1
                   #:italic
                   (if (= (length (car ratiotwo)) 2)
                       (begin (string-append
                               (number->string (car (car ratiotwo)))
                               ":"
                               (number->string (cadr (car ratiotwo)))))
                       (number->string (car (car ratiotwo)))
                       )
                   (#:italic
                    (#:fontsize -5
                                (#:musicglyph "space")))))))

              #:line
              (#:hspace
               -4.8
               #:raise
               4.5
               (#:center-column
                (#:concat
                 (#:translate
                  (cons 3.5 0.5)
                  (#:override
                   (cons 'thickness 1.5)
                   (#:translate
                    (cons 0 -0.5 )
                    (#:draw-line (cons 0 -0.5)))
                   )
                  #:hspace
                  -0.1
                  #:override
                  (cons 'thickness 1.5)
                  (#:translate
                   (cons -3.5 0)
                   (#:draw-line (cons -4.25 0)))
                  )
                 #:vspace
                 -0.35
```

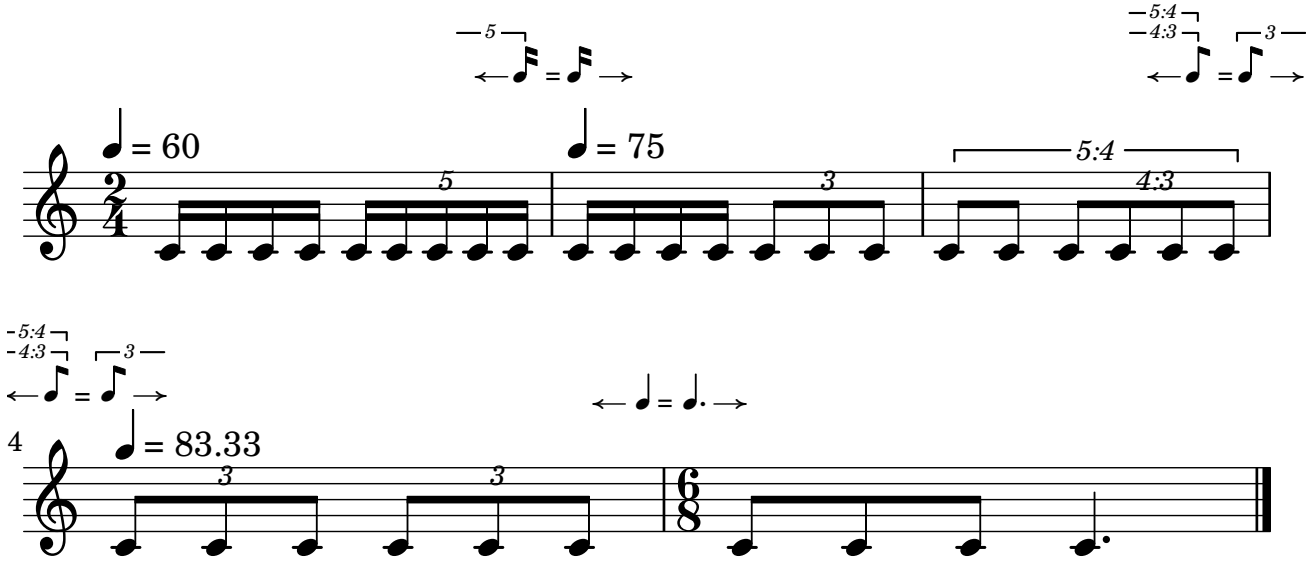
```
                #:whiteout
                (#:halign
                 1.75
                 (#:concat
                  (#:fontsize
                   -1
                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
                   #:fontsize
                   -1
                   #:italic
                   (if (= (length (cadr ratiotwo)) 2)
                       (begin (string-append
                               (number->string (car (cadr ratiotwo)))
                               ":"
                               (number->string (cadr (cadr ratiotwo)))))
                       (number->string (car (cadr ratiotwo)))
                       )
                   (#:italic
                    (#:fontsize -5
                                (#:musicglyph "space")))))))
              )
        }
        {
         \hspace #-4
         \note { $notetwo }
         #(if (= (ly:duration-log notetwo) 4) 1 1 )
        }
        {
         \hspace #0.5
         \combine
         \draw-line #'(-2 . 0)
         \musicglyph "arrowheads.open.01"
        }
       }
      }
     }
    #})
  )

{
 \time 2/4
 \tempo 4 = 60
 c'16
 ^\markup {\translate #'(0 . 10) " "}
 [ c'16 c'16 c'16 ]
 \tuplet 5/4 {c'16 [ c'16 c'16 c'16 c'16 ] }
 \MModEquation 16 #'((5)) 16 #'() #8 #0
```

```
  \tempo 4 = 75
  c'16 [ c'16 c'16 c'16 ]
  \tuplet 3/2 {c'8 [ c'8 c'8 ] }
  \override TupletNumber.text = #tuplet-number::calc-fraction-text
  \tuplet 5/4 {c'8 [ c'8 ] \tuplet 4/3 { c'8 [ c'8 c'8 c'8  ] }}
  \MModEquation 8 #'((4 3)(5 4)) 8 #'((3)) 8 #-3
  \revert TupletNumber.text
  \break
  \MModEquationBegin 8 #'((4 3)(5 4)) 8 #'((3)) #6.5
  \tuplet 3/2 {
   c'8
   ^\markup {\translate #'(0 . 10) " "}
   ^\markup
   {\fontsize #-1 \raise #0.25 \note {4} #1 "= 83.33"}
   [ c'8 c'8 ]
  }
  \tuplet 3/2 {
   c'8 c'8 c'8
   \MModEquation 4 #'() 4. #'() #6 #0
  }
  \time 6/8
  c'8 c'8 c'8 c'4.
  \bar "|."
}
```

Table of Contents

7.3 Metric Modulation Equation (Straight Flag)



7.3.1 Description

This is an alternative implementation of the metric modulation formula, introduced in the **previous entry**, except this time it uses notes with the modern straight flag.

7.3.2 Grammar

```
\MModEquationSTR
  LEFT_NOTE_DURATION #'((LEFT_TUPLET_1)(LEFT_TUPLET_2))
  RIGHT_NOTE_DURATION #'((RIGHT_TUPLET_1)(RIGHT_TUPLET_2))
  #V_OFFSET #H_OFFSET
\MModEquationBeginSTR
  LEFT_NOTE_DURATION #'((LEFT_TUPLET_1)(LEFT_TUPLET_2))
  RIGHT_NOTE_DURATION #'((RIGHT_TUPLET_1)(RIGHT_TUPLET_2))
  #V_OFFSET
```

NB

1. `\MModEquationSTR` utilizes LilyPond's `\textEndMark` functions. It is therefore meant to be used at the end of a measure where the metric modulation is about to take place. Then you may use `\tempo` function on LilyPond to indicate the new tempo in the subsequent measure.
2. `\MModEquationBeginSTR`, on the other hand, uses LilyPond's `\textMark` functions, which places texts at the beginning of a measure. It is meant to be used as part of the editing process. Because `\MModEquationSTR` places the formula at the end of a measure, when that measure is at the end of a system, requiring another formula at the beginning of the subsequent measure (i.e. at the beginning of a new system) may be plausible. Using `\MModEquationBeginSTR` may be the solution.
3. For `LEFT_NOTE_DURATION` and `RIGHT_NOTE_DURATION`, use a numerical value *without* `#`. You may add dot(s) to indicate augmentation dot(s).

4. For the variables 2 and 4, you may put up to two instances of tuplet values, in the form of list(s) within a list. At the minimum, you will need to supply an empty list, i.e. `#'()`.

   For example, if it is a simple triplet you wish to implement, you would write:

   `#'( ( 3 ) )`

   If you wish to indicate tuplet in ratio, e.g. quintuplet in the span of 4 of the note values, you would create a list with two items, i.e.:

   `#'( ( 5 4 ) )`

   You may set another tuplet instance *above* the initial tuplet, so the following list:

   `#'( ( 4 3 ) ( 5 4 ) )`

   ...would produce the tuplet indication at the end of measure 3 in the example shown above.

5. For `#V_OFFSET` and `#H_OFFSET` (only for `\MModEquationSTR`), enter numbers preceded by `#`. These numbers adjust the placement of the formula. When in doubt, start with `#0`.

7.3.3 Code

```
\version "2.24.4"


MModEquationSTR =
#(define-music-function
  (notevalue1 ratio1 notevalue2 ratio2 verticaloffset horizontaloffset)
  (ly:duration? list? ly:duration? list? number? number?)
  (let* (
         (noteone notevalue1)
         (notetwo notevalue2)
         (ratioone ratio1)
         (ratiotwo ratio2)
         )
   #{
    \tweak X-offset #(- horizontaloffset 0.35)
    \tweak Y-offset #verticaloffset
    \textEndMark  \markup \right-align {
     \hspace #-0.5
     \raise #0
     \fontsize #-4.5
     \override #'(self-alignment . LEFT)
     {
      {
       \override #'(flag-style . modern-straight-flag)
       \note { $noteone } #(if (= (ly:duration-log noteone) 4) 1 1 )
      }
      {
```

```
        \hspace #(if (< (ly:duration-log noteone) 3) -4.15
                     (+ (* (ly:duration-dot-count noteone) -0.5) -4.5))
        \concat {
         \combine
         \musicglyph "arrowheads.open.0M1"
         \draw-line #'(2 . 0) \fontsize #-5 \musicglyph "space"
        }
       }
       {
        \hspace #(cond ((<= (ly:duration-log noteone) 2) 0.75)
                       ((> (ly:duration-log noteone) 2) 0.25) )
        \raise #(cond
                 ((= (ly:duration-log noteone) 0) -2)
                 ((and (> (ly:duration-log noteone) 0)
                       (<= (ly:duration-log noteone) 4) ) -.5)
                 ((> (ly:duration-log noteone) 4)
                  (+ (* (- (ly:duration-log noteone) 5) 0.6) 0))
                 )
        #(cond
          ((= (length ratioone) 1)
           (markup
            #:line
            (#:hspace
             -4.5
             #:raise
             2.75
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
                  (cons -3.5 0)
                  (#:draw-line (cons -4.25 0))))
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons 0 0.5)
                 (#:draw-line (cons 0 -0.5))))
               #:vspace
               -0.45
               #:whiteout
               (#:halign
                1.75
                (#:concat
```

```
                (#:fontsize
                 -1
                 (#:italic (#:fontsize -5 (#:musicglyph "space")))
                 #:fontsize
                 -1
                 #:italic
                 (if (= (length (car ratioone)) 2)
                     (begin (string-append
                             (number->string (car (car ratioone)))
                             ":"
                             (number->string (cadr (car ratioone))))  )
                     (number->string (car (car ratioone)))
                     )

                 (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))))

          ((= (length ratioone) 2)
           (markup
            #:line
            (#:hspace
             -4.5
             #:raise
             2.75
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
                  (cons -3.5 0)
                  (#:draw-line (cons -4.25 0))))
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons 0 0.5)
                 (#:draw-line (cons 0 -0.5))))
               #:vspace
               -0.45
               #:whiteout
               (#:halign
                1.75
                (#:concat
                 (#:fontsize
                  -1
                  (#:italic (#:fontsize -5 (#:musicglyph "space")))
```

```
                #:fontsize
                -1
                #:italic
                (if (= (length (car ratioone)) 2)
                    (begin (string-append
                            (number->string (car (car ratioone)))
                            ":"
                            (number->string (cadr (car ratioone))))  )
                    (number->string (car (car ratioone)))
                    )
                (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
          #:line
          (#:hspace
           -4.8
           #:raise
           4
           (#:center-column
            (#:concat
             (#:translate
              (cons 3.5 0.5)
              (#:override
               (cons 'thickness 1.5)
               (#:translate
                (cons -3.5 0)
                (#:draw-line (cons -4.25 0))))
              #:hspace
              -0.1
              #:override
              (cons 'thickness 1.5)
              (#:translate
               (cons 0 0.5)
               (#:draw-line (cons 0 -0.5))))
             #:vspace
             -0.45
             #:whiteout
             (#:halign
              1.75
              (#:concat
               (#:fontsize
                -1
                (#:italic (#:fontsize -5 (#:musicglyph "space")))
                #:fontsize
                -1
                #:italic
                (if (= (length (cadr ratioone)) 2)
                    (begin (string-append
                            (number->string (car (cadr ratioone)))
                            ":"
```

```
                              (number->string (cadr (cadr ratioone))))  )
                        (number->string (car (cadr ratioone)))
                        )
                   (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
            ))
          )
       }
      }
     }
     \tweak self-alignment-X #CENTER
     \tweak Y-offset #(- verticaloffset 0.4)
     \tweak X-offset #(- horizontaloffset 0.35)
     \textEndMark \markup {  \fontsize #-3 "="}

     \tweak Y-offset #verticaloffset
     \tweak self-alignment-X #RIGHT
     \tweak X-offset #(- horizontaloffset 0.35)
     \tweak self-alignment-Y -1
     \textEndMark \markup \left-align {
      \hspace #1.9
      \raise #0
      \fontsize #-4.5
      \concat {
       {
        \hspace #(cond ((<= (ly:duration-log notetwo) 2) 4)
                       ((> (ly:duration-log notetwo) 2) 3.75) )
        \raise #(cond
                  ((= (ly:duration-log notetwo) 0) -2)
                  ((and (> (ly:duration-log notetwo) 0)
                        (<= (ly:duration-log notetwo) 4) ) -.5)
                  ((> (ly:duration-log notetwo) 4)
                   (+ (* (- (ly:duration-log notetwo) 5) 0.6) 0))
                  )
        #(cond
          ((= (length ratiotwo) 1)
           (markup
            #:line
            (#:hspace
             -4.5
             #:raise
             3.25
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)
                 (#:translate
```

```
                  (cons 0 -0.5 )
                  (#:draw-line (cons 0 -0.5)))
                 )
                #:hspace
                -0.1
                #:override
                (cons 'thickness 1.5)
                (#:translate
                 (cons -3.5 0)
                 (#:draw-line (cons -4.25 0))))
               #:vspace
               -0.35
               #:whiteout
               (#:halign
                1.75
                (#:concat
                 (#:fontsize
                  -1
                  (#:italic (#:fontsize -5 (#:musicglyph "space")))
                  #:fontsize
                  -1
                  #:italic
                  (if (= (length (car ratiotwo)) 2)
                      (begin (string-append
                              (number->string (car (car ratiotwo)))
                              ":"
                              (number->string (cadr (car ratiotwo))))  )
                      (number->string (car (car ratiotwo)))
                      )
                 (#:italic
                  (#:fontsize -5
                              (#:musicglyph "space")))))))))
          ((= (length ratiotwo) 2)
           (markup
            #:line
            (#:hspace
             -4.5
             #:raise
             3.25
             (#:center-column
              (#:concat
               (#:translate
                (cons 3.5 0.5)
                (#:override
                 (cons 'thickness 1.5)

                 (#:translate
                  (cons 0 -0.5 )
```

```
268                   (#:draw-line (cons 0 -0.5)))
269                  )
270                 #:hspace
271                 -0.1
272                 #:override
273                 (cons 'thickness 1.5)
274                 (#:translate
275                  (cons -3.5 0)
276                  (#:draw-line (cons -4.25 0))))
277                #:vspace
278                -0.35
279                #:whiteout
280                (#:halign
281                 1.75
282                 (#:concat
283                  (#:fontsize
284                   -1
285                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
286                   #:fontsize
287                   -1
288                   #:italic
289                   (if (= (length (car ratiotwo)) 2)
290                       (begin (string-append
291                               (number->string (car (car ratiotwo)))
292                               ":"
293                               (number->string (cadr (car ratiotwo))))  )
294                       (number->string (car (car ratiotwo)))
295                       )
296                   (#:italic (#:fontsize -5 (#:musicglyph "space"))))))))))
297              #:line
298              (#:hspace
299               -4.8
300               #:raise
301               4.5
302               (#:center-column
303                (#:concat
304                 (#:translate
305                  (cons 3.5 0.5)
306                  (#:override
307                   (cons 'thickness 1.5)
308                   (#:translate
309                    (cons 0 -0.5 )
310                    (#:draw-line (cons 0 -0.5)))
311                   )
312                  #:hspace
313                  -0.1
314                  #:override
315                  (cons 'thickness 1.5)
```

```
                (#:translate
                 (cons -3.5 0)
                 (#:draw-line (cons -4.25 0)))
                )
               #:vspace
               -0.35
               #:whiteout
               (#:halign
                1.75
                (#:concat
                 (#:fontsize
                  -1
                  (#:italic (#:fontsize -5 (#:musicglyph "space")))
                  #:fontsize
                  -1
                  #:italic
                  (if (= (length (cadr ratiotwo)) 2)
                      (begin (string-append
                              (number->string (car (cadr ratiotwo)))
                              ":"
                              (number->string (cadr (cadr ratiotwo)))))
                      (number->string (car (cadr ratiotwo)))
                      )

                  (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
            ))
          )
       }
       {
        \hspace #-4.25
        \override #'(flag-style . modern-straight-flag)
        \note { $notetwo } #(if (= (ly:duration-log notetwo) 4) 1 1 )
       }
       {
        \hspace #0.5
        \combine
        \draw-line #'(-2 . 0)
        \musicglyph "arrowheads.open.01"
       }
      }
     }
    #})
   )


MModEquationBeginSTR =
#(define-music-function
   (notevalue1 ratio1 notevalue2 ratio2 verticaloffset )
```

```
364   (ly:duration? list? ly:duration? list? number? )
365   (let* (
366          (noteone notevalue1)
367          (notetwo notevalue2)
368          (ratioone ratio1)
369          (ratiotwo ratio2)
370          )
371    #{
372
373     \tweak Y-offset #verticaloffset
374     \textMark  \markup \left-align {
375
376      \raise #0
377      \fontsize #-4.5
378      \override #'(self-alignment . LEFT)
379      {
380       {
381        \hspace #(if (< (ly:duration-log noteone) 3) -4.15
382                     (+ (* (ly:duration-dot-count noteone) -0.5) -4.5))
383        \concat {
384         \combine
385         \musicglyph "arrowheads.open.0M1"
386         \draw-line #'(2 . 0) \fontsize #-5 \musicglyph "space"
387        }
388       }
389
390       {
391        \hspace #-0.5
392        \override #'(flag-style . modern-straight-flag)
393        \note { $noteone } #(if (= (ly:duration-log noteone) 4) 1 1 )
394       }
395
396
397       {
398        \hspace #(cond
399                  ((<= (ly:duration-dot-count noteone) 1) -0.5)
400                  ((> (ly:duration-dot-count noteone) 1)
401                   (+ (* (ly:duration-dot-count noteone) -0.5) -0.25)))
402        \right-align
403        \raise #(cond
404                 ((= (ly:duration-log noteone) 0) -2)
405                 ((and (> (ly:duration-log noteone) 0)
406                       (<= (ly:duration-log noteone) 4) ) -.5)
407                 ((> (ly:duration-log noteone) 4)
408                  (+ (* (- (ly:duration-log noteone) 5) 0.6) 0))
409                 )
410
411        #(cond
```

```
412           ((= (length ratioone) 1)
413            (markup
414             #:line
415             (#:hspace
416              -4.5
417              #:raise
418              2.75
419              (#:center-column
420               (#:concat
421                (#:translate
422                 (cons 3.5 0.5)
423                 (#:override
424                  (cons 'thickness 1.5)
425                  (#:translate
426                   (cons -3.5 0)
427                   (#:draw-line (cons -4.25 0))))
428                 #:hspace
429                 -0.1
430                 #:override
431                 (cons 'thickness 1.5)
432                 (#:translate
433                  (cons 0 0.5)
434                  (#:draw-line (cons 0 -0.5))))
435                #:vspace
436                -0.45
437                #:whiteout
438                (#:halign
439                 1.75
440                 (#:concat
441                  (#:fontsize
442                   -1
443                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
444                   #:fontsize
445                   -1
446                   #:italic
447                   (if (= (length (car ratioone)) 2)
448                       (begin (string-append
449                               (number->string (car (car ratioone)))
450                               ":"
451                               (number->string (cadr (car ratioone))))  )
452                       (number->string (car (car ratioone)))
453                       )
454
455                   (#:italic
456                    (#:fontsize -5
457                                (#:musicglyph "space")))))))))))
458
459           ((= (length ratioone) 2)
```

```
460             (markup
461              #:line
462              (#:hspace
463               -4.5
464               #:raise
465               2.75
466               (#:center-column
467                (#:concat
468                 (#:translate
469                  (cons 3.5 0.5)
470                  (#:override
471                   (cons 'thickness 1.5)
472                   (#:translate
473                    (cons -3.5 0)
474                    (#:draw-line (cons -4.25 0))))
475                  #:hspace
476                  -0.1
477                  #:override
478                  (cons 'thickness 1.5)
479                  (#:translate
480                   (cons 0 0.5)
481                   (#:draw-line (cons 0 -0.5))))
482                 #:vspace
483                 -0.45
484                 #:whiteout
485                 (#:halign
486                  1.75
487                  (#:concat
488                   (#:fontsize
489                    -1
490                    (#:italic (#:fontsize -5 (#:musicglyph "space")))
491                    #:fontsize
492                    -1
493                    #:italic
494                    (if (= (length (car ratioone)) 2)
495                        (begin (string-append
496                                (number->string (car (car ratioone)))
497                                ":"
498                                (number->string (cadr (car ratioone)))))
499                        (number->string (car (car ratioone)))
500                        )
501                    (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
502
503              #:line
504              (#:hspace
505               -4.8
506               #:raise
507               4
```

```
508              (#:center-column
509               (#:concat
510                (#:translate
511                 (cons 3.5 0.5)
512                 (#:override
513                  (cons 'thickness 1.5)
514                  (#:translate
515                   (cons -3.5 0)
516                   (#:draw-line (cons -4.25 0))))
517                 #:hspace
518                 -0.1
519                 #:override
520                 (cons 'thickness 1.5)
521                 (#:translate
522                  (cons 0 0.5)
523                  (#:draw-line (cons 0 -0.5))))
524                #:vspace
525                -0.45
526                #:whiteout
527                (#:halign
528                 1.75
529                 (#:concat
530                  (#:fontsize
531                   -1
532                   (#:italic (#:fontsize -5 (#:musicglyph "space")))
533                   #:fontsize
534                   -1
535                   #:italic
536                   (if (= (length (cadr ratioone)) 2)
537                       (begin (string-append
538                               (number->string (car (cadr ratioone)))
539                               ":"
540                               (number->string (cadr (cadr ratioone))))  )
541                       (number->string (car (cadr ratioone)))
542                       )
543
544                   (#:italic (#:fontsize -5 (#:musicglyph "space")))))))))
545             ))
546           )
547
548         }
549         {
550          \hspace #(+ (* (ly:duration-dot-count noteone) 0.35) -0.2)
551          \fontsize #2 \lower #0.5  "="
552         }
553         \concat {
554
555          {
```

```
556         \hspace #(cond ((<= (ly:duration-log notetwo) 2) 4.15 )
557                        ((> (ly:duration-log notetwo) 2) 4.15) )
558         \raise #(cond
559                   ((= (ly:duration-log notetwo) 0) -2)
560                   ((and (> (ly:duration-log notetwo) 0)
561                         (<= (ly:duration-log notetwo) 4) ) -.5)
562                   ((> (ly:duration-log notetwo) 4)
563                    (+ (* (- (ly:duration-log notetwo) 5) 0.6) 0))
564                   )
565
566         #(cond
567           ((= (length ratiotwo) 1)
568            (markup
569             #:line
570             (#:hspace
571              -4.5
572              #:raise
573              3.25
574              (#:center-column
575               (#:concat
576                (#:translate
577                 (cons 3.5 0.5)
578                 (#:override
579                  (cons 'thickness 1.5)
580
581                  (#:translate
582                   (cons 0 -0.5 )
583                   (#:draw-line (cons 0 -0.5)))
584                  )
585
586                 #:hspace
587                 -0.1
588
589                 #:override
590                 (cons 'thickness 1.5)
591                 (#:translate
592                  (cons -3.5 0)
593                  (#:draw-line (cons -4.25 0))))
594
595
596                #:vspace
597                -0.35
598                #:whiteout
599                (#:halign
600                 1.75
601                 (#:concat
602                  (#:fontsize
603                   -1
```

```
                    (#:italic (#:fontsize -5 (#:musicglyph "space")))
                    #:fontsize
                    -1
                    #:italic
                    (if (= (length (car ratiotwo)) 2)
                        (begin (string-append
                                (number->string (car (car ratiotwo)))
                                ":"
                                (number->string (cadr (car ratiotwo)))))
                        (number->string (car (car ratiotwo)))
                        )
                    (#:italic
                     (#:fontsize -5
                                 (#:musicglyph "space")))))))))))

              ((= (length ratiotwo) 2)
               (markup
                #:line
                (#:hspace
                 -4.5
                 #:raise
                 3.25
                 (#:center-column
                  (#:concat
                   (#:translate
                    (cons 3.5 0.5)
                    (#:override
                     (cons 'thickness 1.5)
                     (#:translate
                      (cons 0 -0.5 )
                      (#:draw-line (cons 0 -0.5)))
                     )
                    #:hspace
                    -0.1
                    #:override
                    (cons 'thickness 1.5)
                    (#:translate
                     (cons -3.5 0)
                     (#:draw-line (cons -4.25 0))))
                   #:vspace
                   -0.35
                   #:whiteout
                   (#:halign
                    1.75
                    (#:concat
                     (#:fontsize
                      -1
                      (#:italic (#:fontsize -5 (#:musicglyph "space")))
```

```
                    #:fontsize
                    -1
                    #:italic
                    (if (= (length (car ratiotwo)) 2)
                        (begin (string-append
                                (number->string (car (car ratiotwo)))
                                ":"
                                (number->string (cadr (car ratiotwo)))))
                        (number->string (car (car ratiotwo)))
                        )
                    (#:italic
                     (#:fontsize -5
                                 (#:musicglyph "space")))))))))

                #:line
                (#:hspace
                 -4.8
                 #:raise
                 4.5
                 (#:center-column
                  (#:concat
                   (#:translate
                    (cons 3.5 0.5)
                    (#:override
                     (cons 'thickness 1.5)
                     (#:translate
                      (cons 0 -0.5 )
                      (#:draw-line (cons 0 -0.5)))
                     )
                    #:hspace
                    -0.1
                    #:override
                    (cons 'thickness 1.5)
                    (#:translate
                     (cons -3.5 0)
                     (#:draw-line (cons -4.25 0)))
                    )
                   #:vspace
                   -0.35
                   #:whiteout
                   (#:halign
                    1.75
                    (#:concat
                     (#:fontsize
                      -1
                      (#:italic (#:fontsize -5 (#:musicglyph "space")))
                      #:fontsize
                      -1
```

```
                    #:italic
                    (if (= (length (cadr ratiotwo)) 2)
                        (begin (string-append
                                (number->string (car (cadr ratiotwo)))
                                ":"
                                (number->string (cadr (cadr ratiotwo)))))
                        (number->string (car (cadr ratiotwo)))
                        )
                    (#:italic
                     (#:fontsize -5
                                 (#:musicglyph "space")))))))
              ))
            )
         }
         {
          \hspace #-4
          \override #'(flag-style . modern-straight-flag)
          \note { $notetwo }
          #(if (= (ly:duration-log notetwo) 4) 1 1 )
         }
         {
          \hspace #0.5
          \combine
          \draw-line #'(-2 . 0)
          \musicglyph "arrowheads.open.01"
         }
        }
       }
      }
     #})
    )


{
 \time 2/4
 \tempo 4 = 60
 c'16
 ^\markup {\translate #'(0 . 10) " "}
 [ c'16 c'16 c'16 ]
 \tuplet 5/4 {c'16 [ c'16 c'16 c'16 c'16 ] }
 \MModEquationSTR 16 #'((5)) 16 #'() #8 #0
 \tempo 4 = 75
 c'16 [ c'16 c'16 c'16 ]
 \tuplet 3/2 {c'8 [ c'8 c'8 ] }
 \override TupletNumber.text = #tuplet-number::calc-fraction-text
 \tuplet 5/4 {c'8 [ c'8 ] \tuplet 4/3 { c'8 [ c'8 c'8 c'8  ] }}
 \MModEquationSTR 8 #'((4 3)(5 4)) 8 #'((3)) 8 #-3
 \revert TupletNumber.text
```

```
  \break
  \MModEquationBeginSTR 8 #'((4 3)(5 4)) 8 #'((3)) #6.5
  \tuplet 3/2 {
   c'8
   ^\markup {\translate #'(0 . 10) " "}
   ^\markup
   {\fontsize #-1 \raise #0.25 \note {4} #1 "= 83.33"}
   [ c'8 c'8 ]
  }
  \tuplet 3/2 {
   c'8 c'8 c'8
   \MModEquationSTR 4 #'() 4. #'() #6 #0
  }
  \time 6/8
  c'8 c'8 c'8 c'4.
  \bar "|."
 }

 \layout {
  \context{
   \Score
   harmonicDots = ##t
   \override Flag.stencil = #modern-straight-flag
   \override MetronomeMark.flag-style = #'modern-straight-flag
   \override StemTremolo.shape = #'beam-like
   \override StemTremolo.slope = #0.4

  }
 }

```

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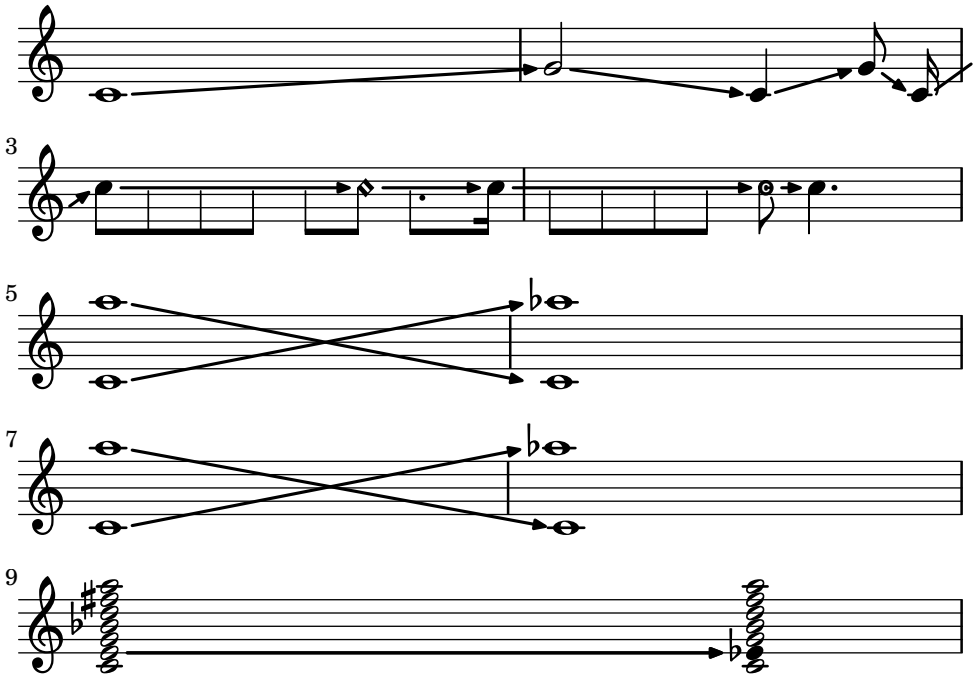
Chapter 8

Spanners

This chapter covers snippets that take advantages of spanners (text, line, etc.) in one way or another. Because functions such as `\startTextSpan` and `\stopTextSpan` activate and deactivate these snippets, caution must be paid when using more than one of them at the same time. See Example in **Combinations** to avoid conflicts between or among the spanner snippets.

8.1 Arrow Lines



8.1.1 Description

Implementation of arrow lines. It takes advantage of the `\glissando` function. It is possible to have the arrow line span over multiple notes, as `glissando-skip` parameter is set to `##t`. When the arrow line spans over multiple systems, the arrow mark will not appaer at the end of the system.[1] Furthermore, it is possible to use the function on dyads and chords. The placement of the beginning of the arrow is adjusted according to the different types of notehead.

8.1.2 Grammar

```
\arrowLineOn STARTING_NOTE (NOTES...)
\arrowLineOff ARRIVAL_NOTE
```

8.1.3 Code

```
\version "2.24.4"

arrowLineOn =
#(define-music-function (note)(ly:music?)
   (define paddingvalue (if (music-is-of-type? note 'event-chord)
                            (ly:duration-log
                             (ly:music-property
                              (first
                               (ly:music-property note 'elements))
                              'duration))
                            (ly:duration-log
```

1. See **Discussion** for more details.

```
                              (ly:music-property note 'duration))))

  #{

   \override Glissando.breakable = ##t
   \override Glissando.after-line-breaking = ##t
   \override Glissando.thickness = #2.35
   \override Glissando.bound-details.right.arrow = ##t
   \override Glissando.bound-details.right-broken.arrow = ##f
   \override Glissando.bound-details.right-broken.padding = #-1
   \override Glissando.bound-details.left.padding =
   #(cond ((= paddingvalue 0) 0.85)
          ((= paddingvalue 1) 0.65)
          ((>= paddingvalue 2) 0.65))

   \override Glissando.bound-details.right.padding = #0.25
   #note
   \glissando  \override NoteColumn.glissando-skip = ##t
  #})


arrowLineOff =
{
 \revert Glissando.breakable
 \revert Glissando.after-line-breaking
 \revert Glissando.thickness
 \revert Glissando.bound-details.right.arrow
 \revert Glissando.bound-details.right-broken.arrow
 \revert Glissando.bound-details.right-broken.padding
 \revert Glissando.bound-details.left.padding
 \revert Glissando.bound-details.right.padding
 \revert NoteColumn.glissando-skip
}



\score {

 {
  \override Score.TimeSignature.stencil = ##f

  \arrowLineOn
  c'1
  \arrowLineOff

  \arrowLineOn
  g'2
  \arrowLineOff
```

```
60
61    \arrowLineOn
62    c'4
63    \arrowLineOff
64
65    \arrowLineOn
66    g'8 \noBeam
67    \arrowLineOff
68    \arrowLineOn
69    c'16 s16 |
70
71    \break
72    \arrowLineOff
73    \arrowLineOn
74    c''8
75    \override Voice.NoteHead.transparent = ##t
76    8 8 8 8
77    \revert Voice.NoteHead.transparent
78    \arrowLineOff
79
80    \arrowLineOn
81    8 \harmonic
82    \override Voice.NoteHead.transparent = ##t
83    \once \override Voice.Dots.extra-offset = #'(-1 . -0.75)
84
85    8.
86    \revert Voice.NoteHead.transparent
87    \arrowLineOff
88
89    \arrowLineOn
90    16
91
92    \override Voice.NoteHead.transparent = ##t
93    8 8 8 8
94    \revert Voice.NoteHead.transparent
95    \arrowLineOff
96    \easyHeadsOn
97    \arrowLineOn
98    8
99    \arrowLineOff
100   \easyHeadsOff
101   4.
102   \break
103   \arrowLineOn
104   <c' a''>1
105
106   \arrowLineOff
107   <aes'' c'>1
```

```
108
109     <<
110      { \arrowLineOn a''1 \arrowLineOff c'1} \\
111      {\arrowLineOn c'1 \arrowLineOff aes''1}
112     >>
113
114     \break
115     \override Voice.Stem.stencil = ##f
116     \override Voice.NoteHead.stencil = #ly:text-interface::print
117     \override Voice.NoteHead.text =\markup{\musicglyph "noteheads.s1"}
118     \set glissandoMap = #'((1 . 1) (1 . 1))
119     \arrowLineOn
120     <c' e' g' bes' d'' fis'' a''>2
121     s4
122     \arrowLineOff
123     <c'
124     \single \override NoteHead.text =
125     \markup{\musicglyph "noteheads.s2"}  es'
126     g' bes' d'' fis'' a''>4
127
128    }
129
130
131    \layout {
132
133     indent = #0
134     line-width = #125
135     ragged-last = ##f
136
137     \context {
138      \Score
139      proportionalNotationDuration = #(ly:make-moment 1/7)
140     }
141    }
142  }
```

8.1.4 Discussion

There are a few things to consider when using the arrow lines on dyads and chords:

- By default, all pair of notes will have arrow lines. In order to selectively show the arrow lines, use `\set glissandoMap`. See **1.3.3 Expressive marks as lines** in LilyPond's *Notation Reference* for details.
- Just as the ordinary `\glissando` function, the X coordinate of the terminating point for *all* of the lines between two dyads/chords is determined by the presence of accidentals in the arrival dyads/chords. Thus, if there is an accidental on one or more of the pitches in the arriving dyad/chord, there may be a space between the tip of arrow and the pitches *without* the accidentals. Should this be avoided, it is best to apply the arrow lines in different layers,

so that each of the layers will have a different X-coordinate value of the terminating point of the arrow lines.

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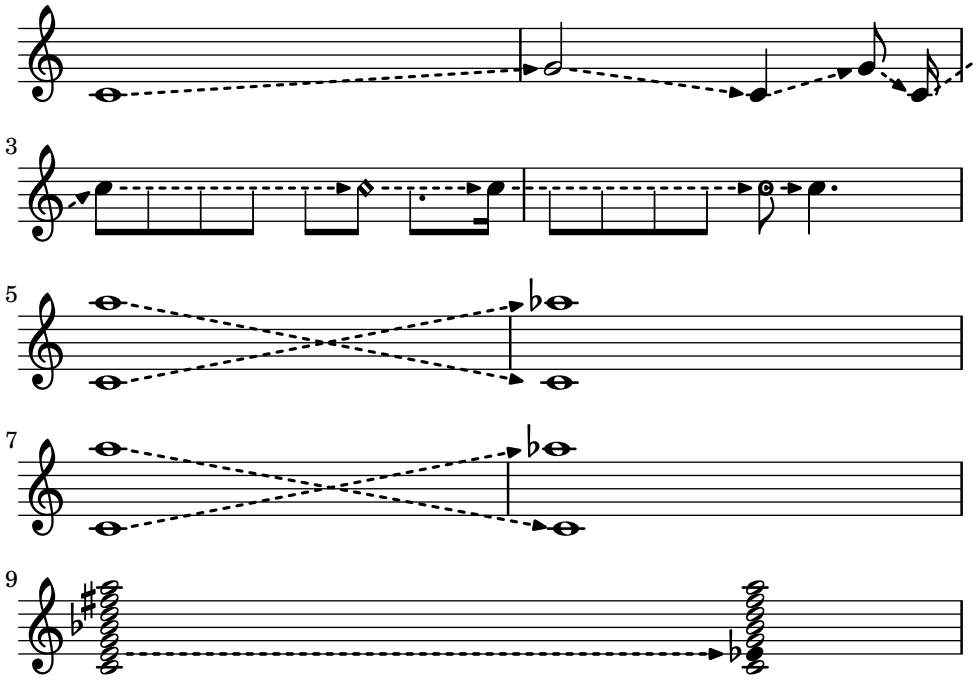
8.2 Dashed Arrow Lines



8.2.1 Description

Implementation of dashed arrow lines. Its design is nearly identical to that of the **Arrow Lines**.

8.2.2 Grammar

```
\dashedArrowLineOn STARTING_NOTE (NOTES...)
\dashedArrowLineOff ARRIVAL_NOTE
```

8.2.3 Code

```
\version "2.24.4"

dashedArrowLineOn =
#(define-music-function (note)(ly:music?)
   (define paddingvalue (if (music-is-of-type? note 'event-chord)
                            (ly:duration-log
                             (ly:music-property
                              (first
                               (ly:music-property note 'elements))
                              'duration))
                            (ly:duration-log
                             (ly:music-property note 'duration))))

   #{

    \override Glissando.breakable = ##t
```

```
    \override Glissando.after-line-breaking = ##t
    \override Glissando.thickness = #2.35
    \override Glissando.style = #'dashed-line
    \override Glissando.bound-details.right.arrow = ##t
    \override Glissando.bound-details.right-broken.arrow = ##f
    \override Glissando.bound-details.right-broken.padding = #-1
    \override Glissando.bound-details.left.padding =
    #(cond ((= paddingvalue 0) 0.85)
           ((= paddingvalue 1) 0.65)
           ((>= paddingvalue 2) 0.65))

    \override Glissando.bound-details.right.padding = #0.25
    #note
    \glissando  \override NoteColumn.glissando-skip = ##t
  #})


dashedArrowLineOff =
{
 \revert Glissando.breakable
 \revert Glissando.after-line-breaking
 \revert Glissando.thickness
 \revert Glissando.style
 \revert Glissando.bound-details.right.arrow
 \revert Glissando.bound-details.right-broken.arrow
 \revert Glissando.bound-details.right-broken.padding
 \revert Glissando.bound-details.left.padding
 \revert Glissando.bound-details.right.padding
 \revert NoteColumn.glissando-skip
}



\score {

 {
  \override Score.TimeSignature.stencil = ##f

  \dashedArrowLineOn
  c'1
  \dashedArrowLineOff

  \dashedArrowLineOn
  g'2
  \dashedArrowLineOff

  \dashedArrowLineOn
  c'4
```

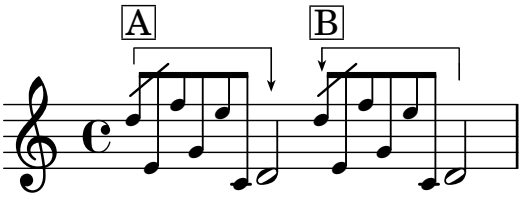
```
65    \dashedArrowLineOff
66
67    \dashedArrowLineOn
68    g'8 \noBeam
69    \dashedArrowLineOff
70    \dashedArrowLineOn
71    c'16 s16 |
72
73    \break
74    \dashedArrowLineOff
75    \dashedArrowLineOn
76    c''8
77    \override Voice.NoteHead.transparent = ##t
78    8 8 8 8
79    \revert Voice.NoteHead.transparent
80    \dashedArrowLineOff
81
82    \dashedArrowLineOn
83    8 \harmonic
84    \override Voice.NoteHead.transparent = ##t
85    \once \override Voice.Dots.extra-offset = #'(-1 . -0.75)
86
87    8.
88    \revert Voice.NoteHead.transparent
89    \dashedArrowLineOff
90
91    \dashedArrowLineOn
92    16
93
94    \override Voice.NoteHead.transparent = ##t
95    8 8 8 8
96    \revert Voice.NoteHead.transparent
97    \dashedArrowLineOff
98    \easyHeadsOn
99    \dashedArrowLineOn
100   8
101   \dashedArrowLineOff
102   \easyHeadsOff
103   4.
104   \break
105   \dashedArrowLineOn
106   <c' a''>1
107
108   \dashedArrowLineOff
109   <aes'' c'>1
110
111   <<
112    { \dashedArrowLineOn a''1 \dashedArrowLineOff c'1} \\
```

```
    {\dashedArrowLineOn c'1 \dashedArrowLineOff aes''1}
   >>
   \break
   \override Voice.Stem.stencil = ##f
   \override Voice.NoteHead.stencil = #ly:text-interface::print
   \override Voice.NoteHead.text =\markup{\musicglyph "noteheads.s1"}
   \set glissandoMap = #'((1 . 1) (1 . 1))
   \dashedArrowLineOn
   <c' e' g' bes' d'' fis'' a''>2
   s4
   \dashedArrowLineOff
   <c'
   \single \override NoteHead.text =
   \markup{\musicglyph "noteheads.s2"}  es'
   g' bes' d'' fis'' a''>4

  }

  \layout {

   indent = #0
   line-width = #125

   ragged-last = ##f

   \context {
    \Score
    proportionalNotationDuration = #(ly:make-moment 1/7)
   }
  }
 }
```

8.2.4 Discussion

See **Discussion** of the Arrow Lines. **Table of Contents**

8.3 Grace Note Brackets I



8.3.1 Description

NB: See Grace Note Brackets II for the updated version of this code.) Replication of grace note brackets seen in scores by Pierre Boulez (e.g. *Sur Incises*,[2] *...explosante-fixe...*[3]). Bracket A in the example shows that the grace notes are to be played *before* the beat to which they are applied. Whereas Bracket B shows that the grace notes are to be played *on* the beat to which they are applied.

8.3.2 Grammar

```
\graceNoteBeforeBeatOn NOTE
\graceNoteBeforeBeatOff NOTE
\graceNoteAfterBeatOn NOTE
\graceNoteAfterBeatOff NOTE
```

8.3.3 Code

```
1  \version "2.24.4"
2
3  \language "english"
4
5  % This code includes snippet for grace note
6  % slashes, which has been taken from:
7  % https://lsr.di.unimi.it/LSR/Item?id=1048
8
9
10 graceNoteBeforeBeatOn =
11 #(define-music-function (starting_note) (ly:music?)
12    #{
13      \once \override TextSpanner.style = #'line
14      \once \override TextSpanner.bound-details.left.text =
15      \markup { \draw-line #'(0 . -1) }
16      \once \override TextSpanner.bound-details.right.text =
17      \markup {
```

2. Pierre Boulez, *Sur incises : pour trois pianos, trois harpes et trois percussions-claviers (1996/1998)* (Universal Edition, 1998).

3. Pierre Boulez, *... explosante-fixe ... transitoire VII : (version 1991/93)* (Universal Edition, 1991).

```
        \postscript
        "newpath 0 0 moveto
0 -2.5 rlineto
stroke
newpath
-0.275 -2 moveto
0.275 -0.75 rlineto
0.275 0.75 rlineto
-0.275 -0.2 rlineto
closepath
fill"
      }
      \once \override TextSpanner.Y-offset = #5
      \once \override TextSpanner.bound-details.left.padding = #0.5
      \once \override TextSpanner.bound-details.right.padding = #-0.25
      #starting_note
      \startTextSpan
   #})


graceNoteBeforeBeatOff =
#(define-music-function (ending_note) (ly:music?)
   #{
     #ending_note
     \stopTextSpan
   #})


graceNoteAfterBeatOn =
#(define-music-function (starting_note) (ly:music?)
   #{
     \once \override TextSpanner.style = #'line
     \once \override TextSpanner.bound-details.right.text =
     \markup {
       \combine \draw-line #'(0 . -1)
       \postscript "newpath
0 -1 moveto
0 -1 rlineto
stroke"
      }
      \once \override TextSpanner.bound-details.left.text =
      \markup {
        \postscript
        "newpath 0 0 moveto
0 -1 rlineto
stroke
newpath
-0.275 -0.75 moveto
```

```
0.275 -0.75 rlineto
0.275 0.75 rlineto
-0.275 -0.2 rlineto
closepath
fill"
     }
     \once \override TextSpanner.Y-offset = #2
     \once \override TextSpanner.bound-details.left.padding = #0.5
     \once \override TextSpanner.bound-details.right.padding = #-0.25
     #starting_note
     \startTextSpan
   #})


graceNoteAfterBeatOff =
#(define-music-function (ending_note) (ly:music?)
   #{
     #ending_note
     \stopTextSpan
   #})

%%%%%%%%%%%%%%%%%LSR SNIPPET START%%%%%%%%%%%%%%%%%

#(define (degrees->radians deg)
   (* PI (/ deg 180.0)))

slash =
#(define-music-function (ang stem-fraction protrusion)
   (number? number? number?)
   (remove-grace-property 'Voice 'Stem 'direction)
   #{
     \once \override Stem.stencil =
     #(lambda (grob)
        (let* ((x-parent (ly:grob-parent grob X))
               (is-rest? (ly:grob?
                          (ly:grob-object x-parent 'rest)))
               (beam (ly:grob-object grob 'beam))
               (stil (ly:stem::print grob)))
          (cond
           (is-rest? empty-stencil)
           ((ly:grob? beam)
            (let* ((refp (ly:grob-system grob))
                   (stem-y-ext (ly:grob-extent grob grob Y))
                   (stem-length
                    (- (cdr stem-y-ext) (car stem-y-ext)))
                   (beam-X-pos (ly:grob-property beam 'X-positions))
                   (beam-Y-pos (ly:grob-property beam 'positions))
                   (beam-slope (/ (- (cdr beam-Y-pos) (car beam-Y-pos))
```

```
                                (- (cdr beam-X-pos) (car beam-X-pos))))
                (beam-angle (atan beam-slope))
                (dir (ly:grob-property grob 'direction))
                (line-dy (* stem-length stem-fraction))
                (line-dy-with-protrusions (if (= dir 1)
                                (+ (* 4 protrusion) beam-angle)
                                (- (* 4 protrusion) beam-angle)))
                (ang (if (> beam-slope 0)
                         (if (= dir 1)
                             (+ (degrees->radians ang) (* beam-angle 0.7))
                             (degrees->radians ang))
                         (if (= dir 1)
                             (degrees->radians ang)
                             (- (degrees->radians ang) (* beam-angle 0.7)))))
                (line-dx (/ line-dy-with-protrusions (tan ang)))
                (protrusion-dx (/ protrusion (tan ang)))
                (corr (if (= dir 1) (car stem-y-ext) (cdr stem-y-ext))))
           (ly:stencil-add
            stil
            (grob-interpret-markup grob
                                   (markup
                                     #:translate
                                     (cons (- protrusion-dx)
                                     (+ corr
                                        (* dir
                                           (- stem-length
                                              (+ stem-fraction protrusion)))))
                                     #:override '(thickness . 1.7)
                                     #:draw-line
                                     (cons line-dx
                                      (* dir line-dy-with-protrusions)))))))
          (else stil))))
   #})

startSlashedGraceMusic = {
  \slash 40 1 0.5
  \override Flag.stroke-style = #"grace"
}
stopSlashedGraceMusic = {
  \revert Flag.stroke-style
}

startAcciaccaturaMusic = {
  \slash 40 1 0.5
  s1*0(
  \override Flag.stroke-style = #"grace"
}
stopAcciaccaturaMusic = {
```

```
  \revert Flag.stroke-style
  s1*0)
}
%%%%%%%%%%%%%%%%%% LSR SNIPPET END %%%%%%%%%%%%%%%%%%


{
  \grace {
    \startSlashedGraceMusic
    \graceNoteBeforeBeatOn d''8^\markup{\box A} e' f'' g' e'' c'
  }
  \graceNoteBeforeBeatOff d'2
  \grace {
    \startSlashedGraceMusic
    \graceNoteAfterBeatOn d''8^\markup{\box B} e' f'' g' e'' c'
  }
  \graceNoteAfterBeatOff d'2
}
```

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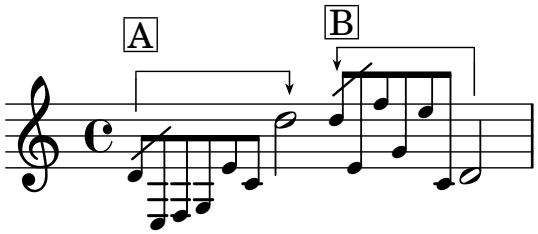
8.4 Grace Note Brackets II



8.4.1 Description

This is an updated version of Grace Note Brackets I. It differs from the original version in that this version takes a list of three parameters in order to finely adjust the shape of the bracket in order to accommodate various shapes of grace notes and the actual note.

8.4.2 Grammar

```
\graceNoteBeforeBeatOn #'(OVERALL LEFT RIGHT) NOTE
\graceNoteBeforeBeatOff #'(OVERALL LEFT RIGHT) NOTE
\graceNoteAfterBeatOn #'(OVERALL LEFT RIGHT) NOTE
\graceNoteAfterBeatOff #'(OVERALL LEFT RIGHT) NOTE
```

NB The list accepts three integers as parameters, i.e.:

1. `OVERALL` is a value of the distance between the top line of the staff and the horizontal line of the grace note bracket. This value cannot be smaller than the skyline value established by the staff line and the notes; when the skyline value is greater than what is specified in this bracket, the skyline value is favored. When in doubt, start with `0`, then increase the amount gradually.
2. `LEFT` and `RIGHT` values (negative value only!) adjust the lengths of the left and right hooks.

8.4.3 Code

```
\version "2.24.4"
\language "english"

% This code includes snippet for grace note
% slashes, which has been taken from:
% https://lsr.di.unimi.it/LSR/Item?id=1048

% Slightly revised, Jan. 19/22 2025 - YO

graceNoteBeforeBeatOn =
#(define-music-function (setting-list starting_note) (list? ly:music? )
  #{
   \once \override TextSpanner.style = #'line
```

```
    \once \override TextSpanner.bound-details.left.text =
    \markup {
     \combine
     \draw-line #(cons 0 -0.5)
     \postscript #(string-append "newpath
0 -0.5 moveto
0 " (number->string (cadr setting-list)) " rlineto
stroke")
    }
    \once \override TextSpanner.bound-details.right.text =
    \markup {
     \postscript
     #(string-append "newpath 0 0 moveto
0 " (number->string (caddr setting-list))  " rlineto
stroke
newpath
-0.275 " (number->string (+ (caddr setting-list) 0.25))  " moveto
0.275 -0.75 rlineto
0.275 0.75 rlineto
-0.275 -0.2 rlineto
closepath
fill")
    }
    \once \override TextSpanner.extra-offset = #(cons 0 (car setting-list))
    \once \override TextSpanner.bound-details.left.padding = #0.5
    \once \override TextSpanner.bound-details.right.padding = #-0.25
    #starting_note
    \startTextSpan
  #})


graceNoteBeforeBeatOff =
#(define-music-function (ending_note) (ly:music?)
  #{
   #ending_note
   \stopTextSpan
  #})


graceNoteAfterBeatOn =
#(define-music-function (setting-list starting_note) (list? ly:music?)
  #{
   \once \override TextSpanner.style = #'line
   \once \override TextSpanner.bound-details.right.text =
   \markup {
    \combine
    \draw-line #(cons 0 -1)
    \postscript #(string-append "newpath
```

```
0 -1 moveto
0 " (number->string (caddr setting-list)) " rlineto
stroke")
   }
   \once \override TextSpanner.bound-details.left.text =
   \markup {
    \postscript
    #(string-append "newpath 0 0 moveto
0 " (number->string (cadr setting-list))  " rlineto
stroke
newpath
-0.275 " (number->string (+ (cadr setting-list) 0.25))  " moveto
0.275 -0.75 rlineto
0.275 0.75 rlineto
-0.275 -0.2 rlineto
closepath
fill")
   }
   \once \override TextSpanner.extra-offset = #(cons 0 (car setting-list))
   \once \override TextSpanner.bound-details.left.padding = #0.5
   \once \override TextSpanner.bound-details.right.padding = #-0.25
   #starting_note
   \startTextSpan
  #})


graceNoteAfterBeatOff =
#(define-music-function (ending_note) (ly:music?)
  #{
   #ending_note
   \stopTextSpan
  #})

%%%%%%%%%%%%%%%%%LSR SNIPPET START%%%%%%%%%%%%%%%%

#(define (degrees->radians deg)
  (* PI (/ deg 180.0)))

slash =
#(define-music-function (ang stem-fraction protrusion)
  (number? number? number?)
  (remove-grace-property 'Voice 'Stem 'direction)
  #{
   \once \override Stem.stencil =
   #(lambda (grob)
     (let* ((x-parent (ly:grob-parent grob X))
            (is-rest? (ly:grob?
                       (ly:grob-object x-parent 'rest)))
```

```
110             (beam (ly:grob-object grob 'beam))
111             (stil (ly:stem::print grob)))
112       (cond
113        (is-rest? empty-stencil)
114        ((ly:grob? beam)
115         (let* ((refp (ly:grob-system grob))
116                (stem-y-ext (ly:grob-extent grob grob Y))
117                (stem-length
118                 (- (cdr stem-y-ext) (car stem-y-ext)))
119                (beam-X-pos (ly:grob-property beam 'X-positions))
120                (beam-Y-pos (ly:grob-property beam 'positions))
121                (beam-slope (/ (- (cdr beam-Y-pos) (car beam-Y-pos))
122                               (- (cdr beam-X-pos) (car beam-X-pos))))
123                (beam-angle (atan beam-slope))
124                (dir (ly:grob-property grob 'direction))
125                (line-dy (* stem-length stem-fraction))
126                (line-dy-with-protrusions (if (= dir 1)
127                                              (+ (* 4 protrusion) beam-angle)
128                                              (- (* 4 protrusion) beam-angle)))
129                (ang (if (> beam-slope 0)
130                         (if (= dir 1)
131                             (+ (degrees->radians ang) (* beam-angle 0.7))
132                             (degrees->radians ang))
133                         (if (= dir 1)
134                             (degrees->radians ang)
135                             (- (degrees->radians ang) (* beam-angle 0.7)))))
136                (line-dx (/ line-dy-with-protrusions (tan ang)))
137                (protrusion-dx (/ protrusion (tan ang)))
138                (corr (if (= dir 1) (car stem-y-ext) (cdr stem-y-ext))))
139           (ly:stencil-add
140            stil
141            (grob-interpret-markup grob
142                                   (markup
143                                    #:translate
144                                    (cons (- protrusion-dx)
145                                          (+ corr
146                                             (* dir
147                                                (- stem-length
148                                                   (+ stem-fraction protrusion)))))
149                                    #:override '(thickness . 1.7)
150                                    #:draw-line
151                                    (cons line-dx
152                                          (* dir line-dy-with-protrusions)))))))
153         (else stil))))
154    #})
155
156  startSlashedGraceMusic = {
157   \slash 40 1 0.5
```

```
 \override Flag.stroke-style = #"grace"
}
stopSlashedGraceMusic = {
 \revert Flag.stroke-style
}

startAcciaccaturaMusic = {
 \slash 40 1 0.5
 s1*0(
 \override Flag.stroke-style = #"grace"
}
stopAcciaccaturaMusic = {
 \revert Flag.stroke-style
 s1*0)
}
%%%%%%%%%%%%%%%%%% LSR SNIPPET END %%%%%%%%%%%%%%%%%%

{
 \grace {
  \startSlashedGraceMusic
  \graceNoteBeforeBeatOn #'(1 -2 -1) d'8^\markup{\translate #'(0 . 3) \box A} e f g e' c'
 }
 \graceNoteBeforeBeatOff d''2
 \grace {
  \startSlashedGraceMusic
  \graceNoteAfterBeatOn #'(0 -1 -2) d''8^\markup{\box B} e' f'' g' e'' c'
 }
 \graceNoteAfterBeatOff d'2
}
```

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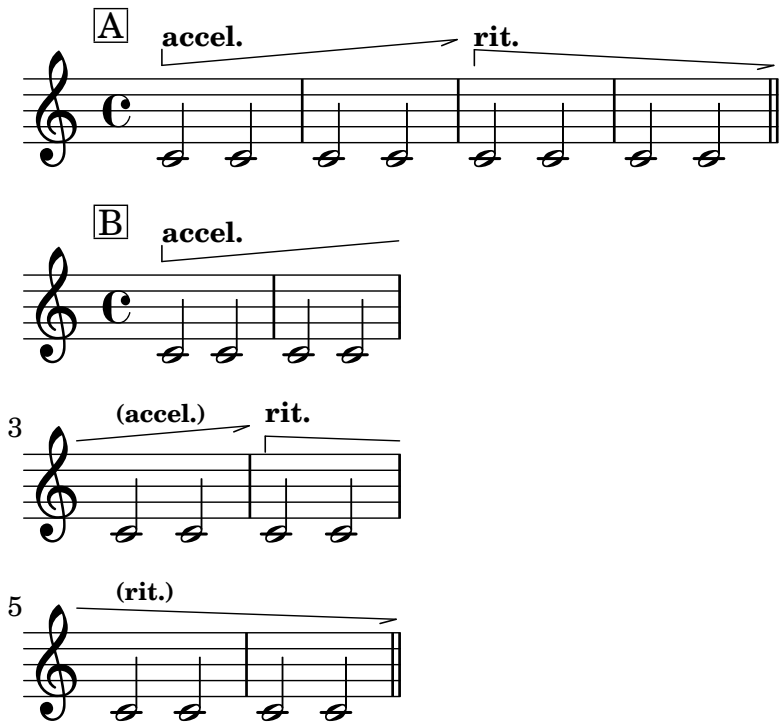
8.5 Tempo Arrows



8.5.1 Description

Replication of accelerando and rallentando arrows chiefly seen in scores by Tōru Takemitsu.[4] The snippets also handle line break.

8.5.2 Grammar

```
\accelArrow #Line_angle ... \stopTextSpan
\rallArrow #Line_angle ... \stopTextSpan
```

NB

1. `#Line_angle` sets how angled the horizontal line should be. `#5` should be more than sufficient for a short line. When it goes over a line break or it extends for a long time, a smaller number may be recommended, such as `#2`.
2. These commands only set the tempo arrows; as such, indications such as `accel.` and `rall.` need to be added separately.

8.5.3 Code

```
1 \version "2.24.4"
2
```

4. Examples abound, but see: Tōru Takemitsu, *Fantasma/cantos : for clarinet and orchestra* (Schott ; Schott Japan, 1993) and Tōru Takemitsu, *Les yeux clos II : for piano* (Schott ; Schott Japan, 1990) Other composers from the same publishing company, e.g. Toshio Hosokawa, have also adopted variants of the arrows in their music.

```
% freely modified from: https://lsr.di.unimi.it/LSR/Item?id=1168
% as well as http://lsr.di.unimi.it/LSR/Item?id=1023


accelArrow =
#(define-music-function (line_angle) (number?)

   (define x_value (cos (* (/ 3.14159265358979 180) (- 90 line_angle))))
   (define y_value (sin (* (/ 3.14159265358979 180) (- 90 line_angle))))
   #{
     \tweak direction #up
     \tweak style  #'line
     \tweak thickness  #1
     \tweak to-barline ##t
     \tweak rotation #(list line_angle -1 0 )
     \tweak bound-details.left.stencil #ly:text-interface::print
     \tweak bound-details.left.text \markup \postscript
     #(string-append
       "gsave newpath
0 0 moveto "
       (number->string x_value) " "
       (number->string y_value)
       " rlineto
stroke
grestore")
     \tweak bound-details.left-broken.stencil #ly:text-interface::print
     \tweak bound-details.left-broken.text ##f

     \tweak bound-details.right.stencil #ly:text-interface::print
     \tweak bound-details.right.text \markup \postscript
     "newpath
0 0 moveto
-1 -0.3 rlineto
stroke"
     \tweak bound-details.right-broken.stencil #ly:text-interface::print
     \tweak bound-details.right-broken.text ##f
     \tweak font-shape  #'upright
     \tweak bound-details.left.padding  #0
     \tweak bound-details.right.padding  #0
     \tweak breakable ##t
     \tweak after-line-breaking ##t

     \startTextSpan
   #})

rallArrow =
#(define-music-function (line_angle) (number?)

```

```
    (define x_value (cos (* (/ 3.14159265358979 180) (- 90 line_angle))))
    (define y_value (sin (* (/ 3.14159265358979 180) (- 90 line_angle))))
    #{
      \tweak direction #up
      \tweak style  #'line
      \tweak thickness  #1
      \tweak to-barline ##t
      \tweak rotation #(list (* -1 line_angle) 1 0 )
      \tweak bound-details.left.stencil #ly:text-interface::print
      \tweak bound-details.left.text \markup \postscript
      #(string-append
        "gsave
newpath
0 0 moveto "
        (number->string x_value) " "
        (number->string (* -1 y_value))
        " rlineto
stroke
grestore")
      \tweak bound-details.left-broken.stencil #ly:text-interface::print
      \tweak bound-details.left-broken.text ##f

      \tweak bound-details.right.stencil #ly:text-interface::print
      \tweak bound-details.right.text \markup \postscript
      "newpath
0 0 moveto
-1 -0.3 rlineto
stroke"
      \tweak bound-details.right-broken.stencil #ly:text-interface::print
      \tweak bound-details.right-broken.text ##f
      \tweak font-shape  #'upright
      \tweak bound-details.left.padding  #0
      \tweak bound-details.right.padding  #0
      \tweak breakable ##t
      \tweak after-line-breaking ##t

      \startTextSpan
    #})

\score {
  \layout {
    indent = 0
  }
  {
    c'2^\markup{\translate #'(-4 . 2) \box "A"}
    ^\markup {\translate #'(0 . 1.5) \tiny \bold "accel."}
            \accelArrow #5   c'2
    c'2 \after 2 \stopTextSpan c'2
```

```
    c'2 ^\markup {\translate #'(0 . 1.5) \tiny \bold "rit."}
            \rallArrow #3   c'2
    c'2 \after 2 \stopTextSpan c'2 \bar "||"
  }
}

\score {
  \layout {
    indent = 0
    line-width = 40
  }
  {
    c'2^\markup{\translate #'(-4 . 2) \box "B"}
    ^\markup {\translate #'(0 . 1.5) \tiny \bold "accel."}
            \accelArrow #5 c'2
    c'2 c'2
    c'2^\markup {\translate #'(0 . 1.5) \teeny \bold "(accel.)"}
            \after 2 \stopTextSpan c'2
    c'2 ^\markup {\translate #'(0 . 1.5) \tiny \bold "rit."}
            \rallArrow #2 c'2 \break
    c'2^\markup {\translate #'(0 . 1.5) \teeny \bold "(rit.)"} c'2
    c'2 \after 2 \stopTextSpan c'2 \bar "||"
  }
}
```

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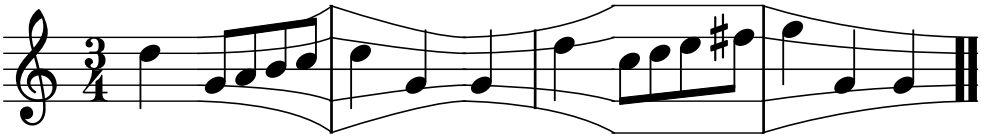
Chapter 9

Staff Lines

9.1 Expanding, Shrinking and Bloated Staff Lines



9.1.1 Description

I made this code as a proof of concept after having read some excellent snippets on LSR.[1]

9.1.2 Grammar

```
\expandingStaff #X-length
\shrinkingStaff #X-length
\bloatedStaff
\normalStaff
```

9.1.3 Code

```
1
2  shrinkingStaff =
3  #(define-music-function
4    (staffDist)
5    (number?)
6
7    #{
8      \stopStaff
9      \once  \override Staff.StaffSymbol.stencil = #ly:text-interface::print
10     \once  \override Staff.StaffSymbol.text = \markup {
```

1. See: https://lsr.di.unimi.it/LSR/Item?id=878, https://lsr.di.unimi.it/LSR/Item?id=1005, and https://lsr.di.unimi.it/LSR/Item?id=1007.

```
        \postscript #(string-append
            "newpath
            0 4 moveto
            0 4 6 2 " (number->string staffDist) " 2 curveto
            0 2 moveto
            0 2 6 1 " (number->string staffDist) " 1 curveto
            0 0 moveto "
            (number->string staffDist) " 0 lineto
            0 -2 moveto
            0 -2 6 -1 " (number->string staffDist) " -1 curveto
            0 -4 moveto
            0 -4 6 -2 " (number->string staffDist) " -2 curveto
            stroke")


      }
      \override Staff.StaffSymbol.line-positions = #'(-4 -2 0 2 4 )
      \startStaff
    #})

normalStaff = {
    \stopStaff
    \revert Staff.StaffSymbol.line-positions
    \revert Staff.StaffSymbol.stencil
    \startStaff
}

expandingStaff =
#(define-music-function
    (staffDist)
    (number?)

    #{

      \stopStaff
      \once  \override Staff.StaffSymbol.stencil = #ly:text-interface::print
      \once  \override Staff.StaffSymbol.text = \markup {
        \postscript #(string-append
            "newpath
            0 2 moveto
            0 2 6 2 " (number->string staffDist) " 4 curveto
            0 1 moveto
            0 1 6 1 " (number->string staffDist) " 2 curveto
            0 0 moveto "
            (number->string staffDist) " 0 lineto
            0 -1 moveto
            0 -1 6 -1 " (number->string staffDist) " -2 curveto
            0 -2 moveto
```

```
            0 -2 6 -2 " (number->string staffDist) " -4 curveto
            stroke ")
      }

      \startStaff
      \override Staff.StaffSymbol.line-positions = #'(-8 -4 0 4 8 )
    #})

bloatedStaff = {
    \stopStaff
    \override Staff.StaffSymbol.line-positions = #'(-8 -4 0 4 8 )
    \override Staff.LedgerLineSpanner.stencil = ##f
    \startStaff}



% to adjust the length of the individual barlines, see:
% https://lilypond.org/doc/v2.24/Documentation/internals/barline

{

    \override Staff.LedgerLineSpanner.transparent = ##t
    \numericTimeSignature
    \time 3/4
    \once \override Staff.BarLine.bar-extent = #'(-2 . 2)
    d''4 \expandingStaff #8.5

    g'8 a' b' c''
    \once \override Staff.BarLine.bar-extent = #'(-4 . 4)
    \shrinkingStaff #8.5
    d''4 g' \expandingStaff #9.5 g'
    \once \override Staff.BarLine.bar-extent = #'(-2.5 . 2.5)


    e''4 \bloatedStaff c''8 d'' e'' fs''
    \once \override Staff.BarLine.bar-extent = #'(-4 . 4)

    \shrinkingStaff #13.5

    g''4 g' g'
    \bar ".."

}

\layout {
    \context{
      \Score   proportionalNotationDuration = #(ly:make-moment 1/6)
    }
```

```
107 }
108
109
```

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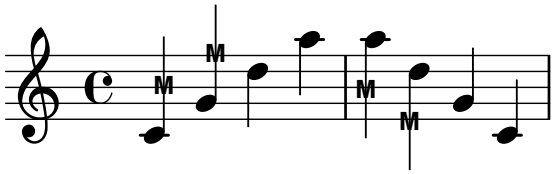
Chapter 10

Stems

10.1 ”M” on Stem



10.1.1 Description

This function attaches ”M” to the stem. I have used this to indicate **M**ultiphonics on woodwind instruments in my pieces. This function lengthens the stem in order to give a balanced look, especially combined with stems/flags.

10.1.2 Grammar

```
\MOnStemOn NOTE ...
\MOnStemOff
```

NB `\MOnStemOn` toggles the feature on, while `\MOnStemOff` toggles it off.

10.1.3 Code

```
MOnStemOn = {
  \override Stem.length = #12
  \override Stem.details.beamed-lengths = #'(5.5)
  \override Stem.stencil =
  #(lambda (grob)
     (let* ((x-parent (ly:grob-parent grob X))
            (is-rest? (ly:grob? (ly:grob-object x-parent 'rest))))
       (if is-rest?
           empty-stencil
           (ly:stencil-combine-at-edge
            (ly:stem::print grob)
            Y
```

```
13              (- (ly:grob-property grob 'direction))
14              (grob-interpret-markup grob
15                                     (markup
16                                      #:center-align
17                                      #:teeny #:sans #:bold "M"))
18              -3.5))))
19  }
20
21  MOnStemOff = {
22    \revert Stem.length
23    \revert Stem.details.beamed-lengths
24    \revert Stem.stencil
25    \revert Flag.stencil
26  }
27
28  {
29    \MOnStemOn c'4 g' \MOnStemOff d'' a''
30    \MOnStemOn a'' d'' \MOnStemOff g' c'
31  }
```

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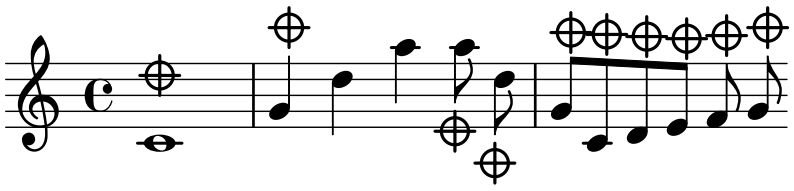
10.2 Mute Sign on Stem



10.2.1 Description

This function attaches a mute sign *above/below* the stem.

10.2.2 Grammar

```
\muteSignOnStemOn NOTE ...
\muteSignOnStemOff
```

NB `\muteSignOnStemOn` toggles the feature on, while `\muteSignOnStemOff` toggles it off.

10.2.3 Code

```
\version "2.24.4"
\pointAndClickOff

muteSignOnStemOn = {

 % Somewhat rough state; I think I will revisit at a later date.

 %  \override Stem.length =
 % #(lambda (grob)
 %           (if (= UP (ly:grob-property grob 'direction ))
 %
 %  7.5
 %  7.5))

 %  \override Stem.details.beamed-lengths = #'(5.5)

 \override Stem.stencil =
 #(lambda (grob)
   (let* ((x-parent (ly:grob-parent grob X))
          (is-rest? (ly:grob? (ly:grob-object x-parent 'rest))))
    (if is-rest?
        empty-stencil

        (if (= UP (ly:grob-property grob 'direction))

            (ly:stencil-combine-at-edge
             (ly:stem::print grob)
             Y
```

```
              (+ (ly:grob-property grob 'direction))
              (grob-interpret-markup
               grob
               (markup

                #:postscript
                "newpath
            0.2 setlinewidth
            1 setlinecap
            0 0 moveto
            0 2.5 rlineto
            -1.25 1.25 moveto
            2.5 0 rlineto
            stroke
            newpath
            0 1.25 0.85 0 360 arc
            stroke"
                ))
             0.5)

            (ly:stencil-combine-at-edge
             (ly:stem::print grob)
             Y
             (+ (ly:grob-property grob 'direction))
             (grob-interpret-markup
              grob
              (markup
               #:rotate 180
               #:postscript
               "newpath
            0.2 setlinewidth
            1 setlinecap
            0 0 moveto
            0 2.5 rlineto
            -1.25 1.25 moveto
            2.5 0 rlineto
            stroke
            newpath
            0 1.25 0.85 0 360 arc
            stroke"
                ))
             0.5)
            ))))
}

muteSignOnStemOff = {
 \revert Stem.length
 \revert Stem.details.beamed-lengths
```

```
77   \revert Stem.stencil
78   \revert Flag.stencil
79  }
80
81  {
82   \muteSignOnStemOn c'1 g'4 \muteSignOnStemOff d'' a''
83   \muteSignOnStemOn a''8 \noBeam d'' g' c'  d' e' f' g'
84  }
```

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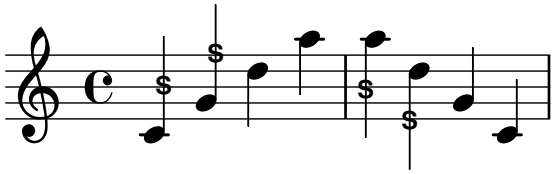
10.3 ”S” on Stem



10.3.1 Description

This function attaches ”S” to the stem. I have used this to indicate **S**plit tone on clarinet/bass clarinet in my pieces. This function lengthens the stem in order to give a balanced look, especially combined with stems/flags.

10.3.2 Grammar

```
\SOnStemOn NOTE ...
\SOnStemOff
```

NB `\SOnStemOn` toggles the feature on, while `\SOnStemOff` toggles it off.

10.3.3 Code

```
SOnStemOn = {
  \override Stem.length = #12
  \override Stem.details.beamed-lengths = #'(5.5)
  \override Stem.stencil =
  #(lambda (grob)
     (let* ((x-parent (ly:grob-parent grob X))
            (is-rest? (ly:grob? (ly:grob-object x-parent 'rest))))
       (if is-rest?
           empty-stencil
           (ly:stencil-combine-at-edge
            (ly:stem::print grob)
            Y
            (- (ly:grob-property grob 'direction))
            (grob-interpret-markup grob
                                   (markup
                                    #:center-align
                                    #:teeny #:sans #:bold "S"))
            -3.5))))
}

SOnStemOff = {
  \revert Stem.length
  \revert Stem.details.beamed-lengths
  \revert Stem.stencil
  \revert Flag.stencil
}

```

```
{
  \SOnStemOn c'4 g' \SOnStemOff d'' a''
  \SOnStemOn a'' d'' \SOnStemOff g' c'
}
```

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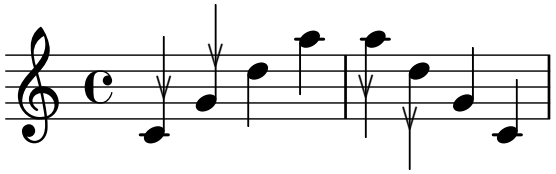
10.4 ”V” on Stem



10.4.1 Description

This function attaches ”V” to the stem. I have used this to designate a note with a differentiated timbre from others, for example ”brassy tone” for bassoon in my *Gz III* (2019-21) for bass clarinet and bassoon. This function lengthens the stem in order to give a balanced look, especially combined with stems/flags.

10.4.2 Grammar

```
\VOnStemOn NOTE ...
\VOnStemOff
```

NB `\VOnStemOn` toggles the feature on, while `\VOnStemOff` toggles it off.

10.4.3 Code

```
VOnStemOn = {
  \override Stem.no-stem-extend = ##f
  \override Stem.length = #12
  \override Stem.details.beamed-lengths = #'(5.5)
  \override Stem.stencil =
  #(lambda (grob)
     (let* ((x-parent (ly:grob-parent grob X))
            (is-rest? (ly:grob? (ly:grob-object x-parent 'rest))))
       (if is-rest?
           empty-stencil
           (ly:stencil-combine-at-edge
            (ly:stem::print grob)
            Y
            (- (ly:grob-property grob 'direction))
            (grob-interpret-markup grob
                                   (markup
                                    #:center-align
                                    #:teeny #:sans #:musicglyph "scripts.upbow"))
            -3.5))))
}

VOnStemOff = {
  \revert Stem.length
  \revert Stem.stencil
  \revert Flag.stencil
}
```

```
27
28
29  {
30    \VOnStemOn c'4 g' \VOnStemOff d'' a''
31    \VOnStemOn a'' d'' \VOnStemOff g' c'
32  }
```

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Chapter 11

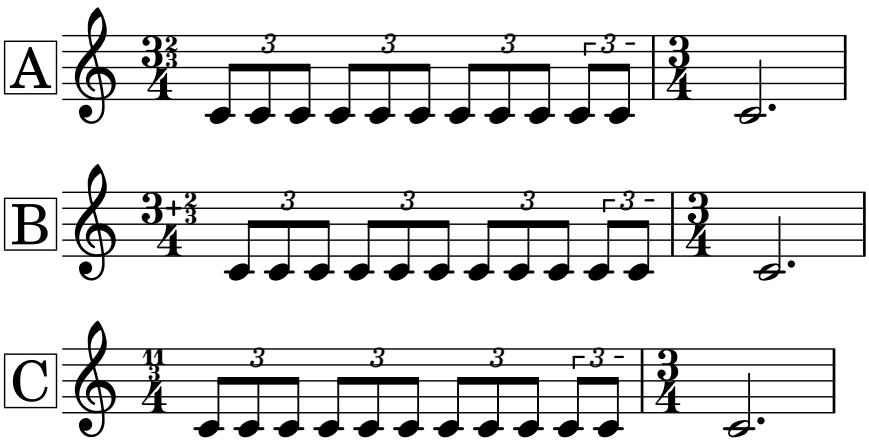
Time Signatures

First nine entries of this chapter discuss fractional time signatures (variants of the irrational time signatures) and their compound forms. I have been inspired to create these implementations after chancing upon the email exchanges on `lilypond-user` dated from 2014.[1]

While Gould discourages the use of time signatures with numerators as fractions,[2] there are cases where the use of such time signatures seems justified, particularly when the fractions deal with some form of tuplets. This is a form of time signature notation widely seen in works by Chaya Czernowin, Stefan Beyer, myself, and so many others.

I present the implementation of fractional time signatures in three different styles, A, B, and C. There are implementations for compound meters for each of the styles, in two and three time signatures.

11.1 Fractional Time Signatures, Style A



1. See: https://lists.gnu.org/archive/html/lilypond-user/2014-06/msg00209.html. However, in the process of writing this documentation I have come across another email thread on the same mailing list: https://mail.gnu.org/archive/html/lilypond-user/2020-04/msg00423.html

2. Gould, *Behind bars : the definitive guide to music notation*, 180.

11.1.1 Description

This particular style of fractional time signatures[3] can be seen in scores by Stefan Beyer, for example *Marsch* (2013-14),[4] *Mittel und Zwecke (Boulevard)* (2014),[5] *Bleib hier. Schau zu. Mach kein Geräusch.* (2017),[6] and *Most of My Clients Come Back* (2012-13).[7] In the case of *Mass und Gewicht* (2021), Beyer uses fractions on the denominator of the time signatures.[8]

Because the size the fractions is a half of the ordinary time signatures, it may be difficult to see from afar.[9]

11.1.2 Grammar

```
\fractionalTimeSignatureA
       #'(NUM1 NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureA
       #'(NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureAPlus
       #'(NUM1 NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureAPlus
       #'(NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. `\fractionalTimeSignatureA` lists time signatures *without* the use of the `+` (plus) sign.
2. `\fractionalTimeSignatureAPlus` lists time signatures with the `+` (plus) sign, when the list with four `NUM`s are given.
3. `NUM1`, `NUM2`, `NUM3`, and `NUM4` can be understood as follows:

$$\frac{1+\frac{2}{3}}{4}$$

   where `NUM1` is optional. The code has `cond` clause, which adjusts the appearance of the time signature according to the length of the list, either having 3 or 4 numbers.
4. `MEASURE_SPAN` denotes how the measure may be written using an *irrational time signature*. In the example snippet, this would be:

3. After having come up with this code, there were other implementations that could be seen on this email thread: https://mail.gnu.org/archive/html/lilypond-user/2020-04/msg00423.html
4. Stefan Beyer, *Marsch* (Manuscript, 2013-14).
5. Stefan Beyer, *Mittel und Zwecke (Boulevard)* (Manuscript, 2014).
6. Stefan Beyer, *Bleib hier. Schau zu. Mach kein Geräusch.* (Manuscript, 2017).
7. Stefan Beyer, *Most of My Clients Come Back* (Manuscript, 2012-13).
8. It would be relatively easy to modify the Scheme code so that the fraction appears next to the denominator of the time signature, instead.
9. It should be noted that in other works such as *Lotte Reiniger's The Sleeping Beauty* (2020-21), Beyer also uses the irrational time signatures as seen in the *Incomplete Tuplet Bracket for Irrational Time Signatures* section of this document.

$$\frac{3}{4} + \frac{2}{12} = \mathbf{\frac{11}{12}}$$

5. `BEAT_STRUCT` indicates beat structure, by which the beaming of the measure abides.
6. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.1.3 Code

```
% Inspired by:
% https://lists.gnu.org/archive/html/lilypond-user/2014-06/msg00209.html

% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

\version "2.24.4"
\language "english"

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))

\suppressWarning 3 "strange time signature found"

incompleteTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t
 \once \override Voice.TupletNumber.X-offset =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       2.2
       1.2))

 \once \override Voice.TupletBracket.shorten-pair =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(-0.7 . 0.15)
       '(-0.3 . 0.8)))
 \once \override Voice.TupletBracket.X-positions =
```

```
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(1.8 . 3)
       '(0.3 . 2.7)))
}

fractionalTimeSignatureA =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)
  #{
   \time $underlyingMeter
   \set beatStructure = $beatStructure

   \override Staff.TimeSignature.stencil =
   #ly:text-interface::print

   \override Staff.TimeSignature.text =
   #(if (= (length timeSignatureToShow) 4)

        (markup
         #:override
         (cons 'baseline-skip 0)
         (#:center-column
          (#:number
           (#:concat
            (#:simple
             (number->string (car timeSignatureToShow))
             #:halign -1.5
             (#:center-column
              ((#:translate
                (cons 0 1)
                (#:fontsize -6
                            (number->string
                             (cadr timeSignatureToShow))))
               (#:translate
                (cons 0 0)
                (#:fontsize -6
                            (number->string
                             (caddr timeSignatureToShow))))))))
           #:number
           (number->string (cadddr timeSignatureToShow)))))

        (markup
         #:override
         (cons 'baseline-skip 0)
         (#:center-column
          (#:number
```

```
87              (#:translate
88               (cons 0 1)
89               (#:fontsize -6 (number->string
90                               (car timeSignatureToShow))))
91              #:number
92              (#:translate
93               (cons 0 0)
94               (#:fontsize -6 (number->string
95                               (cadr timeSignatureToShow))))
96              #:number
97              (number->string (caddr timeSignatureToShow)))))
98
99          )
100   #})
101
102 fractionalTimeSignatureAPlus =
103 #(define-music-function
104   (timeSignatureToShow underlyingMeter beatStructure)
105   (list? fraction? number-list?)
106   #{
107    \time $underlyingMeter
108    \set beatStructure = $beatStructure
109
110    \override Staff.TimeSignature.stencil =
111    #ly:text-interface::print
112
113    \override Staff.TimeSignature.text =
114    #(if (= (length timeSignatureToShow) 4)
115
116         (markup
117          #:override
118          (cons 'baseline-skip 0)
119          (#:center-column
120           (#:number
121            (#:concat
122             (#:simple
123              (number->string (car timeSignatureToShow))
124
125              (#:fontsize -12 (string-append " "))
126              (string-append "+")
127              (#:fontsize -12 (string-append " "))
128
129              #:center-column
130              ((#:translate
131                (cons 0 1)
132                (#:fontsize -6
133                            (number->string
134                             (cadr timeSignatureToShow))))
```

```
135                (#:translate
136                 (cons 0 0)
137                 (#:fontsize -6
138                             (number->string
139                              (caddr timeSignatureToShow)))))))
140              #:number
141              (number->string (cadddr timeSignatureToShow)))))
142
143           (markup
144            #:override
145            (cons 'baseline-skip 0)
146            (#:center-column
147             (#:number
148              (#:translate
149               (cons 0 1)
150               (#:fontsize -6 (number->string
151                               (car timeSignatureToShow))))
152              #:number
153              (#:translate
154               (cons 0 0)
155               (#:fontsize -6 (number->string
156                               (cadr timeSignatureToShow))))
157              #:number
158              (number->string (caddr timeSignatureToShow)))))
159
160           )
161    #})
162
163
164  backToNormalTimeSignature =
165  {
166   \unset beatStructure
167   \revert Timing.TimeSignature.stencil
168   \revert Timing.TimeSignature.text
169   \revert Staff.TimeSignature.stencil
170   \revert Staff.TimeSignature.text
171  }
172
173
174  \new Staff \with { instrumentName = \markup {\fontsize #4 \box "A"}} {
175   \fractionalTimeSignatureA #'(3 2 3 4) 11/12 3,3,3,2
176   \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
177   \tuplet 3/2 {c' c' c'}
178   \incompleteTupletBracket \tuplet 3/2 {c' c'}
179   \backToNormalTimeSignature
180   \time 3/4
181   c'2.
182  }
```

```
\new Staff \with { instrumentName = \markup {\fontsize #4 \box "B"}} {
 \fractionalTimeSignatureAPlus #'(3 2 3 4) 11/12 3,3,3,2
 \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c' c' c'}
 \incompleteTupletBracket \tuplet 3/2 {c' c'}
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}
\new Staff \with { instrumentName = \markup {\fontsize #4 \box "C"}} {
 \fractionalTimeSignatureA #'(11 3 4) 11/12 3,3,3,2
 \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c' c' c'}
 \incompleteTupletBracket \tuplet 3/2 {c' c'}
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}

```

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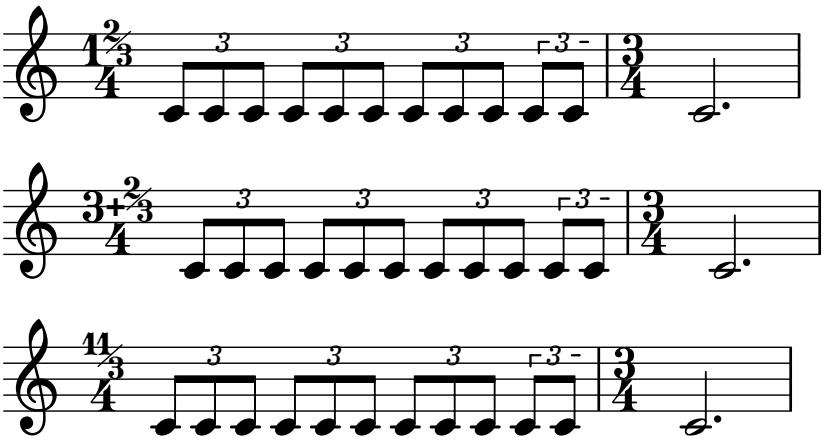
11.2 Fractional Time Signatures, Style B



11.2.1 Description

Style B differs from Style A, as the fraction has a bigger font size. This is similar to the design of fractional time signatures I have used in works such as *Gz II* (2017-22).[10]

11.2.2 Grammar

```
\fractionalTimeSignatureB
       #'(NUM1 NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureB
       #'(NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureBPlus
       #'(NUM1 NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureBPlus
       #'(NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. `\fractionalTimeSignatureB` lists time signatures *without* the use of the `+` (plus) sign.
2. `\fractionalTimeSignatureBPlus` lists time signatures with the `+` (plus) sign, when the list with four `NUM`s are given.
3. See *Grammar* of Fractional Time Signatures, Style A for the explanation on the arguments.
4. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

10. Yoshiaki Onishi, *Gz II : for two accordions* (Brühl and Berlin: Edition Gravis, 2024).

11.2.3 Code

```
\version "2.24.4"
\language "english"

% Revised Jan 2 2025 for improving the appearance of fractions
% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))

\suppressWarning 3 "strange time signature found"

incompleteTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t
 \once \override Voice.TupletNumber.X-offset =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       2.2
       1.2))

 \once \override Voice.TupletBracket.shorten-pair =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(-0.7 . 0.15)
       '(-0.3 . 0.8)))
 \once \override Voice.TupletBracket.X-positions =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(1.8 . 3)
       '(0.3 . 2.7)))
}

fractionalTimeSignatureB =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)
```

```
47    #{
48
49     \time $underlyingMeter
50     \set beatStructure = $beatStructure
51
52     \override Staff.TimeSignature.stencil =
53     #ly:text-interface::print
54     \override Staff.TimeSignature.text =
55
56     #(if (= (length timeSignatureToShow) 4)
57
58          (markup
59           (make-override-markup
60            (cons 'baseline-skip 0)
61            (make-center-column-markup
62             (list
63              (make-line-markup
64               (list
65                (make-number-markup
66                 (number->string (car timeSignatureToShow)))
67
68
69                (make-hspace-markup -0.5)
70                (make-right-align-markup
71                 (make-number-markup
72                  (make-translate-markup
73                   (cons 0 1.5)
74                   (make-fontsize-markup
75                    -3
76                    (number->string (cadr timeSignatureToShow))))))
77
78                (make-hspace-markup -1.5)
79
80                (make-override-markup
81                 (cons 'alignment 0)
82                 (make-translate-markup
83                  (cons 0 0.8)
84                  (make-draw-line-markup (cons 1.5 1.35))))
85
86                (make-hspace-markup -1.5)
87
88                (make-number-markup
89                 (make-left-align-markup
90                  (make-fontsize-markup
91                   -3
92                   (number->string (caddr timeSignatureToShow)))))))
93
94              (make-number-markup
```

```
95              (number->string (cadddr timeSignatureToShow)))))))
96
97
98          (markup
99           (make-override-markup
100           (cons 'baseline-skip 0)
101           (make-center-column-markup
102            (list
103             (make-line-markup
104              (list
105               (make-number-markup
106                (make-right-align-markup
107                 (make-translate-markup
108                  (cons 0 1.5)
109                  (make-fontsize-markup
110                   -3
111                   (number->string (car timeSignatureToShow))))))
112
113               (make-hspace-markup -1.5)
114
115               (make-override-markup
116                (cons 'alignment 0)
117                (make-translate-markup
118                 (cons 0 0.8)
119                 (make-draw-line-markup (cons 1.5 1.35))))
120
121               (make-hspace-markup -1.5)
122
123               (make-translate-markup
124                (cons 0 0)
125                (make-fontsize-markup
126                 -3
127                 (make-number-markup
128                  (number->string (cadr timeSignatureToShow)))))))
129
130             (make-number-markup
131              (number->string (caddr timeSignatureToShow)))))))
132
133         )
134   #})
135
136 fractionalTimeSignatureBPlus =
137 #(define-music-function
138   (timeSignatureToShow underlyingMeter beatStructure)
139   (list? fraction? number-list?)
140   #{
141
142    \time $underlyingMeter
```

```
143     \set beatStructure = $beatStructure
144
145     \override Staff.TimeSignature.stencil =
146     #ly:text-interface::print
147     \override Staff.TimeSignature.text =
148
149     #(if (= (length timeSignatureToShow) 4)
150
151
152          (markup
153           (make-override-markup
154            (cons 'baseline-skip 0)
155            (make-center-column-markup
156             (list
157              (make-line-markup
158               (list
159                (make-number-markup
160                 (number->string (car timeSignatureToShow)))
161                (make-fontsize-markup
162                 -12
163                 (make-simple-markup " "))
164
165
166                (make-hspace-markup -1.25)
167                (make-translate-markup
168                 (cons 0 0.4)
169                 (make-bold-markup
170                  (make-simple-markup "+")))
171
172                (make-hspace-markup -0.25)
173
174                (make-hspace-markup -0.5)
175                (make-right-align-markup
176                 (make-number-markup
177                  (make-translate-markup
178                   (cons 0 1.5)
179                   (make-fontsize-markup
180                    -3
181                    (number->string (cadr timeSignatureToShow))))))
182
183
184
185
186                (make-hspace-markup -1.5)
187
188                (make-override-markup
189                 (cons 'alignment 0)
190                 (make-translate-markup
```

```
                (cons 0 0.8)
                (make-draw-line-markup (cons 1.5 1.35))))

              (make-hspace-markup -1.5)

              (make-number-markup
               (make-left-align-markup
                (make-fontsize-markup
                 -3
                 (number->string (caddr timeSignatureToShow)))))))

            (make-number-markup
             (number->string (cadddr timeSignatureToShow)))))))


          (markup
           (make-override-markup
            (cons 'baseline-skip 0)
            (make-center-column-markup
             (list
              (make-line-markup
               (list
                (make-number-markup
                 (make-right-align-markup
                  (make-translate-markup
                   (cons 0 1.6)
                   (make-fontsize-markup
                    -3
                    (number->string (car timeSignatureToShow))))))

                (make-hspace-markup -1.5)

                (make-override-markup
                 (cons 'alignment 0)
                 (make-translate-markup
                  (cons 0 0.8)
                  (make-draw-line-markup (cons 1.5 1.35))))

                (make-hspace-markup -1.5)

                (make-translate-markup
                 (cons 0 0)
                 (make-fontsize-markup
                  -3
                  (make-number-markup
                   (number->string (cadr timeSignatureToShow)))))))

              (make-number-markup
```

```
239                (number->string (caddr timeSignatureToShow)))))))
240          )
241    #})
242
243  backToNormalTimeSignature =
244  {
245   \unset beatStructure
246   \revert Timing.TimeSignature.stencil
247   \revert Timing.TimeSignature.text
248   \revert Staff.TimeSignature.stencil
249   \revert Staff.TimeSignature.text
250  }
251
252
253  {
254   \fractionalTimeSignatureB #'(1 2 3 4) 11/12 3,3,3,2
255   \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
256   \tuplet 3/2 {c' c' c'}
257   \incompleteTupletBracket \tuplet 3/2 {c' c'}
258   \backToNormalTimeSignature
259   \time 3/4
260   c'2.
261  }
262
263  {
264   \fractionalTimeSignatureBPlus #'(3 2 3 4) 11/12 3,3,3,2
265   \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
266   \tuplet 3/2 {c' c' c'}
267   \incompleteTupletBracket \tuplet 3/2 {c' c'}
268   \backToNormalTimeSignature
269   \time 3/4
270   c'2.
271  }
272
273  {
274   \fractionalTimeSignatureB #'(11 3 4) 11/12 3,3,3,2
275   \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
276   \tuplet 3/2 {c' c' c'}
277   \incompleteTupletBracket \tuplet 3/2 {c' c'}
278   \backToNormalTimeSignature
279   \time 3/4
280   c'2.
281  }
```

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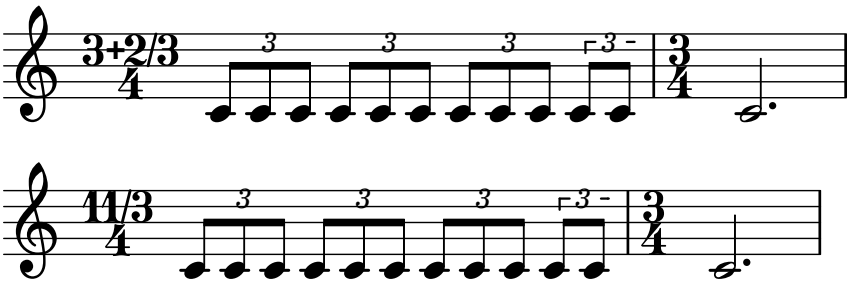
11.3 Fractional Time Signatures, Style C



11.3.1 Description

Style C of the fractional time signatures offers the largest font size for displaying the fractions. This design is commonly seen in scores by Chaya Czernowin, in such works as String Quartet (1995),[11] *Lovesong* (2010),[12] *Streams (Slow Summer Stay I)* (2012),[13] and *At the fringe of our gaze* (2012/13).[14]

11.3.2 Grammar

```
\fractionalTimeSignatureC
       #'(NUM1 NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT
\fractionalTimeSignatureC
       #'(NUM2 NUM3 NUM4) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. By default, `\fractionalTimeSignatureC` shows `+` (plus) sign when four `NUM`s are given. As the font size for the ordinary numerator and the fractions is the same, without `+` it becomes very confusing to read the time signature. Thus, contrary to Styles A and B, there is no separate function for the time signature with the `+` sign given.
2. See *Grammar* of Fractional Time Signatures, Style A for the explanation on the arguments.
3. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.3.3 Code

```
1 \version "2.24.4"
2 \language "english"
3
4
```

11. Chaya Czernowin, *String Quartet* (Schott, 1995).
12. Chaya Czernowin, *Lovesong : for mixed ensemble* (Schott, 2010).
13. Chaya Czernowin, *Streams (Slow Summer Stay I) : for 8 players* (Schott, 2012).
14. Chaya Czernowin, *At the fringe of our gaze : for Orchestra and Concertino Group* (Schott, 2012/13).

```
% Revised Jan 2 2025 for improving the appearance of fractions
% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))

\suppressWarning 2 "strange time signature found"

incompleteTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t
 \once \override Voice.TupletNumber.X-offset =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       2.2
       1.2))

 \once \override Voice.TupletBracket.shorten-pair =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(-0.7 . 0.15)
       '(-0.3 . 0.8)))
 \once \override Voice.TupletBracket.X-positions =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(1.8 . 3)
       '(0.3 . 2.7)))
}

fractionalTimeSignatureC =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)
  #{

   \time $underlyingMeter
   \set beatStructure = $beatStructure

```

```
53      \override Staff.TimeSignature.stencil =
54      #ly:text-interface::print
55      \override Staff.TimeSignature.text =
56
57      #(if (= (length timeSignatureToShow) 4)
58
59           (markup
60            (make-override-markup
61             (cons 'baseline-skip 0)
62             (make-center-column-markup
63              (list
64               (make-line-markup
65                (list
66                 (make-number-markup
67                  (number->string
68                   (car timeSignatureToShow)))
69                 (make-fontsize-markup
70                  -12
71                  (make-simple-markup " "))
72
73
74                 (make-hspace-markup -1.25)
75                 (make-translate-markup
76                  (cons 0 0.4)
77                  (make-bold-markup
78                   (make-simple-markup "+")))
79
80                 (make-hspace-markup -0.25)
81
82                 (make-hspace-markup -0.5)
83                 (make-right-align-markup
84                  (make-number-markup
85                   (number->string
86                    (cadr timeSignatureToShow))))
87
88                 (make-hspace-markup -0.6)
89
90                 (make-override-markup
91                  (list (cons 'alignment 0)
92                        (cons 'thickness 2))
93                  (make-draw-line-markup (cons 0.5 2)))
94
95                 (make-hspace-markup -0.6)
96
97                 (make-number-markup
98                  (make-left-align-markup
99                   (number->string
100                   (caddr timeSignatureToShow))))))
```

```
101
102             (make-number-markup
103              (number->string
104               (cadddr timeSignatureToShow)))))))
105
106
107         (markup
108          (make-override-markup
109           (cons 'baseline-skip 0)
110           (make-center-column-markup
111            (list
112             (make-line-markup
113              (list
114
115               (make-right-align-markup
116                (make-number-markup
117                 (number->string
118                  (car timeSignatureToShow))))
119
120               (make-hspace-markup -0.6)
121
122               (make-override-markup
123                (list (cons 'alignment 0)
124                      (cons 'thickness 2))
125                (make-draw-line-markup
126                 (cons 0.5 2)))
127
128               (make-hspace-markup -0.6)
129
130               (make-number-markup
131                (make-left-align-markup
132                 (number->string
133                  (cadr timeSignatureToShow))))))
134
135             (make-number-markup
136              (number->string
137               (caddr timeSignatureToShow))))))
138          ))
139   #})
140
141 backToNormalTimeSignature =
142 {
143  \unset beatStructure
144  \revert Timing.TimeSignature.stencil
145  \revert Timing.TimeSignature.text
146  \revert Staff.TimeSignature.stencil
147  \revert Staff.TimeSignature.text
148 }
```

```
149
150
151 {
152  \fractionalTimeSignatureC #'(3 2 3 4) 11/12 3,3,3,2
153  \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
154  \tuplet 3/2 {c' c' c'}
155  \incompleteTupletBracket \tuplet 3/2 {c' c'}
156
157  \backToNormalTimeSignature
158  \time 3/4
159  c'2.
160 }
161
162
163 {
164  \fractionalTimeSignatureC #'(11 3 4) 11/12 3,3,3,2
165  \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
166  \tuplet 3/2 {c' c' c'}
167  \incompleteTupletBracket \tuplet 3/2 {c' c'}
168   \backToNormalTimeSignature
169  \time 3/4
170  c'2.
171 }
```

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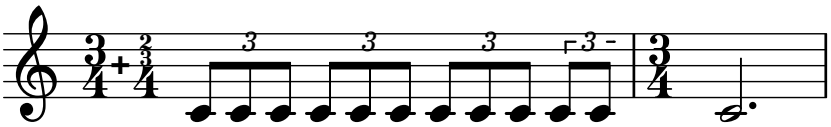
11.4 Compound Meter with Two Fractional Time Signatures, Style A



11.4.1 Description

This is an implementation of a compound meter with two fractional time signatures with Style A.

11.4.2 Grammar

```
\compoundFractionalTimeSignatureATwo
       #'((TIME_SIG1)(TIME_SIG2)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. Following the convention of `\compoundMeter` to enter the two time signatures, you will create a list of lists. Each `TIME_SIG` accepts:
   - an ordinary time signature (list with two numbers);
   - a time signature with a fraction (list with three numbers), or;
   - a time signature with an ordinary numerator and a fraction.

   See *Grammar* of Fractional Time Signatures, Style A for the explanation on the arguments for the order of arguments to specify time signatures.
2. `MEASURE_SPAN` and `BEAT_STRUCT` follow the same convention as before.
3. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.4.3 Code

```
\version "2.24.4"
\language "english"

% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
```

```
    (ly:expect-warning message))
   (iota amount 1 1)))

\suppressWarning 1 "strange time signature found"

incompleteTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t
 \once \override Voice.TupletNumber.X-offset =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       2.2
       1.2))

 \once \override Voice.TupletBracket.shorten-pair =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(-0.7 . 0.15)
       '(-0.3 . 0.8)))
 \once \override Voice.TupletBracket.X-positions =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(1.8 . 3)
       '(0.3 . 2.7)))
}

compoundFractionalTimeSignatureATwo =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)
  (define mkup
   (markup
    #:concat
    (
     #:override
     (cons 'baseline-skip 0)
     (cond ((= (length (car timeSignatureToShow)) 2)
            (make-center-column-markup
             (list (make-number-markup
                    (number->string
                     (car (car timeSignatureToShow))))
                   (make-number-markup
                    (number->string
```

```
                    (cadr (car timeSignatureToShow)))))))

            ((= (length (car timeSignatureToShow)) 3)
             (make-override-markup
              (cons 'baseline-skip 0)
              (make-center-column-markup
               (list


                (make-center-column-markup
                 (list
                  (make-translate-markup
                   (cons 0 1)
                   (make-fontsize-markup
                    -6
                    (make-number-markup
                     (number->string
                      (car (car timeSignatureToShow))))))
                  (make-translate-markup
                   (cons 0 0)
                   (make-fontsize-markup
                    -6
                    (make-number-markup
                     (number->string
                      (cadr (car timeSignatureToShow)))))))))
                (make-number-markup
                 (number->string
                  (caddr (car timeSignatureToShow))))))
              ))


            ((= (length (car timeSignatureToShow)) 4)

             (make-override-markup
              (cons 'baseline-skip 0)
              (make-center-column-markup
               (list

                (make-concat-markup
                 (list (make-number-markup
                        (number->string
                         (car (car timeSignatureToShow))))
                       (make-halign-markup
                        -1.5
                        (make-center-column-markup
                         (list
                          (make-translate-markup
                           (cons 0 1)
```

```
                          (make-fontsize-markup
                           -6
                           (make-number-markup
                            (number->string
                             (cadr (car timeSignatureToShow))))))
                         (make-translate-markup
                          (cons 0 0)
                          (make-fontsize-markup
                           -6
                           (make-number-markup
                            (number->string
                             (caddr (car timeSignatureToShow))))))))))
              (make-number-markup
               (number->string
                (cadddr (car timeSignatureToShow))))))
          ))
        )


    #:translate
    (cons 0 -0.5)
    (#:fontsize -12 " ")
    #:translate
    (cons 0 -0.5)
    (#:bold "+")
    #:translate
    (cons 0 -0.5)
    (#:fontsize -12 " ")

    #:override
    (cons 'baseline-skip 0)
    (cond ((= (length (cadr timeSignatureToShow)) 2)
           (make-center-column-markup
            (list (make-number-markup
                   (number->string
                    (car (cadr timeSignatureToShow))))
                  (make-number-markup
                   (number->string
                    (cadr (cadr timeSignatureToShow)))))))

          ((= (length (cadr timeSignatureToShow)) 3)

           (make-override-markup
            (cons 'baseline-skip 0)
            (make-center-column-markup
             (list


```

```
155                (make-center-column-markup
156                 (list
157                  (make-translate-markup
158                   (cons 0 1)
159                   (make-fontsize-markup
160                    -6
161                    (make-number-markup
162                     (number->string
163                      (car (cadr timeSignatureToShow))))))
164                  (make-translate-markup
165                   (cons 0 0)
166                   (make-fontsize-markup
167                    -6
168                    (make-number-markup
169                     (number->string
170                      (cadr (cadr timeSignatureToShow)))))))
171                (make-number-markup
172                 (number->string
173                  (caddr (cadr timeSignatureToShow))))))
174               ))
175
176
177              ((= (length (cadr timeSignatureToShow)) 4)
178
179               (make-override-markup
180                (cons 'baseline-skip 0)
181                (make-center-column-markup
182                 (list
183
184                  (make-concat-markup
185                   (list (make-number-markup
186                          (number->string
187                           (car (cadr timeSignatureToShow))))
188                         (make-halign-markup
189                          -1.5
190                          (make-center-column-markup
191                           (list
192                            (make-translate-markup
193                             (cons 0 1)
194                             (make-fontsize-markup
195                              -6
196                              (make-number-markup
197                               (number->string
198                                (cadr (cadr timeSignatureToShow))))))
199                            (make-translate-markup
200                             (cons 0 0)
201                             (make-fontsize-markup
202                              -6
```

```
                              (make-number-markup
                               (number->string
                                (caddr (cadr timeSignatureToShow)))))))))))
                  (make-number-markup
                   (number->string
                    (cadddr (cadr timeSignatureToShow))))))
                ))
              )
      )))

  #{
   \time $underlyingMeter
   \set beatStructure = $beatStructure

   \override Timing.TimeSignature.stencil =
   #ly:text-interface::print
   \override Timing.TimeSignature.text =
   #mkup
  #})


backToNormalTimeSignature =
{
 \unset beatStructure
 \revert Timing.TimeSignature.stencil
 \revert Timing.TimeSignature.text
 \revert Staff.TimeSignature.stencil
 \revert Staff.TimeSignature.text
}


{
 \compoundFractionalTimeSignatureATwo #'((3 4)(2 3 4)) 11/12 3,3,3,2
 \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c' c' c'}
 \incompleteTupletBracket \tuplet 3/2 {c' c'}
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}
```

11.4.4 Discussion

1. This was a tricky one to make, as I had to resort to building the Scheme code without using the syntactic sugars, i.e. `#:`.[15] If any modification are to be made to this code, it is recommended to carefully examine where the corresponding parenthesis of a starting parenthesis is located.

15. See *Known issues and warnings* at: https://lilypond.org/doc/v2.24/Documentation/extending/markup-construction-in-scheme

It is also helpful to watch LilyPond Log for any errors, as it seems to give hints for how many argument(s) a function is looking for.

2. I am hoping to find ways to simplify the code, as the same bits (with variations in variables that are called upon) of the codes are used to streamline the formatting of the time signature appearances.

3. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

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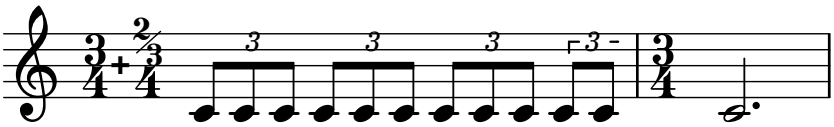
11.5 Compound Meter with Two Fractional Time Signatures, Style B



11.5.1 Description

This is an implementation of a compound meter with two fractional time signatures with Style B.

11.5.2 Grammar

```
\compoundFractionalTimeSignatureBTwo
       #'((TIME_SIG1)(TIME_SIG2)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. Following the convention of `\compoundMeter` to enter the two time signatures, you will create a list of lists. Each `TIME_SIG` accepts: an ordinary time signature (list with two numbers), a time signature with a fraction (list with three numbers), or a time signature with an ordinary numerator and a fraction. See *Grammar* of Fractional Time Signatures, Style A for the explanation on the arguments for the order of arguments to specify time signatures.
2. `MEASURE_SPAN` and `BEAT_STRUCT` follow the same convention as before.
3. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.5.3 Code

```
\version "2.24.4"
\language "english"


% Revised Jan 2 2025 for improving the appearance of fractions
% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))
```

```
15
16 \suppressWarning 1 "strange time signature found"
17
18 incompleteTupletBracket =  {
19  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
20  \once \override Voice.TupletBracket.bracket-visibility = ##t
21
22 }
23 incompleteSmallTupletBracket =  {
24  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
25  \once \override Voice.TupletBracket.bracket-visibility = ##t
26  \once \override Voice.TupletNumber.X-offset =
27  #(lambda (grob)
28    (if (= UP (ly:grob-property grob 'direction))
29        2.2
30        1.2))
31
32  \once \override Voice.TupletBracket.shorten-pair =
33  #(lambda (grob)
34    (if (= UP (ly:grob-property grob 'direction))
35        '(-0.7 . 0.15)
36        '(-0.3 . 0.8)))
37  \once \override Voice.TupletBracket.X-positions =
38  #(lambda (grob)
39    (if (= UP (ly:grob-property grob 'direction))
40        '(1.8 . 3)
41        '(0.3 . 2.7)))
42 }
43
44 compoundFractionalTimeSignatureBTwo =
45 #(define-music-function
46   (timeSignatureToShow underlyingMeter beatStructure)
47   (list? fraction? number-list?)
48   (define mkup
49    (markup
50     #:concat
51     (
52
53      #:override
54      (cons 'baseline-skip 0)
55      (cond ((= (length (car timeSignatureToShow)) 2)
56             (make-center-column-markup
57              (list (make-number-markup
58                     (number->string
59                      (car (car timeSignatureToShow))))
60                    (make-number-markup
61                     (number->string
62                      (cadr (car timeSignatureToShow)))))))
```

```
63
64              ((= (length (car timeSignatureToShow)) 3)
65               (make-override-markup
66                (cons 'baseline-skip 0)
67                (make-center-column-markup
68                 (list
69                  (make-line-markup
70                   (list
71                    (make-number-markup
72                     (make-right-align-markup
73                      (make-translate-markup
74                       (cons 0 1.6)
75                       (make-fontsize-markup
76                        -3
77                        (number->string
78                         (car (car timeSignatureToShow)))))))
79
80                    (make-hspace-markup -1.5)
81
82                    (make-override-markup
83                     (cons 'alignment 0)
84                     (make-translate-markup
85                      (cons 0 0.8)
86                      (make-draw-line-markup (cons 1.5 1.35))))
87
88                    (make-hspace-markup -1.5)
89
90                    (make-translate-markup
91                     (cons 0 0)
92                     (make-fontsize-markup
93                      -3
94                      (make-number-markup
95                       (number->string
96                        (cadr (car timeSignatureToShow)))))))
97
98                  (make-number-markup
99                   (number->string
100                   (caddr (car timeSignatureToShow)))))))
101
102
103             ((= (length (car timeSignatureToShow)) 4)
104
105              (make-override-markup
106               (cons 'baseline-skip 0)
107               (make-center-column-markup
108                (list
109                 (make-line-markup
110                  (list
```

```
111                    (make-number-markup
112                     (number->string
113                      (car (car timeSignatureToShow))))
114                    (make-fontsize-markup
115                     -12
116                     (make-simple-markup " "))
117
118                    (make-hspace-markup -1.25)
119                    (make-translate-markup
120                     (cons 0 0.4)
121                     (make-bold-markup
122                      (make-simple-markup "+")))
123
124                    (make-hspace-markup -0.25)
125
126                    (make-hspace-markup -0.5)
127                    (make-right-align-markup
128                     (make-number-markup
129                      (make-translate-markup
130                       (cons 0 1.5)
131                       (make-fontsize-markup
132                        -3
133                        (number->string
134                         (cadr (car timeSignatureToShow)))))))
135
136                    (make-hspace-markup -1.5)
137
138                    (make-override-markup
139                     (cons 'alignment 0)
140                     (make-translate-markup
141                      (cons 0 0.8)
142                      (make-draw-line-markup
143                       (cons 1.5 1.35))))
144
145                    (make-hspace-markup -1.5)
146
147                    (make-number-markup
148                     (make-left-align-markup
149                      (make-fontsize-markup
150                       -3
151                       (number->string
152                        (caddr (car timeSignatureToShow)))))))
153
154                   (make-number-markup
155                    (number->string
156                     (cadddr (car timeSignatureToShow)))))))))
157
158
```

```
      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")
      #:translate
      (cons 0 -0.5)
      (#:bold "+")
      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")

      #:override
      (cons 'baseline-skip 0)

      (cond ((= (length (cadr timeSignatureToShow)) 2)
             (make-center-column-markup
              (list (make-number-markup
                     (number->string
                      (car (cadr timeSignatureToShow))))
                    (make-number-markup
                     (number->string
                      (cadr (cadr timeSignatureToShow)))))))

            ((= (length (cadr timeSignatureToShow)) 3)
             (make-override-markup
              (cons 'baseline-skip 0)
              (make-center-column-markup
               (list
                (make-line-markup
                 (list
                  (make-number-markup
                   (make-right-align-markup
                    (make-translate-markup
                     (cons 0 1.6)
                     (make-fontsize-markup
                      -3
                      (number->string
                       (car (cadr timeSignatureToShow)))))))

                  (make-hspace-markup -1.5)

                  (make-override-markup
                   (cons 'alignment 0)
                   (make-translate-markup
                    (cons 0 0.8)
                    (make-draw-line-markup (cons 1.5 1.35))))

                  (make-hspace-markup -1.5)
```

```
                (make-translate-markup
                 (cons 0 0)
                 (make-fontsize-markup
                  -3
                  (make-number-markup
                   (number->string
                    (cadr (cadr timeSignatureToShow))))))))

               (make-number-markup
                (number->string
                 (caddr (cadr timeSignatureToShow))))))))


          ((= (length (cadr timeSignatureToShow)) 4)

           (make-override-markup
            (cons 'baseline-skip 0)
            (make-center-column-markup
             (list
              (make-line-markup
               (list
                (make-number-markup
                 (number->string
                  (car (cadr timeSignatureToShow))))
                (make-fontsize-markup
                 -12
                 (make-simple-markup " "))

                (make-hspace-markup -1.25)
                (make-translate-markup
                 (cons 0 0.4)
                 (make-bold-markup
                  (make-simple-markup "+")))

                (make-hspace-markup -0.25)

                (make-hspace-markup -0.5)
                (make-right-align-markup
                 (make-number-markup
                  (make-translate-markup
                   (cons 0 1.5)
                   (make-fontsize-markup
                    -3
                    (number->string
                     (cadr (cadr timeSignatureToShow)))))))

                (make-hspace-markup -1.5)
```

```
                    (make-override-markup
                     (cons 'alignment 0)
                     (make-translate-markup
                      (cons 0 0.8)
                      (make-draw-line-markup
                       (cons 1.5 1.35))))

                    (make-hspace-markup -1.5)

                    (make-number-markup
                     (make-left-align-markup
                      (make-fontsize-markup
                       -3
                       (number->string
                        (caddr (cadr timeSignatureToShow))))))))

                  (make-number-markup
                   (number->string
                    (cadddr (cadr timeSignatureToShow))))))))
      )))

  #{
   \time $underlyingMeter
   \set beatStructure = $beatStructure

   \override Timing.TimeSignature.stencil =
   #ly:text-interface::print
   \override Timing.TimeSignature.text =
   #mkup
  #})


backToNormalTimeSignature =
{
 \unset beatStructure
 \revert Timing.TimeSignature.stencil
 \revert Timing.TimeSignature.text
 \revert Staff.TimeSignature.stencil
 \revert Staff.TimeSignature.text
}


{
 \compoundFractionalTimeSignatureBTwo #'((3 4)(2 3 4)) 11/12 3,3,3,2
 \tuplet 3/2 { c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c' c' c'}
 \incompleteTupletBracket \tuplet 3/2 {c' c'}
 \backToNormalTimeSignature
```

```
303   \time 3/4
304   c'2.
305  }
306
```

11.5.4 Discussion

See **Discussion** of the entry *Compound Meter with Two Fractional Time Signatures, Style A*.

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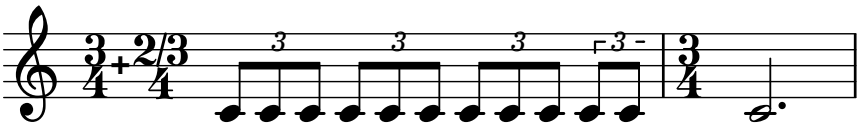
11.6 Compound Meter with Two Fractional Time Signatures, Style C



11.6.1 Description

This is an implementation of a compound meter with two fractional time signatures with Style C.

11.6.2 Grammar

```
\compoundFractionalTimeSignatureCTwo
       #'((TIME_SIG1)(TIME_SIG2)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. Following the convention of `\compoundMeter` to enter the two time signatures, you will create a list of lists. Each `TIME_SIG` accepts: an ordinary time signature (list with two numbers), a time signature with a fraction (list with three numbers), or a time signature with an ordinary numerator and a fraction. See *Grammar* of Fractional Time Signatures, Style A for the explanation on the arguments for the order of arguments to specify time signatures.
2. `MEASURE_SPAN` and `BEAT_STRUCT` follow the same convention as before.
3. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.6.3 Code

```
\version "2.24.4"
\language "english"


% Revised Jan 2 2025 for improving the appearance of fractions
% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))
```

```
15
16 \suppressWarning 1 "strange time signature found"
17
18 incompleteTupletBracket =  {
19  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
20  \once \override Voice.TupletBracket.bracket-visibility = ##t
21
22 }
23 incompleteSmallTupletBracket =  {
24  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
25  \once \override Voice.TupletBracket.bracket-visibility = ##t
26  \once \override Voice.TupletNumber.X-offset =
27  #(lambda (grob)
28    (if (= UP (ly:grob-property grob 'direction))
29        2.2
30        1.2))
31
32  \once \override Voice.TupletBracket.shorten-pair =
33  #(lambda (grob)
34    (if (= UP (ly:grob-property grob 'direction))
35        '(-0.7 . 0.15)
36        '(-0.3 . 0.8)))
37  \once \override Voice.TupletBracket.X-positions =
38  #(lambda (grob)
39    (if (= UP (ly:grob-property grob 'direction))
40        '(1.8 . 3)
41        '(0.3 . 2.7)))
42 }
43
44 compoundFractionalTimeSignatureCTwo =
45 #(define-music-function
46   (timeSignatureToShow underlyingMeter beatStructure)
47   (list? fraction? number-list?)
48   (define mkup
49    (markup
50     #:concat
51     (
52
53      #:override
54      (cons 'baseline-skip 0)
55      (cond ((= (length (car timeSignatureToShow)) 2)
56             (make-center-column-markup
57              (list (make-number-markup
58                     (number->string
59                      (car (car timeSignatureToShow))))
60                    (make-number-markup
61                     (number->string
62                      (cadr (car timeSignatureToShow)))))))
```

```
63
64              ((= (length (car timeSignatureToShow)) 3)
65               (make-override-markup
66                (cons 'baseline-skip 0)
67                (make-center-column-markup
68                 (list
69                  (make-line-markup
70                   (list
71
72                    (make-right-align-markup
73                     (make-number-markup
74                      (number->string
75                       (car (car timeSignatureToShow)))))
76
77                    (make-hspace-markup -0.6)
78
79                    (make-override-markup
80                     (list (cons 'alignment 0)
81                           (cons 'thickness 2))
82                     (make-draw-line-markup
83                      (cons 0.5 2)))
84
85                    (make-hspace-markup -0.6)
86
87                    (make-number-markup
88                     (make-left-align-markup
89                      (number->string
90                       (cadr (car timeSignatureToShow)))))))
91
92                   (make-number-markup
93                    (number->string
94                     (caddr (car timeSignatureToShow))))))))
95
96
97              ((= (length (car timeSignatureToShow)) 4)
98
99               (make-override-markup
100               (cons 'baseline-skip 0)
101               (make-center-column-markup
102                (list
103                 (make-line-markup
104                  (list
105                   (make-number-markup
106                    (number->string
107                     (car (car timeSignatureToShow))))
108                   (make-fontsize-markup
109                    -12
110                    (make-simple-markup " "))
```

```
111
112
113                 (make-hspace-markup -1.25)
114                 (make-translate-markup
115                  (cons 0 0.4)
116                  (make-bold-markup
117                   (make-simple-markup "+")))
118
119                 (make-hspace-markup -0.25)
120
121                 (make-hspace-markup -0.5)
122                 (make-right-align-markup
123                  (make-number-markup
124                   (number->string
125                    (cadr (car timeSignatureToShow)))))
126
127                 (make-hspace-markup -0.6)
128
129                 (make-override-markup
130                  (list (cons 'alignment 0)
131                        (cons 'thickness 2))
132                  (make-draw-line-markup (cons 0.5 2)))
133
134                 (make-hspace-markup -0.6)
135
136                 (make-number-markup
137                  (make-left-align-markup
138                   (number->string
139                    (caddr (car timeSignatureToShow)))))))
140
141               (make-number-markup
142                (number->string
143                 (cadddr (car timeSignatureToShow)))))))))
144
145
146       #:translate
147       (cons 0 -0.5)
148       (#:fontsize -12 " ")
149       #:translate
150       (cons 0 -0.5)
151       (#:bold "+")
152       #:translate
153       (cons 0 -0.5)
154       (#:fontsize -12 " ")
155
156       #:override
157       (cons 'baseline-skip 0)
158
```

```
159       (cond ((= (length (cadr timeSignatureToShow)) 2)
160              (make-center-column-markup
161               (list (make-number-markup
162                      (number->string
163                       (car (cadr timeSignatureToShow))))
164                     (make-number-markup
165                      (number->string
166                       (cadr (cadr timeSignatureToShow)))))))
167
168             ((= (length (cadr timeSignatureToShow)) 3)
169              (make-override-markup
170               (cons 'baseline-skip 0)
171               (make-center-column-markup
172                (list
173                 (make-line-markup
174                  (list
175
176                   (make-right-align-markup
177                    (make-number-markup
178                     (number->string
179                      (car (cadr timeSignatureToShow)))))
180
181                   (make-hspace-markup -0.6)
182
183                   (make-override-markup
184                    (list (cons 'alignment 0)
185                          (cons 'thickness 2))
186                    (make-draw-line-markup
187                     (cons 0.5 2)))
188
189                   (make-hspace-markup -0.6)
190
191                   (make-number-markup
192                    (make-left-align-markup
193                     (number->string
194                      (cadr (cadr timeSignatureToShow)))))))
195
196                  (make-number-markup
197                   (number->string
198                    (caddr (cadr timeSignatureToShow))))))))
199
200
201             ((= (length (cadr timeSignatureToShow)) 4)
202
203              (make-override-markup
204               (cons 'baseline-skip 0)
205               (make-center-column-markup
206                (list
```

```
                (make-line-markup
                 (list
                  (make-number-markup
                   (number->string
                    (car (cadr timeSignatureToShow))))
                  (make-fontsize-markup
                   -12
                   (make-simple-markup " "))


                  (make-hspace-markup -1.25)
                  (make-translate-markup
                   (cons 0 0.4)
                   (make-bold-markup
                    (make-simple-markup "+")))

                  (make-hspace-markup -0.25)

                  (make-hspace-markup -0.5)
                  (make-right-align-markup
                   (make-number-markup
                    (number->string
                     (cadr (cadr timeSignatureToShow)))))

                  (make-hspace-markup -0.6)

                  (make-override-markup
                   (list (cons 'alignment 0)
                         (cons 'thickness 2))
                   (make-draw-line-markup (cons 0.5 2)))

                  (make-hspace-markup -0.6)

                  (make-number-markup
                   (make-left-align-markup
                    (number->string
                     (caddr (cadr timeSignatureToShow)))))))

                (make-number-markup
                 (number->string
                  (cadddr (cadr timeSignatureToShow)))))))))
    )))

  #{
   \time $underlyingMeter
   \set beatStructure = $beatStructure
   \override Timing.TimeSignature.stencil =
   #ly:text-interface::print
```

```
    \override Timing.TimeSignature.text =
    #mkup
   #})


backToNormalTimeSignature =
{
 \unset beatStructure
 \revert Timing.TimeSignature.stencil
 \revert Timing.TimeSignature.text
 \revert Staff.TimeSignature.stencil
 \revert Staff.TimeSignature.text
}


{

 \compoundFractionalTimeSignatureCTwo #'((3 4)(2 3 4)) 11/12 3,3,3,2
 \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c' c' c'}
 \incompleteTupletBracket \tuplet 3/2 {c' c'}
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}
```

11.6.4 Discussion

See **Discussion** of the entry *Compound Meter with Two Fractional Time Signatures, Style A.*

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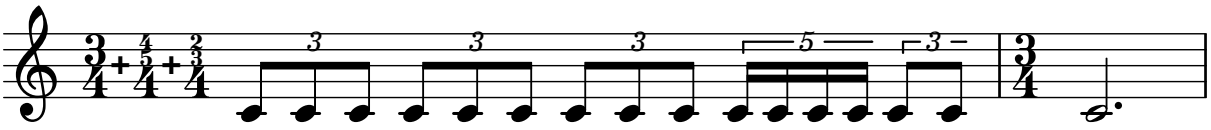
11.7 Compound Meter with Three Fractional Time Signatures, Style A



11.7.1 Description

This is an implementation of a compound meter with three fractional time signatures with Style A.

11.7.2 Grammar

```
\compoundFractionalTimeSignatureAThree
     #'((TIME_SIG1)(TIME_SIG2)(TIME_SIG3)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. Following the convention of `\compoundMeter` to enter the two time signatures, you will create a list of lists. Each `TIME_SIG` accepts:

   - an ordinary time signature (list with two numbers);
   - a time signature with a fraction (list with three numbers), or;
   - a time signature with an ordinary numerator and a fraction.

   See *Grammar* of Fractional Time Signatures, Style A for the explanation on the arguments for the order of arguments to specify time signatures.

2. In the code of the given snippet, the value for `MEASURE_SPAN` may appear absurd. However, this results from following the same convention as before, i.e. adding the constituent time signatures to give a general irrational time signature for the entire bar. Thus:

$$\frac{3}{4} + \frac{4}{20} + \frac{2}{12} = \mathbf{\frac{67}{60}}$$

3. `BEAT_STRUCT` follows the same convention as before; however, as the given code shows, it may be necessary to still use `[` and `]` to explicitly specify the beaming.

4. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.7.3 Code

```
1 \version "2.24.4"
2 \language "english"
```

```
3
4  % Revised Aug 10 2025 to include the function to revert to a
5  % regular time signature
6
7  suppressWarning =
8  #(define-void-function (amount message)(number? string?)
9    (for-each
10    (lambda (warning)
11     (ly:expect-warning message))
12    (iota amount 1 1)))
13
14 \suppressWarning 3 "strange time signature found"
15
16 incompleteTupletBracket =  {
17  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
18  \once \override Voice.TupletBracket.bracket-visibility = ##t
19
20 }
21 incompleteSmallTupletBracket =  {
22  \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
23  \once \override Voice.TupletBracket.bracket-visibility = ##t
24  \once \override Voice.TupletNumber.X-offset =
25  #(lambda (grob)
26    (if (= UP (ly:grob-property grob 'direction))
27        2.2
28        1.2))
29
30  \once \override Voice.TupletBracket.shorten-pair =
31  #(lambda (grob)
32    (if (= UP (ly:grob-property grob 'direction))
33        '(-0.7 . 0.15)
34        '(-0.3 . 0.8)))
35  \once \override Voice.TupletBracket.X-positions =
36  #(lambda (grob)
37    (if (= UP (ly:grob-property grob 'direction))
38        '(1.8 . 3)
39        '(0.3 . 2.7)))
40 }
41
42 compoundFractionalTimeSignatureAThree =
43 #(define-music-function
44   (timeSignatureToShow underlyingMeter beatStructure)
45   (list? fraction? number-list?)
46   (define mkup
47    (markup
48     #:concat
49     (
50      #:override
```

```
51        (cons 'baseline-skip 0)
52        (cond ((= (length (car timeSignatureToShow)) 2)
53               (make-center-column-markup
54                (list (make-number-markup
55                       (number->string
56                        (car (car timeSignatureToShow))))
57                      (make-number-markup
58                       (number->string
59                        (cadr (car timeSignatureToShow)))))))
60
61              ((= (length (car timeSignatureToShow)) 3)
62               (make-override-markup
63                (cons 'baseline-skip 0)
64                (make-center-column-markup
65                 (list
66                  (make-center-column-markup
67                   (list
68                    (make-translate-markup
69                     (cons 0 1)
70                     (make-fontsize-markup
71                      -6
72                      (make-number-markup
73                       (number->string
74                        (car (car timeSignatureToShow))))))
75                    (make-translate-markup
76                     (cons 0 0)
77                     (make-fontsize-markup
78                      -6
79                      (make-number-markup
80                       (number->string
81                        (cadr (car timeSignatureToShow)))))))))
82                  (make-number-markup
83                   (number->string
84                    (caddr (car timeSignatureToShow))))))
85                ))
86
87
88              ((= (length (car timeSignatureToShow)) 4)
89
90               (make-override-markup
91                (cons 'baseline-skip 0)
92                (make-center-column-markup
93                 (list
94
95                  (make-concat-markup
96                   (list (make-number-markup
97                          (number->string
98                           (car (car timeSignatureToShow))))
```

```
                      (make-halign-markup
                       -1.5
                       (make-center-column-markup
                        (list
                         (make-translate-markup
                          (cons 0 1)
                          (make-fontsize-markup
                           -6
                           (make-number-markup
                            (number->string
                             (cadr (car timeSignatureToShow))))))
                         (make-translate-markup
                          (cons 0 0)
                          (make-fontsize-markup
                           -6
                           (make-number-markup
                            (number->string
                             (caddr (car timeSignatureToShow))))))))))
               (make-number-markup
                (number->string
                 (cadddr (car timeSignatureToShow))))))
            ))
          )


      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")
      #:translate
      (cons 0 -0.5)
      (#:bold "+")
      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")

      #:override
      (cons 'baseline-skip 0)
      (cond ((= (length (cadr timeSignatureToShow)) 2)
             (make-center-column-markup
              (list (make-number-markup
                     (number->string
                      (car (cadr timeSignatureToShow))))
                    (make-number-markup
                     (number->string
                      (cadr (cadr timeSignatureToShow)))))))

            ((= (length (cadr timeSignatureToShow)) 3)

```

```
147              (make-override-markup
148               (cons 'baseline-skip 0)
149               (make-center-column-markup
150                (list
151
152
153                 (make-center-column-markup
154                  (list
155                   (make-translate-markup
156                    (cons 0 1)
157                    (make-fontsize-markup
158                     -6
159                     (make-number-markup
160                      (number->string
161                       (car (cadr timeSignatureToShow))))))
162                   (make-translate-markup
163                    (cons 0 0)
164                    (make-fontsize-markup
165                     -6
166                     (make-number-markup
167                      (number->string
168                       (cadr (cadr timeSignatureToShow)))))))))
169                 (make-number-markup
170                  (number->string
171                   (caddr (cadr timeSignatureToShow))))))
172               ))
173
174
175             ((= (length (cadr timeSignatureToShow)) 4)
176
177              (make-override-markup
178               (cons 'baseline-skip 0)
179               (make-center-column-markup
180                (list
181
182                 (make-concat-markup
183                  (list (make-number-markup
184                         (number->string
185                          (car (cadr timeSignatureToShow))))
186                        (make-halign-markup
187                         -1.5
188                         (make-center-column-markup
189                          (list
190                           (make-translate-markup
191                            (cons 0 1)
192                            (make-fontsize-markup
193                             -6
194                             (make-number-markup
```

```
                              (number->string
                               (cadr (cadr timeSignatureToShow))))))
                           (make-translate-markup
                            (cons 0 0)
                            (make-fontsize-markup
                             -6
                             (make-number-markup
                              (number->string
                               (caddr (cadr timeSignatureToShow))))))))))
                 (make-number-markup
                  (number->string
                   (cadddr (cadr timeSignatureToShow))))))
               ))
             )
       #:translate
       (cons 0 -0.5)
       (#:fontsize -12 " ")
       #:translate
       (cons 0 -0.5)
       (#:bold "+")
       #:translate
       (cons 0 -0.5)
       (#:fontsize -12 " ")

       #:override
       (cons 'baseline-skip 0)
       (cond ((= (length (caddr timeSignatureToShow)) 2)
              (make-center-column-markup
               (list (make-number-markup
                      (number->string
                       (car (caddr timeSignatureToShow))))
                     (make-number-markup
                      (number->string
                       (cadr (caddr timeSignatureToShow)))))))

             ((= (length (caddr timeSignatureToShow)) 3)

              (make-override-markup
               (cons 'baseline-skip 0)
               (make-center-column-markup
                (list


                 (make-center-column-markup
                  (list
                   (make-translate-markup
                    (cons 0 1)
                    (make-fontsize-markup
```

```
                    -6
                    (make-number-markup
                     (number->string
                      (car (caddr timeSignatureToShow))))))
                   (make-translate-markup
                    (cons 0 0)
                    (make-fontsize-markup
                     -6
                     (make-number-markup
                      (number->string
                       (cadr (caddr timeSignatureToShow))))))))
                (make-number-markup
                 (number->string
                  (caddr (caddr timeSignatureToShow))))))
               ))


             ((= (length (caddr timeSignatureToShow)) 4)

              (make-override-markup
               (cons 'baseline-skip 0)
               (make-center-column-markup
                (list

                 (make-concat-markup
                  (list (make-number-markup
                         (number->string
                          (car (caddr timeSignatureToShow))))
                        (make-halign-markup
                         -1.5
                         (make-center-column-markup
                          (list
                           (make-translate-markup
                            (cons 0 1)
                            (make-fontsize-markup
                             -6
                             (make-number-markup
                              (number->string
                               (cadr (caddr timeSignatureToShow))))))
                           (make-translate-markup
                            (cons 0 0)
                            (make-fontsize-markup
                             -6
                             (make-number-markup
                              (number->string
                               (caddr (caddr timeSignatureToShow))))))))))))
                 (make-number-markup
                  (number->string
```

```
                  (cadddr (caddr timeSignatureToShow))))))
              ))
            )


      )))

   #{
    \time $underlyingMeter
    \set beatStructure = $beatStructure

    \override Timing.TimeSignature.stencil =
    #ly:text-interface::print
    \override Timing.TimeSignature.text =
    #mkup
   #})

backToNormalTimeSignature =
{
 \unset beatStructure
 \revert Timing.TimeSignature.stencil
 \revert Timing.TimeSignature.text
 \revert Staff.TimeSignature.stencil
 \revert Staff.TimeSignature.text
}


{

 \compoundFractionalTimeSignatureAThree #'((3 4)(4 5 4)(2 3 4)) 67/60 3,3,3,4,2
 \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c'[ c' c']}
 \incompleteTupletBracket \tuplet 5/4 {c'16[ c' c' c']}
 \incompleteTupletBracket \tuplet 3/2 {c'8 c'}

 \backToNormalTimeSignature
 \time 3/4
 c'2.
}
```

11.7.4 Discussion

1. As mentioned in the **Grammar** section, it appears that specifying the beaming in the LilyPond code is still necessary. This is probably because of the unusual value of the fraction that needs to be given in the second argument of the function, `MEASURE_SPAN`.

2. As in the case of the other compound meters introduced in this document, I am hoping to find ways to simplify the code.

3. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

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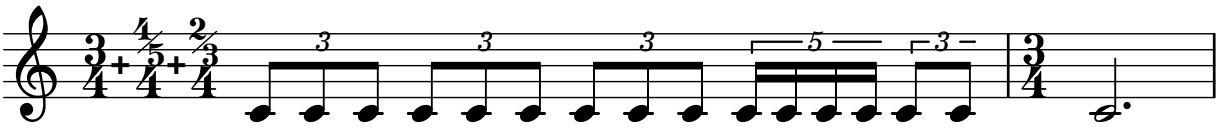
11.8 Compound Meter with Three Fractional Time Signatures, Style B



11.8.1 Description

This is an implementation of a compound meter with three fractional time signatures with Style B.

11.8.2 Grammar

```
\compoundFractionalTimeSignatureBThree
      #'((TIME_SIG1)(TIME_SIG2)(TIME_SIG3)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. See **Grammar** of the entry *Compound Meter with Three Fractional Time Signatures, Style A*.
2. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.8.3 Code

```
\version "2.24.4"
\language "english"

% Revised Jan 2 2025 for improving the appearance of fractions
% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))

\suppressWarning 1 "strange time signature found"

incompleteTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
```

```
 \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t
 \once \override Voice.TupletNumber.X-offset =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       2.2
       1.2))

 \once \override Voice.TupletBracket.shorten-pair =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(-0.7 . 0.15)
       '(-0.3 . 0.8)))
 \once \override Voice.TupletBracket.X-positions =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(1.8 . 3)
       '(0.3 . 2.7)))
}

compoundFractionalTimeSignatureBThree =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)
  (define mkup
   (markup
    #:concat

    (

     #:override
     (cons 'baseline-skip 0)
     (cond ((= (length (car timeSignatureToShow)) 2)
            (make-center-column-markup
             (list (make-number-markup
                    (number->string
                     (car (car timeSignatureToShow))))
                   (make-number-markup
                    (number->string
                     (cadr (car timeSignatureToShow)))))))

           ((= (length (car timeSignatureToShow)) 3)
            (make-override-markup
             (cons 'baseline-skip 0)
```

```
67                (make-center-column-markup
68                 (list
69                  (make-line-markup
70                   (list
71                    (make-number-markup
72                     (make-right-align-markup
73                      (make-translate-markup
74                       (cons 0 1.6)
75                       (make-fontsize-markup
76                        -3
77                        (number->string
78                         (car (car timeSignatureToShow)))))))
79
80                    (make-hspace-markup -1.5)
81
82                    (make-override-markup
83                     (cons 'alignment 0)
84                     (make-translate-markup
85                      (cons 0 0.8)
86                      (make-draw-line-markup (cons 1.5 1.35))))
87
88                    (make-hspace-markup -1.5)
89
90                    (make-translate-markup
91                     (cons 0 0)
92                     (make-fontsize-markup
93                      -3
94                      (make-number-markup
95                       (number->string
96                        (cadr (car timeSignatureToShow)))))))
97
98                   (make-number-markup
99                    (number->string
100                    (caddr (car timeSignatureToShow)))))))
101
102
103             ((= (length (car timeSignatureToShow)) 4)
104
105              (make-override-markup
106               (cons 'baseline-skip 0)
107               (make-center-column-markup
108                (list
109                 (make-line-markup
110                  (list
111                   (make-number-markup
112                    (number->string
113                     (car (car timeSignatureToShow))))
114                   (make-fontsize-markup
```

```
                  -12
                  (make-simple-markup " "))

                 (make-hspace-markup -1.25)
                 (make-translate-markup
                  (cons 0 0.4)
                  (make-bold-markup
                   (make-simple-markup "+")))

                 (make-hspace-markup -0.25)

                 (make-hspace-markup -0.5)
                 (make-right-align-markup
                  (make-number-markup
                   (make-translate-markup
                    (cons 0 1.5)
                    (make-fontsize-markup
                     -3
                     (number->string
                      (cadr (car timeSignatureToShow)))))))

                 (make-hspace-markup -1.5)

                 (make-override-markup
                  (cons 'alignment 0)
                  (make-translate-markup
                   (cons 0 0.8)
                   (make-draw-line-markup
                    (cons 1.5 1.35))))

                 (make-hspace-markup -1.5)

                 (make-number-markup
                  (make-left-align-markup
                   (make-fontsize-markup
                    -3
                    (number->string
                     (caddr (car timeSignatureToShow))))))))

               (make-number-markup
                (number->string
                 (cadddr (car timeSignatureToShow)))))))))


      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")
      #:translate
```

```
163       (cons 0 -0.5)
164       (#:bold "+")
165       #:translate
166       (cons 0 -0.5)
167       (#:fontsize -12 " ")
168
169       #:override
170       (cons 'baseline-skip 0)
171
172       (cond ((= (length (cadr timeSignatureToShow)) 2)
173              (make-center-column-markup
174               (list (make-number-markup
175                      (number->string
176                       (car (cadr timeSignatureToShow))))
177                     (make-number-markup
178                      (number->string
179                       (cadr (cadr timeSignatureToShow)))))))
180
181             ((= (length (cadr timeSignatureToShow)) 3)
182              (make-override-markup
183               (cons 'baseline-skip 0)
184               (make-center-column-markup
185                (list
186                 (make-line-markup
187                  (list
188                   (make-number-markup
189                    (make-right-align-markup
190                     (make-translate-markup
191                      (cons 0 1.6)
192                      (make-fontsize-markup
193                       -3
194                       (number->string
195                        (car (cadr timeSignatureToShow)))))))
196
197                   (make-hspace-markup -1.5)
198
199                   (make-override-markup
200                    (cons 'alignment 0)
201                    (make-translate-markup
202                     (cons 0 0.8)
203                     (make-draw-line-markup (cons 1.5 1.35))))
204
205                   (make-hspace-markup -1.5)
206
207                   (make-translate-markup
208                    (cons 0 0)
209                    (make-fontsize-markup
210                     -3
```

```
211                     (make-number-markup
212                      (number->string
213                       (cadr (cadr timeSignatureToShow))))))))
214
215                   (make-number-markup
216                    (number->string
217                     (caddr (cadr timeSignatureToShow))))))))
218
219
220             ((= (length (cadr timeSignatureToShow)) 4)
221
222              (make-override-markup
223               (cons 'baseline-skip 0)
224               (make-center-column-markup
225                (list
226                 (make-line-markup
227                  (list
228                   (make-number-markup
229                    (number->string
230                     (car (cadr timeSignatureToShow))))
231                   (make-fontsize-markup
232                    -12
233                    (make-simple-markup " "))
234
235                   (make-hspace-markup -1.25)
236                   (make-translate-markup
237                    (cons 0 0.4)
238                    (make-bold-markup
239                     (make-simple-markup "+")))
240
241                   (make-hspace-markup -0.25)
242
243                   (make-hspace-markup -0.5)
244                   (make-right-align-markup
245                    (make-number-markup
246                     (make-translate-markup
247                      (cons 0 1.5)
248                      (make-fontsize-markup
249                       -3
250                       (number->string
251                        (cadr (cadr timeSignatureToShow)))))))
252
253                   (make-hspace-markup -1.5)
254
255                   (make-override-markup
256                    (cons 'alignment 0)
257                    (make-translate-markup
258                     (cons 0 0.8)
```

```
259                   (make-draw-line-markup
260                    (cons 1.5 1.35))))
261
262                  (make-hspace-markup -1.5)
263
264                  (make-number-markup
265                   (make-left-align-markup
266                    (make-fontsize-markup
267                     -3
268                     (number->string
269                      (caddr (cadr timeSignatureToShow))))))))
270
271                (make-number-markup
272                 (number->string
273                  (cadddr (cadr timeSignatureToShow)))))))))
274
275       #:translate
276       (cons 0 -0.5)
277       (#:fontsize -12 " ")
278       #:translate
279       (cons 0 -0.5)
280       (#:bold "+")
281       #:translate
282       (cons 0 -0.5)
283       (#:fontsize -12 " ")
284
285       #:override
286       (cons 'baseline-skip 0)
287
288       (cond ((= (length (caddr timeSignatureToShow)) 2)
289              (make-center-column-markup
290               (list (make-number-markup
291                      (number->string
292                       (car (caddr timeSignatureToShow))))
293                     (make-number-markup
294                      (number->string
295                       (cadr (caddr timeSignatureToShow)))))))
296
297             ((= (length (caddr timeSignatureToShow)) 3)
298              (make-override-markup
299               (cons 'baseline-skip 0)
300               (make-center-column-markup
301                (list
302                 (make-line-markup
303                  (list
304                   (make-number-markup
305                    (make-right-align-markup
306                     (make-translate-markup
```

```
                    (cons 0 1.6)
                    (make-fontsize-markup
                     -3
                     (number->string
                      (car (caddr timeSignatureToShow)))))))

                  (make-hspace-markup -1.5)

                  (make-override-markup
                   (cons 'alignment 0)
                   (make-translate-markup
                    (cons 0 0.8)
                    (make-draw-line-markup (cons 1.5 1.35))))

                  (make-hspace-markup -1.5)

                  (make-translate-markup
                   (cons 0 0)
                   (make-fontsize-markup
                    -3
                    (make-number-markup
                     (number->string
                      (cadr (caddr timeSignatureToShow)))))))

                (make-number-markup
                 (number->string
                  (caddr (caddr timeSignatureToShow)))))))


              ((= (length (caddr timeSignatureToShow)) 4)

               (make-override-markup
                (cons 'baseline-skip 0)
                (make-center-column-markup
                 (list
                  (make-line-markup
                   (list
                    (make-number-markup
                     (number->string
                      (car (caddr timeSignatureToShow))))
                    (make-fontsize-markup
                     -12
                     (make-simple-markup " "))

                    (make-hspace-markup -1.25)
                    (make-translate-markup
                     (cons 0 0.4)
                     (make-bold-markup
```

```
                    (make-simple-markup "+")))

                  (make-hspace-markup -0.25)

                  (make-hspace-markup -0.5)
                  (make-right-align-markup
                   (make-number-markup
                    (make-translate-markup
                     (cons 0 1.5)
                     (make-fontsize-markup
                      -3
                      (number->string
                       (cadr (caddr timeSignatureToShow)))))))

                  (make-hspace-markup -1.5)

                  (make-override-markup
                   (cons 'alignment 0)
                   (make-translate-markup
                    (cons 0 0.8)
                    (make-draw-line-markup
                     (cons 1.5 1.35))))

                  (make-hspace-markup -1.5)

                  (make-number-markup
                   (make-left-align-markup
                    (make-fontsize-markup
                     -3
                     (number->string
                      (caddr (caddr timeSignatureToShow))))))))

                (make-number-markup
                 (number->string
                  (cadddr (caddr timeSignatureToShow)))))))
    )

   ))

  #{
   \time $underlyingMeter
   \set beatStructure = $beatStructure

   \override Timing.TimeSignature.stencil =
   #ly:text-interface::print
   \override Timing.TimeSignature.text =
   #mkup
  #})
```

```
403
404 backToNormalTimeSignature =
405 {
406  \unset beatStructure
407  \revert Timing.TimeSignature.stencil
408  \revert Timing.TimeSignature.text
409  \revert Staff.TimeSignature.stencil
410  \revert Staff.TimeSignature.text
411 }
412
413 {
414
415  \compoundFractionalTimeSignatureBThree #'((3 4)(4 5 4)(2 3 4)) 67/60 3,3,3,4,2
416  \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
417  \tuplet 3/2 {c'[ c' c']}
418  \incompleteTupletBracket \tuplet 5/4 {c'16[ c' c' c']}
419  \incompleteTupletBracket \tuplet 3/2 {c'8 c'}
420  \backToNormalTimeSignature
421  \time 3/4
422  c'2.
423
424 }
```

11.8.4 Discussion

See **Discussion** of the entry *Compound Meter with Three Fractional Time Signatures, Style A.*

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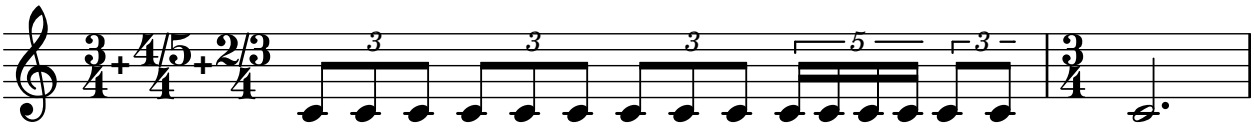
11.9 Compound Meter with Three Fractional Time Signatures, Style C



11.9.1 Description

This is an implementation of a compound meter with three fractional time signatures with Style C.

11.9.2 Grammar

```
\compoundFractionalTimeSignatureCThree
      #'((TIME_SIG1)(TIME_SIG2)(TIME_SIG3)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. See **Grammar** of the entry *Compound Meter with Three Fractional Time Signatures, Style A*.
2. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.9.3 Code

```
\version "2.24.4"
\language "english"


% Revised Jan 2 2025 for improving the appearance of fractions
% Revised Aug 10 2025 to include the function to revert to a
% regular time signature

suppressWarning =
#(define-void-function (amount message)(number? string?)
  (for-each
   (lambda (warning)
    (ly:expect-warning message))
   (iota amount 1 1)))

\suppressWarning 1 "strange time signature found"

```

```
incompleteTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t

}
incompleteSmallTupletBracket =  {
 \once \override Voice.TupletBracket.edge-height = #'(0.7 . 0)
 \once \override Voice.TupletBracket.bracket-visibility = ##t
 \once \override Voice.TupletNumber.X-offset =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       2.2
       1.2))

 \once \override Voice.TupletBracket.shorten-pair =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(-0.7 . 0.15)
       '(-0.3 . 0.8)))
 \once \override Voice.TupletBracket.X-positions =
 #(lambda (grob)
   (if (= UP (ly:grob-property grob 'direction))
       '(1.8 . 3)
       '(0.3 . 2.7)))
}

compoundFractionalTimeSignatureCThree =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)
  (define mkup
   (markup
    #:concat
    (

     #:override
     (cons 'baseline-skip 0)
     (cond ((= (length (car timeSignatureToShow)) 2)
            (make-center-column-markup
             (list (make-number-markup
                    (number->string
                     (car (car timeSignatureToShow))))
                   (make-number-markup
                    (number->string
                     (cadr (car timeSignatureToShow)))))))

           ((= (length (car timeSignatureToShow)) 3)
            (make-override-markup
```

```
66              (cons 'baseline-skip 0)
67              (make-center-column-markup
68               (list
69                (make-line-markup
70                 (list
71
72                  (make-right-align-markup
73                   (make-number-markup
74                    (number->string
75                     (car (car timeSignatureToShow)))))
76
77                  (make-hspace-markup -0.6)
78
79                  (make-override-markup
80                   (list (cons 'alignment 0)
81                         (cons 'thickness 2))
82                   (make-draw-line-markup
83                    (cons 0.5 2)))
84
85                  (make-hspace-markup -0.6)
86
87                  (make-number-markup
88                   (make-left-align-markup
89                    (number->string
90                     (cadr (car timeSignatureToShow)))))))
91
92                (make-number-markup
93                 (number->string
94                  (caddr (car timeSignatureToShow))))))))
95
96
97            ((= (length (car timeSignatureToShow)) 4)
98
99             (make-override-markup
100             (cons 'baseline-skip 0)
101             (make-center-column-markup
102              (list
103               (make-line-markup
104                (list
105                 (make-number-markup
106                  (number->string
107                   (car (car timeSignatureToShow))))
108                 (make-fontsize-markup
109                  -12
110                  (make-simple-markup " "))
111
112
113                 (make-hspace-markup -1.25)
```

```
                  (make-translate-markup
                   (cons 0 0.4)
                   (make-bold-markup
                    (make-simple-markup "+")))

                  (make-hspace-markup -0.25)

                  (make-hspace-markup -0.5)
                  (make-right-align-markup
                   (make-number-markup
                    (number->string
                     (cadr (car timeSignatureToShow)))))

                  (make-hspace-markup -0.6)

                  (make-override-markup
                   (list (cons 'alignment 0)
                         (cons 'thickness 2))
                   (make-draw-line-markup (cons 0.5 2)))

                  (make-hspace-markup -0.6)

                  (make-number-markup
                   (make-left-align-markup
                    (number->string
                     (caddr (car timeSignatureToShow)))))))

                (make-number-markup
                 (number->string
                  (cadddr (car timeSignatureToShow)))))))))


      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")
      #:translate
      (cons 0 -0.5)
      (#:bold "+")
      #:translate
      (cons 0 -0.5)
      (#:fontsize -12 " ")

      #:override
      (cons 'baseline-skip 0)

      (cond ((= (length (cadr timeSignatureToShow)) 2)
             (make-center-column-markup
              (list (make-number-markup
```

```
                    (number->string
                     (car (cadr timeSignatureToShow))))
                   (make-number-markup
                    (number->string
                     (cadr (cadr timeSignatureToShow)))))))

             ((= (length (cadr timeSignatureToShow)) 3)
              (make-override-markup
               (cons 'baseline-skip 0)
               (make-center-column-markup
                (list
                 (make-line-markup
                  (list

                   (make-right-align-markup
                    (make-number-markup
                     (number->string
                      (car (cadr timeSignatureToShow)))))

                   (make-hspace-markup -0.6)

                   (make-override-markup
                    (list (cons 'alignment 0)
                          (cons 'thickness 2))
                    (make-draw-line-markup
                     (cons 0.5 2)))

                   (make-hspace-markup -0.6)

                   (make-number-markup
                    (make-left-align-markup
                     (number->string
                      (cadr (cadr timeSignatureToShow)))))))

                 (make-number-markup
                  (number->string
                   (caddr (cadr timeSignatureToShow))))))))


             ((= (length (cadr timeSignatureToShow)) 4)

              (make-override-markup
               (cons 'baseline-skip 0)
               (make-center-column-markup
                (list
                 (make-line-markup
                  (list
                   (make-number-markup
```

```
                    (number->string
                     (car (cadr timeSignatureToShow))))
                   (make-fontsize-markup
                    -12
                    (make-simple-markup " "))


                   (make-hspace-markup -1.25)
                   (make-translate-markup
                    (cons 0 0.4)
                    (make-bold-markup
                     (make-simple-markup "+")))

                   (make-hspace-markup -0.25)

                   (make-hspace-markup -0.5)
                   (make-right-align-markup
                    (make-number-markup
                     (number->string
                      (cadr (cadr timeSignatureToShow)))))

                   (make-hspace-markup -0.6)

                   (make-override-markup
                    (list (cons 'alignment 0)
                          (cons 'thickness 2))
                    (make-draw-line-markup (cons 0.5 2)))

                   (make-hspace-markup -0.6)

                   (make-number-markup
                    (make-left-align-markup
                     (number->string
                      (caddr (cadr timeSignatureToShow)))))))

                 (make-number-markup
                  (number->string
                   (cadddr (cadr timeSignatureToShow)))))))))

       #:translate
       (cons 0 -0.5)
       (#:fontsize -12 " ")
       #:translate
       (cons 0 -0.5)
       (#:bold "+")
       #:translate
       (cons 0 -0.5)
       (#:fontsize -12 " ")
```

```
258
259       #:override
260       (cons 'baseline-skip 0)
261
262       (cond ((= (length (caddr timeSignatureToShow)) 2)
263              (make-center-column-markup
264               (list (make-number-markup
265                      (number->string
266                       (car (caddr timeSignatureToShow))))
267                     (make-number-markup
268                      (number->string
269                       (cadr (caddr timeSignatureToShow)))))))
270
271             ((= (length (caddr timeSignatureToShow)) 3)
272              (make-override-markup
273               (cons 'baseline-skip 0)
274               (make-center-column-markup
275                (list
276                 (make-line-markup
277                  (list
278
279                   (make-right-align-markup
280                    (make-number-markup
281                     (number->string
282                      (car (caddr timeSignatureToShow)))))
283
284                   (make-hspace-markup -0.6)
285
286                   (make-override-markup
287                    (list (cons 'alignment 0)
288                          (cons 'thickness 2))
289                    (make-draw-line-markup
290                     (cons 0.5 2)))
291
292                   (make-hspace-markup -0.6)
293
294                   (make-number-markup
295                    (make-left-align-markup
296                     (number->string
297                      (cadr (caddr timeSignatureToShow)))))))
298
299                 (make-number-markup
300                  (number->string
301                   (caddr (caddr timeSignatureToShow))))))))
302
303
304             ((= (length (caddr timeSignatureToShow)) 4)
305
```

```
306               (make-override-markup
307                (cons 'baseline-skip 0)
308                (make-center-column-markup
309                 (list
310                  (make-line-markup
311                   (list
312                    (make-number-markup
313                     (number->string
314                      (car (caddr timeSignatureToShow))))
315                    (make-fontsize-markup
316                     -12
317                     (make-simple-markup " "))
318
319
320                    (make-hspace-markup -1.25)
321                    (make-translate-markup
322                     (cons 0 0.4)
323                     (make-bold-markup
324                      (make-simple-markup "+")))
325
326                    (make-hspace-markup -0.25)
327
328                    (make-hspace-markup -0.5)
329                    (make-right-align-markup
330                     (make-number-markup
331                      (number->string
332                       (cadr (caddr timeSignatureToShow)))))
333
334                    (make-hspace-markup -0.6)
335
336                    (make-override-markup
337                     (list (cons 'alignment 0)
338                           (cons 'thickness 2))
339                     (make-draw-line-markup (cons 0.5 2)))
340
341                    (make-hspace-markup -0.6)
342
343                    (make-number-markup
344                     (make-left-align-markup
345                      (number->string
346                       (caddr (caddr timeSignatureToShow)))))))
347
348                  (make-number-markup
349                   (number->string
350                    (cadddr (caddr timeSignatureToShow)))))))))
351        )
352       ))
353
```

```
   #{
    \time $underlyingMeter
    \set beatStructure = $beatStructure

    \override Timing.TimeSignature.stencil =
    #ly:text-interface::print
    \override Timing.TimeSignature.text =
    #mkup
   #})

backToNormalTimeSignature =
{
 \unset beatStructure
 \revert Timing.TimeSignature.stencil
 \revert Timing.TimeSignature.text
 \revert Staff.TimeSignature.stencil
 \revert Staff.TimeSignature.text
}


{

 \compoundFractionalTimeSignatureCThree #'((3 4)(4 5 4)(2 3 4)) 67/60 3,3,3,4,2
 \tuplet 3/2 {c'8 c' c'} \tuplet 3/2 {c' c' c'}
 \tuplet 3/2 {c'[ c' c']}
 \incompleteTupletBracket \tuplet 5/4 {c'16[ c' c' c']}
 \incompleteTupletBracket \tuplet 3/2 {c'8 c'}
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}

```

11.9.4 Discussion

See **Discussion** of the entry *Compound Meter with Three Fractional Time Signatures, Style A.*

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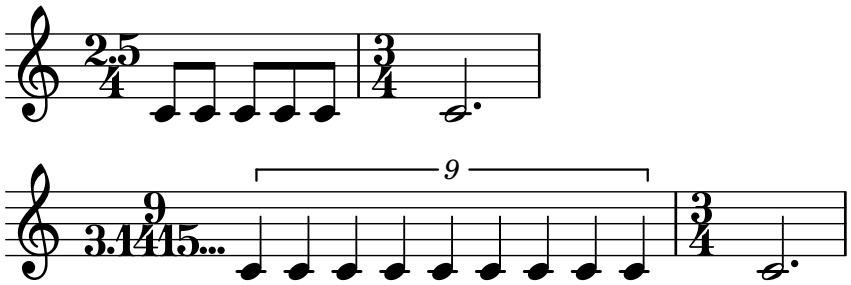
11.10 Time Signature with Decimals



11.10.1 Description

This is an implementation of a time signature with decimals. This function allows the user to use decimals for both numerator and denominator values of the time signature. While there are many examples where the numerator value contains decimals, notable examples for denominators that contain decimals include works by Mark Andre, such as *Un-fini I* (1995) for harp,[16] *Un-fini II* (1994-95) for harpsichord,[17] and *Contrapunctus* (1998/99) for piano..[18] This function also has the option of showing ellipsis, as discussed in **Grammar**.

11.10.2 Grammar

```
\decimalPointTimeSignature
       #'((NUMERATOR)(DENOMINATOR)) MEASURE_SPAN BEAT_STRUCT

\backToNormalTimeSignature
```

NB

1. The first argument takes a list of two lists. For both `NUMERATOR` and `DENOMINATOR`, one or two numbers can be placed.
   (a) If only one number is placed, it is treated as an integer. For example, `#'((3)(4))` would print: $\frac{3}{4}$.
   (b) If two numbers are placed, the first number is the integer portion of the number, and the second number is the decimals. For example, `#'((3 5)(4 232))` would print: $\frac{3.5}{4.232}$.
   (c) Placing a dot `.` at the end of the second number will print the ellipsis `...` at the end. This is useful for notating infinite decimal representations. For example, `#'((3 14159.)(4))` would print: $\frac{3.14159...}{4}$.
2. `MEASURE_SPAN` denotes how the measure may be written without the use of "decimal point" time signature.
3. `BEAT_STRUCT` indicates beat structure, by which the beaming of the measure abides.

16. Mark Andre, *Un-fini I : 1995, für eine Harfenistin/einen Harfenisten (Harfe, Tam-tam, grosse Trommel)*, Neue Musik bei Carus (Stuttgart: Carus, 1997).
17. Mark Andre, *Un-fini II : pour clavecin (1996)* (Paris: Editions Durand, 1998).
18. Mark Andre, *Contrapunctus : pour piano* (Paris: Durand, 2006).

4. When you wish to go back to a regular time signature, use `\backToNormalTimeSignature`, otherwise the identical fractional time signature will keep showing up.

11.10.3 Code

```
\version "2.24.4"
\language "english"

decimalPointTimeSignature =
#(define-music-function
  (timeSignatureToShow underlyingMeter beatStructure)
  (list? fraction? number-list?)

  (define (is-float? x)
   (and (number? x) (inexact? x)))

  #{
   \time $underlyingMeter
   \set beatStructure = $beatStructure
   \override Staff.TimeSignature.stencil =
   #ly:text-interface::print
   \override Staff.TimeSignature.text =
   #(markup
     (make-override-markup
      (cons 'baseline-skip 0)
      (make-center-column-markup
       (list
        (if (= (length (car  timeSignatureToShow)) 1)
            (make-number-markup
             (number->string

              (car (car timeSignatureToShow))))
            (make-line-markup
             (list
              (make-number-markup
               (number->string
                (car (car timeSignatureToShow))))
              (make-hspace-markup -0.5)
              (make-translate-markup
               '(0 . 0.15)
               (make-musicglyph-markup "period"))
              (make-hspace-markup -0.5)
              (if (not (is-float? (cadr (car timeSignatureToShow))))
                  (make-number-markup
                   (number->string
                    (inexact->exact (cadr (car timeSignatureToShow)))
                    ))
                  (make-line-markup
```

```
                    (list (make-number-markup
                           (number->string
                            (inexact->exact
                             (cadr (car timeSignatureToShow)))
                            ))
                          (make-hspace-markup -0.5)
                          (make-translate-markup
                           '(0 . 0.15)
                           (make-musicglyph-markup "period"))
                          (make-hspace-markup -0.5)
                          (make-translate-markup
                           '(0 . 0.15)
                           (make-musicglyph-markup "period"))
                          (make-hspace-markup -0.5)
                          (make-translate-markup
                           '(0 . 0.15)
                           (make-musicglyph-markup "period"))))
                )
               )
              )
             )
        (if (= (length (cadr  timeSignatureToShow)) 1)
            (make-number-markup
             (number->string
              (car (cadr timeSignatureToShow))))
            (make-line-markup
             (list
              (make-number-markup
               (number->string
                (car (cadr timeSignatureToShow))))
              (make-hspace-markup -0.5)
              (make-translate-markup
               '(0 . 0.15)
               (make-musicglyph-markup "period"))
              (make-hspace-markup -0.5)
              (if (not (is-float? (cadr (cadr timeSignatureToShow))))
                  (make-number-markup
                   (number->string
                    (inexact->exact (cadr (cadr timeSignatureToShow)))
                    ))
                  (make-line-markup
                   (list (make-number-markup
                          (number->string
                           (inexact->exact
                            (cadr (cadr timeSignatureToShow)))
                           ))
                         (make-hspace-markup -0.5)
                         (make-translate-markup
```

```
                            '(0 . 0.15)
                            (make-musicglyph-markup "period"))
                           (make-hspace-markup -0.5)
                           (make-translate-markup
                            '(0 . 0.15)
                            (make-musicglyph-markup "period"))
                           (make-hspace-markup -0.5)
                           (make-translate-markup
                            '(0 . 0.15)
                            (make-musicglyph-markup "period"))))
                    )
                )
               )
              )
          )
         ))
      (make-hspace-markup -1))
  #})

backToNormalTimeSignature =
{
 \unset beatStructure
 \revert Timing.TimeSignature.stencil
 \revert Timing.TimeSignature.text
 \revert Staff.TimeSignature.stencil
 \revert Staff.TimeSignature.text
}


{
 \decimalPointTimeSignature #'((2 5)(4)) 5/8 2,3
 c'8 c' c' c' c'
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}


{
 \decimalPointTimeSignature #'((9)(3 1415.)) 9/4 3,3,3
 \tuplet 9/9 {c'4 4 4 4 4 4 4 4 4}
 \backToNormalTimeSignature
 \time 3/4
 c'2.
}

```

11.10.4 Discussion

The structure of the code where the user specifies integer and decimal portions of either numerator, denominator, or both, resulted from the fact that the period "." by default appeared too close to the staff line and the denominator, possibly rendering the time signature difficult to read. In the code I made these periods appear via `\translate` feature, where I offset the period upward by the value of 0.15, allowing the period sign to be separated from the staff line and the denominator.

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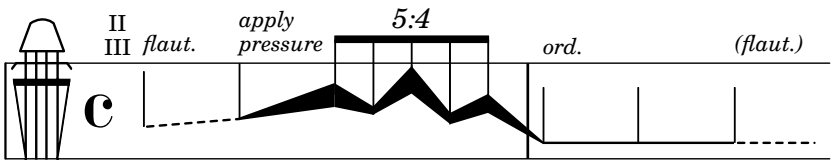
Chapter 12

Combinations

This chapter presents examples that combine several snippets from the previous chapters. **Variables Used** provides a comprehensive list of all the variables required to generate the snippet. Among these, indented variables indicate "variables of a variable," i.e., dependent variables necessary for the main variables to function. The **Code** section only lists the score portion of the LilyPond code.

12.1 Prescriptive Notation for String Instruments



12.1.1 Description

An example of a prescriptive notation for a string instrument. Vertical placement of the notehead corresponds to the position at which bowing takes place. Horizontally it shows the change of the bow pressure against the string(s).

12.1.2 Variables Used

```
\stringPositionClef
  \stringPositionClefDesign
\dashedLineNotehead
\modularLineNotehead
\noteheadless
```

12.1.3 Code

```
1
2  \score {
```

```
  {
    \override Staff.StaffSymbol.line-positions = #'(6  -6)
    \stringPositionClef
    \dashedLineNotehead g'4
            ^\markup {\fontsize #-4 \italic flaut.}
            ^\markup \translate #'(-2.5 . -0) \center-column
                        {\translate #'(0 . -1.5) \fontsize #-4 II
                        \fontsize #-4 III}
                a' #6
    \modularLineNotehead a'
            ^\markup \column {\translate #'(0 . -1.5)
                        \fontsize #-4 \italic apply \fontsize #-4
                        \italic pressure}
                d'' #15 #150 #6
    \override TupletNumber.text = #tuplet-number::calc-fraction-text
    \stemUp  \tuplet 5/4 {
      \modularLineNotehead d''8 b' #150 #50 #2.5
      \modularLineNotehead b' f'' #50 #175 #2.5
      \modularLineNotehead f'' a' #175 #70 #2.5
      \modularLineNotehead a' c'' #70 #120 #2.5
      \modularLineNotehead c'' e' #120 #15 #3.5
    }
    |
    \modularLineNotehead e'4
            ^\markup {\fontsize #-4 \italic ord.}
                e' #15 #15 #12
    \noteheadless e'
    \dashedLineNotehead e'
            ^\markup {\fontsize #-4 \italic (flaut.)}
                e' #5
  }

  \layout {
    \context {
      \Score proportionalNotationDuration = #(ly:make-moment 1/10)
                      \override SpacingSpanner.uniform-stretching = ##t
    }
  }
}

```

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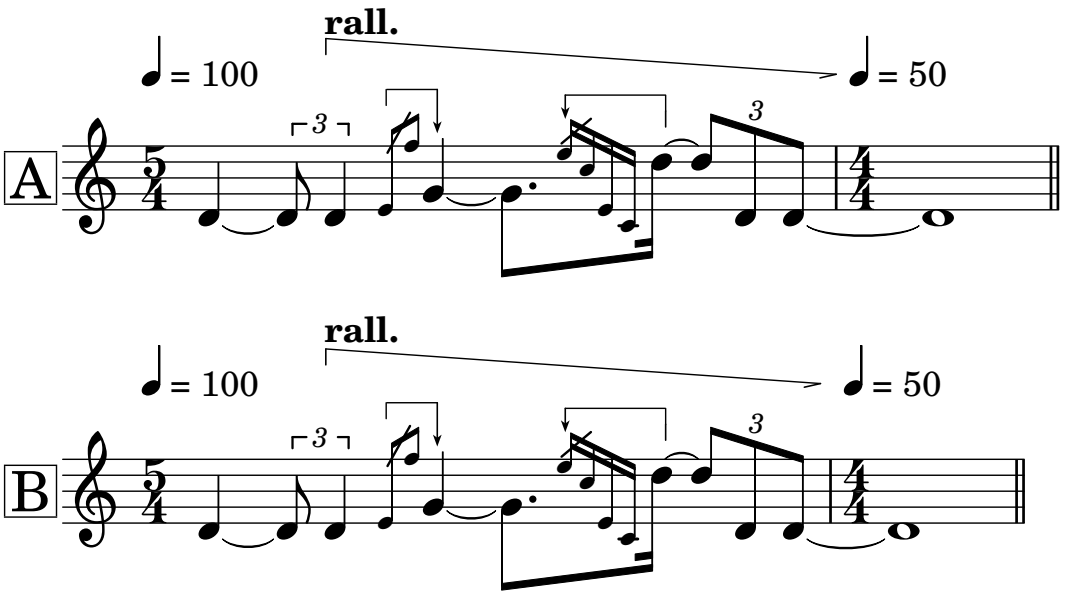
12.2 Multiple Instances Of Spanners At Once



12.2.1 Description

Invoking two or more Text Spanners (that require `\stopTextSpan` for them to finish their processes) all on one single layer could cause the spanners to behave unexpectedly. This entry is an attempt to avoid such unexpected behaviors by invoking a spanner per layer (A), or per staff line (B).

12.2.2 Variables Used

```
\startSlashedGraceMusic
\stopSlashedGraceMusic
\graceNoteBeforeBeatOn
\graceNoteBeforeBeatOff
\graceNoteAfterBeatOn
\graceNoteAfterBeatOff
\rallArrow
```

12.2.3 Code

```
1
2  %%%%%%%%%%%%%%%%%% A %%%%%%%%%%%%%%%%%%
3  \score {
4    \new Staff = "allElementsCombined"
5    \with {instrumentName = \markup {\fontsize #4 \box "A"}}  {
6      \numericTimeSignature
7      \override Score.MetronomeMark.Y-offset = #5.75
8      \tempo 4 = 100
9      \time 5/4
```

```
    <<
      {
        \tieNeutral \stemNeutral d'4~
        \tuplet 3/2 {d'8 d'4}
        \stemUp \grace  {
          \startSlashedGraceMusic \graceNoteBeforeBeatOn e'8 f''
          \stopSlashedGraceMusic
        } \graceNoteBeforeBeatOff g'4~
        \stemNeutral g'8.[ \grace {
        \startSlashedGraceMusic \graceNoteAfterBeatOn
          e''16 c'' e' c' \stopSlashedGraceMusic
        }
        \graceNoteAfterBeatOff d''16]~
        \tuplet 3/2 {d''8 d'8 d'8~} |
        \time 4/4
        d'1 \bar"||"
      }
      \\
      {
        s4  \tuplet 3/2 {
          s8 \override Voice.TextSpanner.Y-offset = #6.5
          s4^\markup {\translate #'(0 . 6.5) \bold "rall."}
          \rallArrow #4
        } s2. \tempo 4 = 50 s4*4 \stopTextSpan
      }
    >>
  }
}




%%%%%%%%%%%%%%%%% B %%%%%%%%%%%%%%%%
\score {
  <<
    \new Staff = "tempoLine" \with {
      \remove Clef_engraver
      \remove Staff_symbol_engraver
      \remove Time_signature_engraver
    }
    {
      \numericTimeSignature
      \override Score.MetronomeMark.Y-offset = #6
      \tempo 4 = 100
      \time 5/4
      s4  \tuplet 3/2 {
        s8 \override Voice.TextSpanner.Y-offset = #-2.25
```

```
          s4^\markup {\translate #'(0 . 0) \bold "rall."}
          \rallArrow #4} s2 \after 64*15 \stopTextSpan s8*2 |
        \tempo 4 = 50  s4*4
      }
      \new Staff = "music"
      \with { instrumentName = \markup {\fontsize #4 \box "B"}}
      {
        \tieNeutral \stemNeutral d'4~
        \tuplet 3/2 {d'8 d'4}
        \grace {
          \startSlashedGraceMusic \graceNoteBeforeBeatOn e'8 f''
          \stopSlashedGraceMusic
        } \graceNoteBeforeBeatOff g'4~
        g'8.[ \grace { \startSlashedGraceMusic \graceNoteAfterBeatOn
          e''16 c'' e' c' \stopSlashedGraceMusic
        }
        \graceNoteAfterBeatOff d''16]~
        \tuplet 3/2 {d''8 d'8 d'8~} |
        \time 4/4
        d'1 \bar"||"
      }
    >>
}
```

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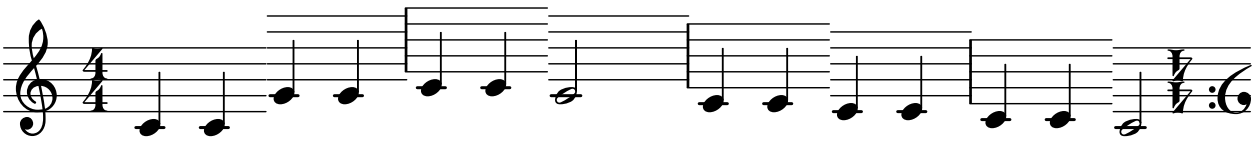
Chapter 13

Miscellanies

This chapter presents snippets that do not really belong to any of the other preceding chapters but I learned tremendously from making. Quite often I have made these snippets as a diversion.

13.1 Shifting Staffs, Rotated Clef and Time Signature



13.1.1 Description

Staff lines that are shifted so that, when the note moves away from the middle C, the staff lines move accordingly. The excerpt ends with a time signature and a clef that are rotated 180 degrees.

13.1.2 Code

```
\version "2.24.4"
\language "english"

staone = {
  \stopStaff
  \override Staff.StaffSymbol.line-positions =
  #'(0 2 4 6 8)
  \startStaff
}
statwo = {
  \stopStaff
  \override Staff.StaffSymbol.line-positions =
  #'(1 3 5 7 9)
  \startStaff
}
stathree = {
```

```
  \stopStaff
  \override Staff.StaffSymbol.line-positions =
  #'(-1 1 3 5 7)
  \startStaff
}
stafour = {
  \stopStaff
  \override Staff.StaffSymbol.line-positions =
  #'(-2 0 2 4 6)
  \startStaff
}
stafive = {
  \stopStaff
  \override Staff.StaffSymbol.line-positions =
  #'(-3 -1 1 3 5)
  \startStaff
}
stanorm = {
  \stopStaff
  \revert Staff.StaffSymbol.line-positions
  \startStaff
}
{
  \numericTimeSignature
  \time 4/4

  c'4 c' \staone g' g' \statwo a' a' \staone g'2
  \stathree f'4 f' \stafour e' e' \stafive d' d' \stanorm
  \override TextScript.outside-staff-priority = ##f
  \once \override TextScript.extra-offset = #'(0 . -4.5)
  c'2 ^\markup \concat {
    {
      \hspace #3 \rotate #180
      {\compound-meter #'(4 4)}
    }
    {
      \translate-scaled #'(1 . 0.5)
      \rotate #180 \musicglyph "clefs.F"
    }
  }
  \bar ""

}

\layout {
  \context{
    \Score   proportionalNotationDuration = #(ly:make-moment 1/7)
  }
```

```
65 }
```

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Chapter 14

Exploring Scheme

14.1 Introduction

Scheme, one of the dialects of the Lisp family of programming languages, is used in LilyPond as its extension language. Scheme allows LilyPond users to explore the inner workings of the program, enabling significant customization. The snippets in this document would not exist without taking advantage of it.[1]

However, learning Scheme can be daunting. In his unfinished book on Scheme and LilyPond, Urs Liska refers to its "thorny path."[2] While I have experience with Common Lisp (another Lisp dialect) from my work with OpenMusic, adjusting to Scheme's grammatical nuances still took some time.

This chapter does not aim to be a comprehensive guide to using Scheme in LilyPond.[3] Instead, it offers suggestions for newcomers to familiarize themselves with Scheme.

14.1.1 Step 1a: Focus on the Scheme Language Itself

Scheme is a language distinct from LilyPond, and understanding this distinction is essential. For simpler LilyPond tasks, Scheme may not be necessary. However, when working with internal parameters, Scheme allows deeper customization. It is beneficial to first study Scheme independently, learning its syntax and concepts by writing simple code.

14.1.2 Step 1b: Get Used to Prefix Notation

Scheme, like its Lisp relatives, uses prefix notation (Cambridge Polish Notation). Here are examples:

```
(+ 12 34)
>> This expression results in the value of 46.
```

1. For newcomers: parts of LilyPond code written in Scheme are often enclosed in `#(` and `)`. Numerical values preceded by `#`, and number pairs such as `\#'(1 . -2)`, are also part of the Scheme language.

2. Urs Liska, *Understanding Scheme In LilyPond*, vol. 2024, December 19 (2020), Web Page, https://scheme-book.readthedocs.io/en/latest/.

3. For a deeper dive, refer to the resource by Liska, as well as Jean Abou Samra, *Extending LilyPond*, vol. 2024, December 19 (2021), Web Page, https://extending-lilypond.gitlab.io/en/index.html. LilyPond also provides its own Extending Manual: https://lilypond.org/doc/v2.24/Documentation/extending/index

```
(+ 4 (* 3 9))
>> This expression first resolves the multiplication: (+ 4 27), which is 31.
```

If you are new to this, I recommend starting with Daniel P. Friedman and Matthias Felleisen, *The little Schemer (4th ed.)* (Cambridge, MA, USA: MIT Press, 1996), ISBN: 0262560992. While you might be eager to dive into using Scheme in LilyPond, learning Scheme as a programming language will make the process smoother.[4]

14.1.3 Step 2: Study Lots of Snippets

Once familiar with Scheme, study how it integrates with LilyPond by reviewing snippets from LSR. Start with shorter examples and analyze their structure. Here is an example snippet for adding the *Schleifer* ornament:[5] The corresponding code:[6]

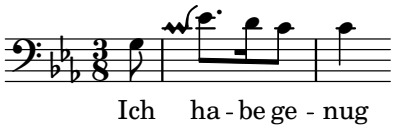

Figure 14.1: LSR No. 1185: *Schleifer* Ornament.

```
% Implementation by Martin Straeten of the Schleifer ornament
% as used by Johann Sebastian Bach, contributed to the user
% mailing list. In this case, it functions like a set of (always?)
% two grace notes, hence using a modified grace note to represent
% it in LilyPond makes sense.
%
% Code styling and user interface by Simon Albrecht 2024.

schleiferMarkup = \markup {
  \large \halign #.2 \raise #0.0
  \combine
  \halign #.8 \musicglyph "scripts.prall"
  \rotate #140 \normalsize \raise #2.4 \musicglyph "flags.u3"
}
schleiferGrace =
#(define-music-function (note) (ly:music?)
   #{
     \grace {
       \once\override NoteHead.stencil = #ly:text-interface::print
       \once\override NoteHead.X-extent = #'(-2 . -0)
       \once\override NoteHead.text = \schleiferMarkup
       \once\omit Stem
       \once\omit Flag
```

4. Liska and Samra's resources serve as excellent refreshers later on.
5. https://lsr.di.unimi.it/LSR/Item?id=1185
6. The mailing list thread referenced in the preamble is available at https://lists.gnu.org/archive/html/lilypond-user/2021-09/msg00352.html

```
24          $note
25        }
26      #})
27
28  \relative {
29    \time 3/8
30    \partial 8
31    \clef bass
32    \key c \minor
33    g8
34    \schleiferGrace c es8. d16 c8
35    c4
36  }
37  \addlyrics {
38    Ich ha -- be ge -- nug
39  }
```

The `\schleiferGrace` variable creates a customized ornament using Scheme's `define-music-function` macro. For a deeper understanding of the macro syntax, refer to the *LilyPond – Internals Reference*.[7]

Taking the variable `\schleiferGrace`, we see that invoking it creates an instance of activating a Scheme function that starts at Line 16. `define-music-function` is a macro that allows you to create a function that operates on LilyPond.

According to *LilyPond – Internals Reference*, the syntax for `define-music-function` is:

```
(define-music-function (arg1 arg2 …)
                       (type1? type2? …)
    function-body)
```

In the code, the argument's name is `note`, and it is tested according to the type specified in `type1?`, which in this case is `ly:music?`. According to the *Internal Reference*, `ly:music?` is a function that checks whether the object—in this case, `note`—is a `Music` object. Thus, it becomes clear that this function will not work unless it is followed by a musical note.

From Line 17 to Line 26, we see that a LilyPond code snippet has been inserted, as `#{` and `#}` signify the boundary of the LilyPond code within the Scheme code. This means that as part of invoking the variable `\schleiferGrace`, it passes through this LilyPond fragment, which is responsible for creating a grace note. Here, the notehead of the grace note is replaced with `\schleiferMarkup`, which is defined in Lines 9 to 14 of the code.[8]

Lines 22 and 23 show that the stem and flag are omitted from the grace note, while Line 24's `$note` signifies that the original argument `note` is called upon.[9] In this way, the *Schleifer* ornament is

7. https://lilypond.org/doc/v2.24/Documentation/internals/scheme-functions

8. The technique of sequential overrides, invoking the Scheme command `#ly:text-interface::print`, sets the `.stencil` of the notehead to use whatever is defined in the `.text` parameter. This technique is frequently used and is very useful in customizing notation. See also: https://lilypond.org/doc/v2.24/Documentation/notation/modifying-stencils.

9. Refer to this page for the difference between `#` and `$`: https://lilypond.org/doc/v2.24/Documentation/extending/lilypond-scheme-syntax

created from a note that follows the variable `\schleiferGrace`. This note is transformed into a grace note with a customized stencil setting, all done within the Scheme code.

14.1.4 Step 3: Hack the Codes

Once you study a code and become familiar with how it operates, experimenting with the code by hacking is a good way to deepen your understanding. Below, I give one example using the preceding *Schleifer* ornament snippet.

The *LilyPond – Internal Reference* reveals that the object `NoteHead` has its own standard settings, as well as support for about a dozen other interfaces.[10] One of them is the `grob-interface`, which makes it possible to change the color of a graphical object, or *Grob*.[11] Further reading in the *LilyPond – Notation Reference* shows that it is possible to override the color of an object.[12] Let us now tweak the *Schleifer* ornament code to allow us to change the ornament's color.

Following the reference, add the following line underneath `\once\override NoteHead.X-extent`:

```
\once\override NoteHead.color = #red
```

Running LilyPond now should produce the following result: Hard-coding a change like this may

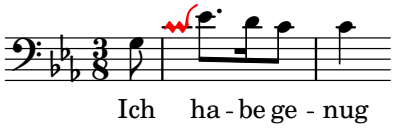

Figure 14.2: LSR No. 1185: *Schleifer* Ornament in red.

be good for testing the waters, but we may want the *Schleifer* ornament in more than just one color. The beauty of extending LilyPond is that we can customize the Scheme code to allow for this flexibility.

Let us move on. We should now let the `define-music-function` know that we are adding an additional argument to specify the color. The first part of the code will look like this:

```
#(define-music-function (note schleiferColor) (ly:music? color?)
```

This adds the argument `schleiferColor`, which only accepts color, as indicated by the corresponding test function `color?`.

Then, implement this argument in the sequence of `\once\override` processes. The line `NoteHead.color` can now be changed to:

```
\once\override NoteHead.color = #schleiferColor
```

Now, the variable `\schleiferGrace` requires one more argument to specify the ornament's color. The entire code should look like this:

```
1 schleiferMarkup = \markup {
2   \large \halign #.2 \raise #0.0
3   \combine
4   \halign #.8 \musicglyph "scripts.prall"
```

10. https://lilypond.org/doc/v2.24/Documentation/internals/notehead
11. https://lilypond.org/doc/v2.24/Documentation/internals/grob_002dinterface
12. https://lilypond.org/doc/v2.24/Documentation/notation/inside-the-staff#coloring-objects

```
  \rotate #140 \normalsize \raise #2.4 \musicglyph "flags.u3"
}

schleiferGrace =
#(define-music-function (note schleiferColor) (ly:music? color?)
   #{
     \grace {
       \once\override NoteHead.stencil = #ly:text-interface::print
       \once\override NoteHead.X-extent = #'(-2 . 0)
       \once\override NoteHead.color = #schleiferColor
       \once\override NoteHead.text = \schleiferMarkup
       \once\omit Stem
       \once\omit Flag
       $note
     }
   #})
\relative {
  \time 3/8
  \partial 8
  \clef bass
  \key c \minor
  g8
  \schleiferGrace c #green es8. d16 c8
  c4
}
\addlyrics {
  Ich ha -- be ge -- nug
}
```

This produces the following output:

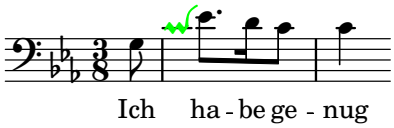

Figure 14.3: LSR No. 1185: *Schleifer* Ornament in green.

Notice that on Line 27, `#green` has been added. You can change this to any of the colors listed under "Normal Colors" in the *Notation Reference*,[13] such as `#'"lightsalmon"`, `#(x11-color "medium turquoise")`, or even `#'"#5e45ad"`.

As an exercise, try replicating the following excerpt:[14]

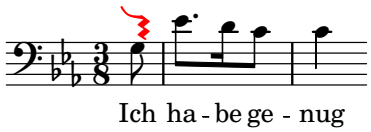

Figure 14.4: Can you replicate this?

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13. https://lilypond.org/doc/v2.24/Documentation/notation/list-of-colors
14. See LSR1185e3.ly for the answer.

14.2 Example 1: Creating a Time Signature with Its Compound Meter Form

On January 1, 2025, I came across a post by an anonymous user on Facebook.[15] The post asked if it would be possible to create a time signature that had its beat structure expressed in the form of a compound meter. Something like this:

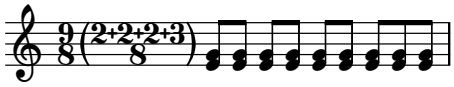

Figure 14.5: What the anonymous user wanted to achieve.

I responded to the post with relevant email threads on `lilypond-user` mailing list. I commented that it would be possible to override `TimeSignature.stencil` with custom-made time signatures. Incidentally, I was making a series of Fractional Time Signatures, which used this method.

The code for the aforementioned example is as follows:

```
\version "2.24.4"

{
  \clef "G"
  \time 9/8
  \set beatStructure = #'(2 2 2 3)
  \once \override Timing.TimeSignature.stencil = #ly:text-interface::print
  \once \override Timing.TimeSignature.text = \markup
  {
    \override #'(baseline-skip . 0)
    \center-column \number {9 8}
    \center-column {\fontsize #6 \musicglyph "accidentals.leftparen"}
    \hspace #-0.75
    \override #'(baseline-skip . 0)
    \center-column \number {{2+2+2+3} 8}
    \hspace #-0.75
    \center-column {\fontsize #6 \musicglyph "accidentals.rightparen"}
    \hspace #-1
  }
  \repeat unfold 9 {<e' g'>8 }
}
```

I realized that, while this might be an acceptable method if such time signatures appeared only once or twice in a piece, it may become problematic if I had to copy and paste this code every time I have such a time signature. Normally this could easily be resolved by making a variable out of `\override` clauses; however, a piece of music may use time signatures of this form in different configurations, just as the following example:

The code:

```
\version "2.24.4"
```

15. https://www.facebook.com/groups/gnulilypond/posts/10162467719483529/

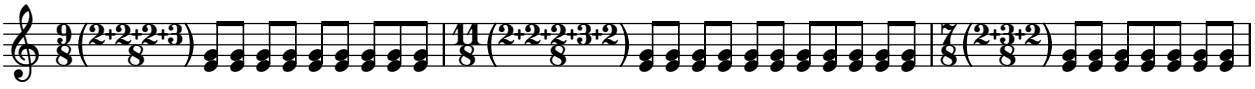

Figure 14.6: More compound meters.

```
2
3  {
4    \clef "G"
5    \time 9/8
6    \set beatStructure = #'(2 2 2 3)
7    \once \override Timing.TimeSignature.stencil = #ly:text-interface::print
8    \once \override Timing.TimeSignature.text = \markup
9    {
10     \override #'(baseline-skip . 0)
11     \center-column \number {9 8}
12     \center-column {\fontsize #6 \musicglyph "accidentals.leftparen"}
13     \hspace #-0.75
14     \override #'(baseline-skip . 0)
15     \center-column \number {{2+2+2+3} 8}
16     \hspace #-0.75
17     \center-column {\fontsize #6 \musicglyph "accidentals.rightparen"}
18     \hspace #-1
19   }
20   \repeat unfold 9 {<e' g'>8}
21
22   \time 11/8
23   \set beatStructure = #'(2 2 2 3 2)
24   \once \override Timing.TimeSignature.stencil = #ly:text-interface::print
25   \once \override Timing.TimeSignature.text = \markup
26   {
27     \override #'(baseline-skip . 0)
28     \center-column \number {11 8}
29     \center-column {\fontsize #6 \musicglyph "accidentals.leftparen"}
30     \hspace #-0.75
31     \override #'(baseline-skip . 0)
32     \center-column \number {{2+2+2+3+2} 8}
33     \hspace #-0.75
34     \center-column {\fontsize #6 \musicglyph "accidentals.rightparen"}
35     \hspace #-1
36   }
37   \repeat unfold 11 {<e' g'>8 }
38
39   \time 7/8
40   \set beatStructure = #'(2 3 2)
41   \once \override Timing.TimeSignature.stencil = #ly:text-interface::print
42   \once \override Timing.TimeSignature.text = \markup
```

```
    {
      \override #'(baseline-skip . 0)
      \center-column \number {7 8}
      \center-column {\fontsize #6 \musicglyph "accidentals.leftparen"}
      \hspace #-0.75
      \override #'(baseline-skip . 0)
      \center-column \number {{2+3+2} 8}
      \hspace #-0.75
      \center-column {\fontsize #6 \musicglyph "accidentals.rightparen"}
      \hspace #-1
    }
    \repeat unfold 7 {<e' g'>8 }

}
```

Writing as long of a code as this (for just three measures!) would be cumbersome, indeed. What could help is to come up with a music function, using the Scheme.

14.2.1 Step 1: Analyze What Could Be Automatized

I quote the code for the first example of this section again. This time, however, I turn the variables that could change each time I create an instance of this kind of time signature, into red:

```
\version "2.24.4"

{
  \clef "G"
  \time 9/8
  \set beatStructure = #'(2 2 2 3)
  \once \override Timing.TimeSignature.stencil = #ly:text-interface::print
  \once \override Timing.TimeSignature.text = \markup
  {
    \override #'(baseline-skip . 0)
    \center-column \number {9 8}
    \center-column {\fontsize #6 \musicglyph "accidentals.leftparen"}
    \hspace #-0.75
    \override #'(baseline-skip . 0)
    \center-column \number {{2+2+2+3}{8}}
    \hspace #-0.75
    \center-column {\fontsize #6 \musicglyph "accidentals.rightparen"}
    \hspace #-1
  }
  \repeat unfold 9 {<e' g'>8 }
}
```

14.2.2 Step 2: Write the Code

It would be good if this function could accept the following as arguments:

- Time signature of the measure as defined normally in the LilyPond function `\time`. For this, I will set `timesig` as the name of the argument, that tests its value with `fraction?`.
- The customized stencil of the time signature. I need to declare how it looks, namely:
  - Overall time signature;
  - Numerator portion of the compound meter, and;
  - Denominator portion of the compound meter.

  It should look similar to how the LilyPond function `\compoundMeter` that accepts a list of lists.For this, I will set `beatstruct` as the name of the argument, that tests its value with `list?`.

I will now build the rest of the function. Notice the way the Scheme code references various locations of a list, using `car`, `cadr`, and so on:

```
\version "2.24.4"

compoundTimeWithBeatStructure =
#(define-music-function (timesig beatstruct) (fraction? list?)
   #{
     \time #timesig
     \set beatStructure = #(cadr beatstruct)
     \once \override Timing.TimeSignature.stencil = #ly:text-interface::print
     \once \override Timing.TimeSignature.text = \markup
     {
       \override #'(baseline-skip . 0)
       \center-column \number
       {
         #(number->string (car (car beatstruct)))
         #(number->string (cadr (car beatstruct)))
       }
       \center-column {\fontsize #6 \musicglyph "accidentals.leftparen"}
       \hspace #-0.75
       \override #'(baseline-skip . 0)
       \center-column \number
       {
         {#(string-join (map number->string (cadr beatstruct)) "+")}
         #(number->string (car (caddr beatstruct)))
       }
       \hspace #-0.75
       \center-column {\fontsize #6 \musicglyph "accidentals.rightparen"}
       \hspace #-1
     }
   #}

   )

{
```

```
34    \compoundTimeWithBeatStructure 9/8 #'((9 8)(2 2 2 3)(8))
35    \repeat unfold 9 {<e' g'>8}
36    \compoundTimeWithBeatStructure 11/8 #'((11 8)(2 2 2 3 2)(8))
37    \repeat unfold 11 {<e' g'>8}
38    \compoundTimeWithBeatStructure 7/8 #'((7 8)(2 3 2)(8))
39    \repeat unfold 7 {<e' g'>8}
40  }
```

Thus, there is now a function called `\compoundTimeWithBeatStructure`, whose grammar is:

```
\compoundTimeWithBeatStructure
        TIME_SIGNATURE #'((TIME_SIGNATURE)(BEAT_STRUCTURE)(DENOMINATOR))
```

Running the code will result in the identical snippet as the previous figure:

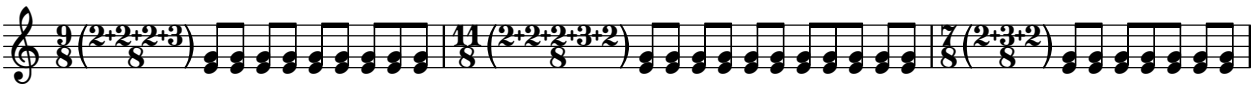

Figure 14.7: The same result as before with a shorter code.

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Appendices

Appendix A: Resources

As I taught LilyPond in a special topic course at the University of Delaware in Fall 2024, I compiled a list of links to useful websites and pages. It is in no way intended as a comprehensive list; instead, I list some essential pages that I have frequently looked up and found very useful. This page is subject to frequent revision.

On LilyPond

- Website: https://lilypond.org/
- Installing: https://lilypond.org/doc/v2.24/Documentation/learning/installing
- Manuals: https://lilypond.org/manuals.html

Text Editor for LilyPond

- Frescobaldi (Editor): https://frescobaldi.org/

Coding LilyPond

- Cheat Sheet: https://lilypond.org/doc/v2.24/Documentation/notation/cheat-sheet
- Snippets: https://lilypond.org/doc/v2.24/Documentation/web/snippets
- LilyPond Snippet Repository: https://lsr.di.unimi.it/

Mailing List

- Mailing list: https://lists.gnu.org/mailman/listinfo/lilypond-user
- Archives 1 https://lists.gnu.org/archive/html/lilypond-user/
- Archives 2 https://www.mail-archive.com/lilypond-user@gnu.org/

Advanced Topic on LilyPond

- LilyPond – Extending v2.24.4: https://lilypond.org/doc/v2.24/Documentation/extending/index#top
- Scheme (in LilyPond): https://scheme-book.readthedocs.io/en/latest/
- Extending LilyPond: https://extending-lilypond.gitlab.io/en/extending/index.html
- Scheme Resources https://www.gnu.org/software/guile/learn/#scheme-resources
- PostScript Manual: https://www.adobe.com/jp/print/postscript/pdfs/PLRM.pdf
- PostScript Tutorial: https://paulbourke.net/dataformats/postscript/

Troubleshooting

- The default text font for LilyPond doesn't seem to work (Mac)
- Frescobaldi freezes upon loading

Miscellaneous Items

- About Emmentaler font: https://lilypond.org/doc/v2.25/Documentation/notation/the-emmentaler-font

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