Rhythm Necklace & Hemiola: Hidden Meter in Radiohead and Björk

Stephen Taylor, University of Illinois at Urbana-Champaign

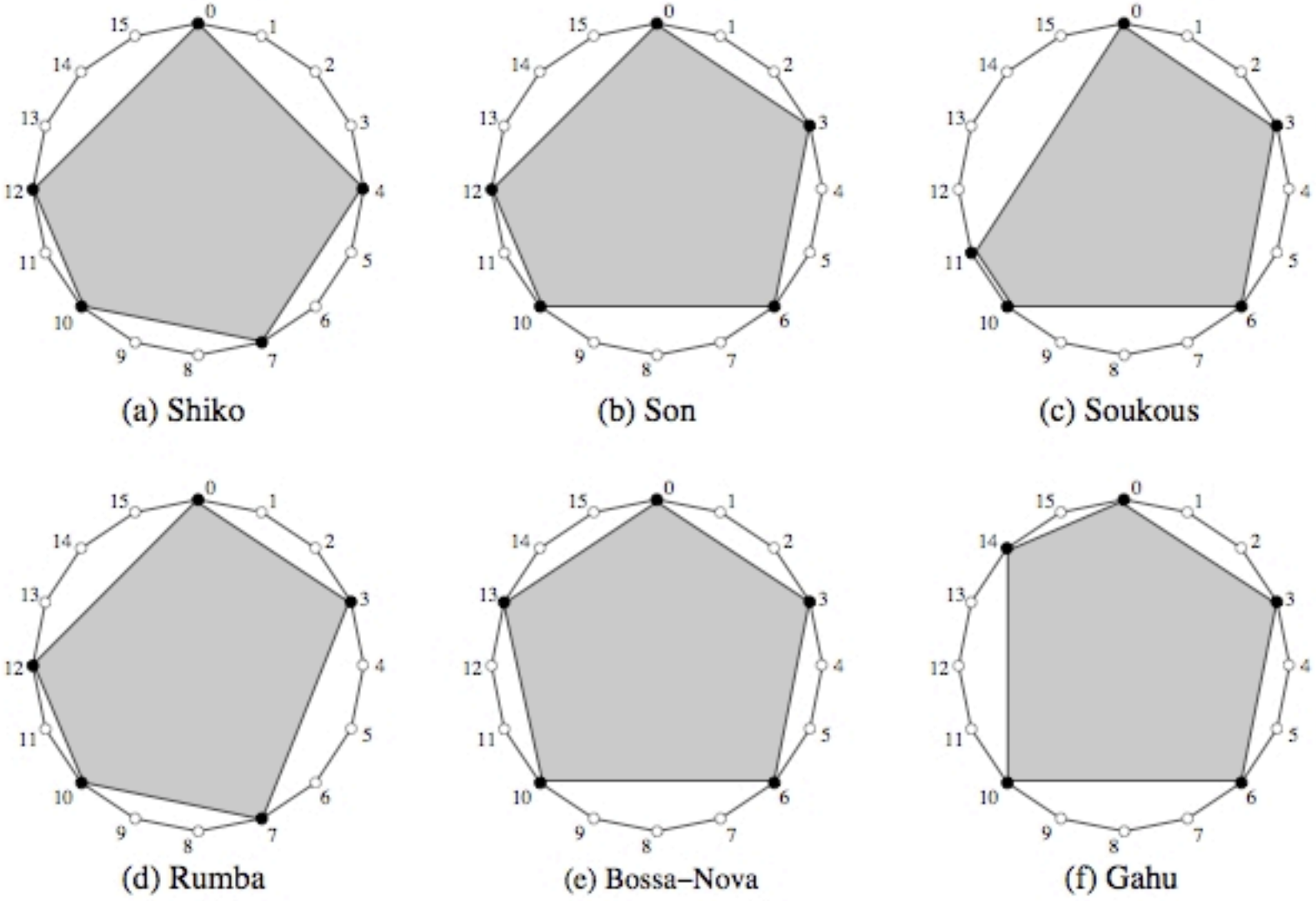
Bellairs, Barbados, February 6-8, 2010

Rhythm ... is a closed, timelike loop.

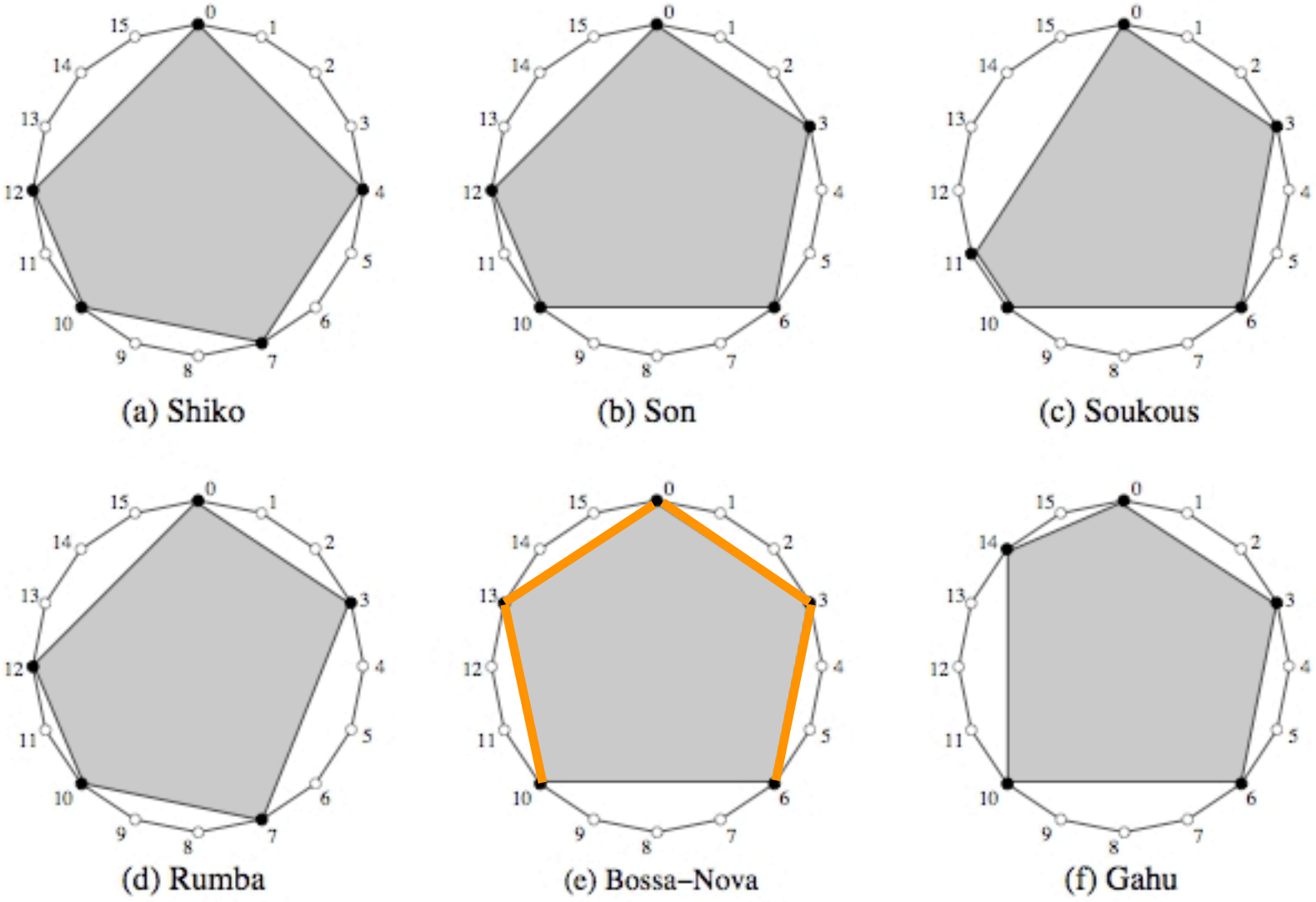
Richard Powers, The Time of Our Singing (2003)

The beat is not in the signal; it is in your mind.

William Sethares, Rhythm and Transforms (2007)



Example 1. (from Demaine *et al.*, 2007) Six African and Latin American rhythms arranged in a 4/4 circular lattice; 0 equals the downbeat, and the other strong beats fall on 4, 8, and 12. Intuitively the most even rhythm is (e), Bossa-Nova, a 3-3-4-3-3 beat cycle. In these examples, n =16, and k = 5.



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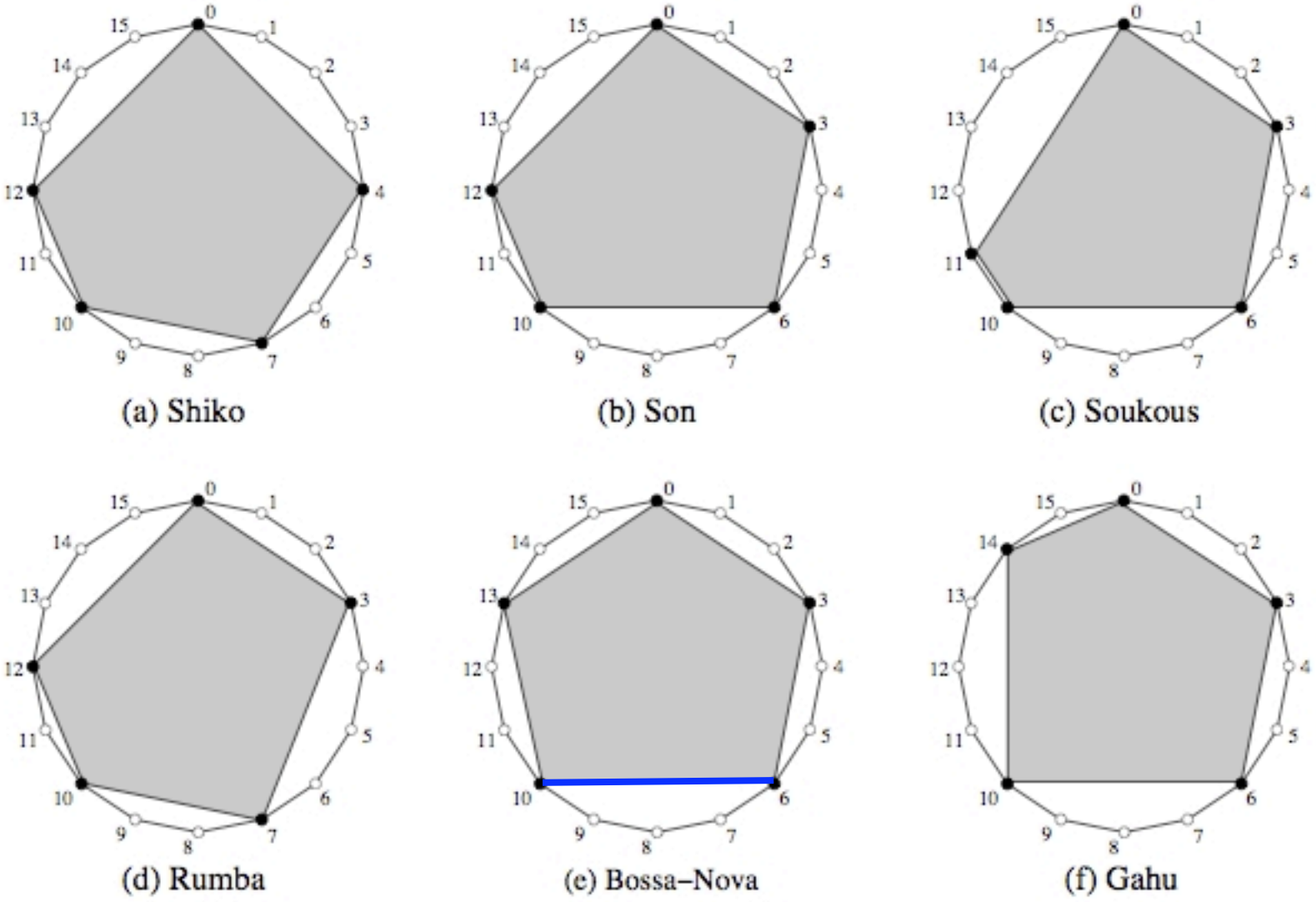

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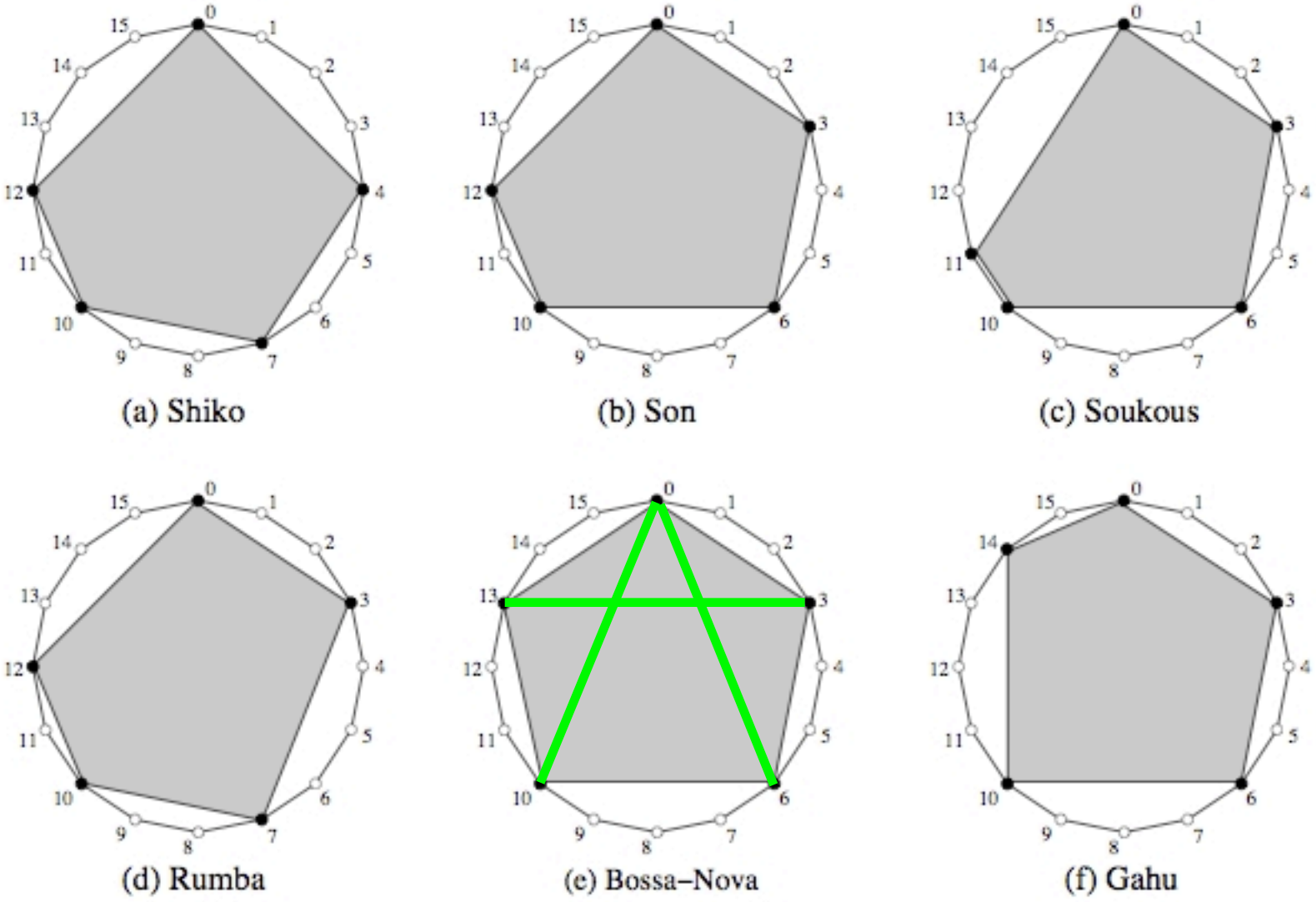

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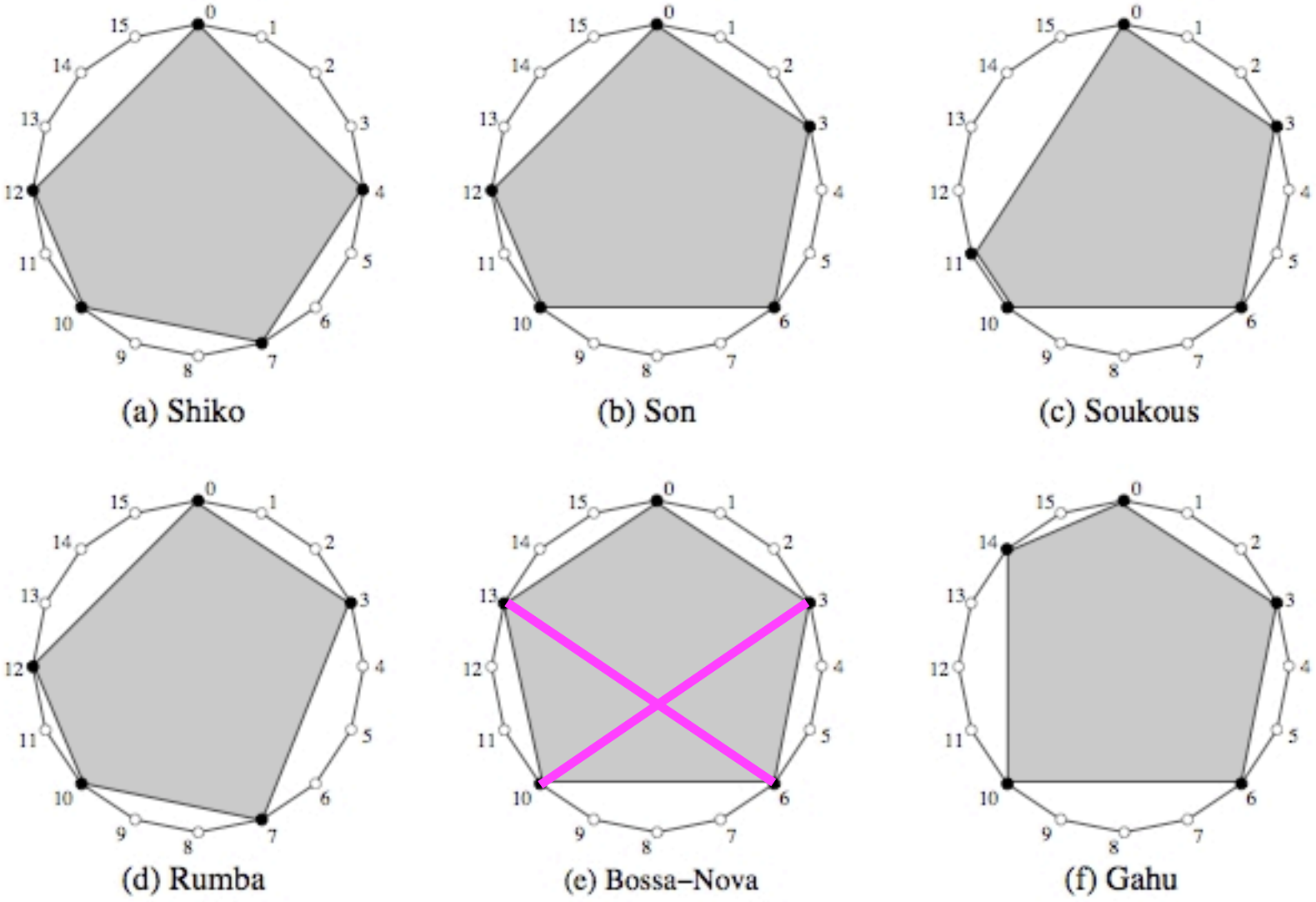

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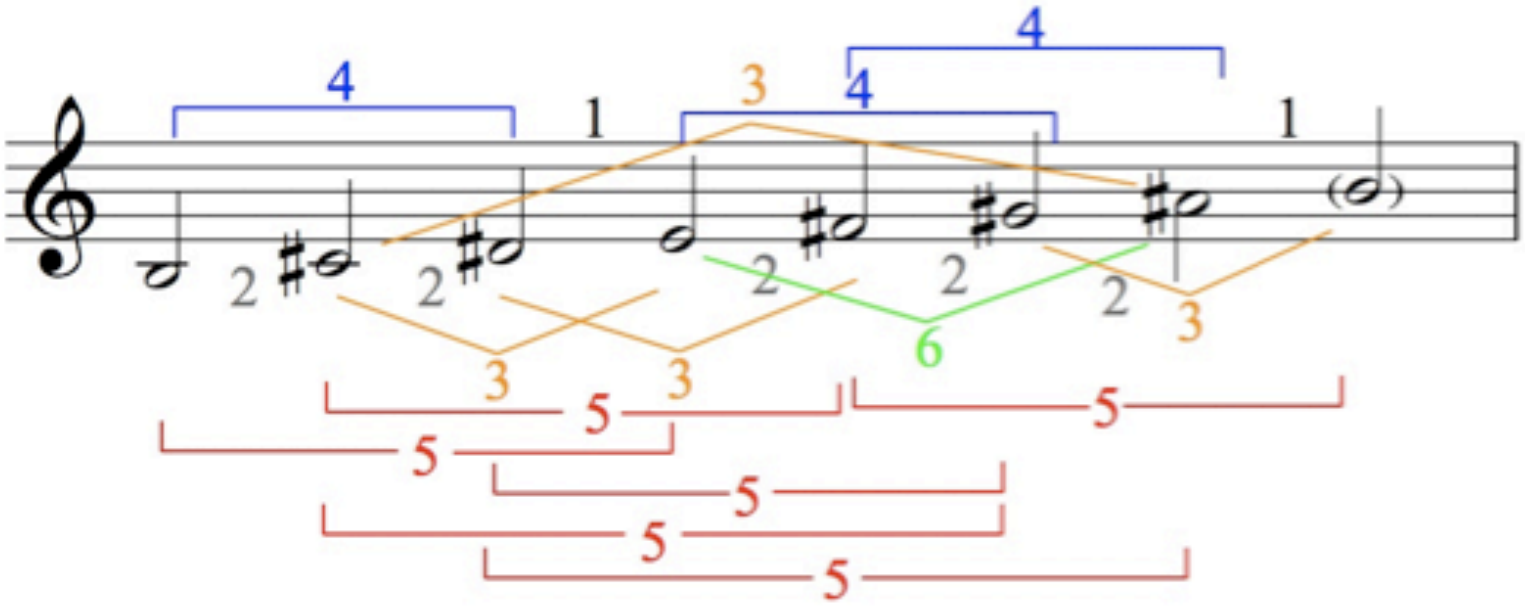
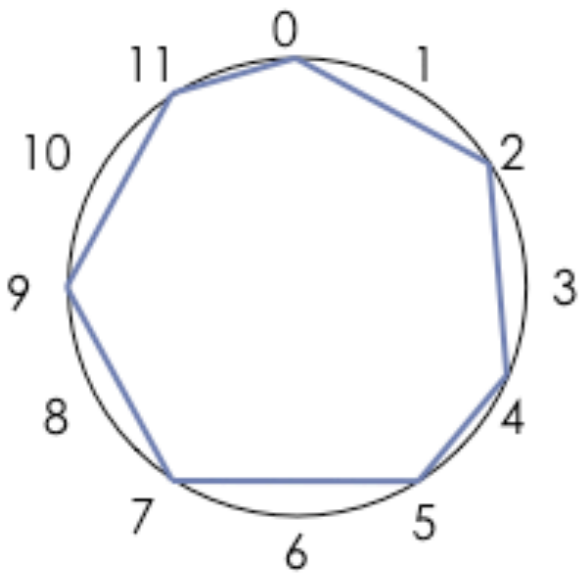
Example 2. The "Erdös-deep" property of the diatonic mode



interval vector for diatonic scale:
<2543612>



each interval has a unique multiplicity

i jumped in the river and what did I see?
black-eyed angels swimming with me
a moon full of stars and astral cars
all the figures i used to see
all my lovers were there with me
all my past and futures
and we all went to heaven in a little row boat

there was nothing to fear and nothing to doubt

i jumped in the river
black-eyed angels swimming with me
a moon full of stars and astral cars
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all my lovers were there with me
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there was nothing to fear and nothing to doubt
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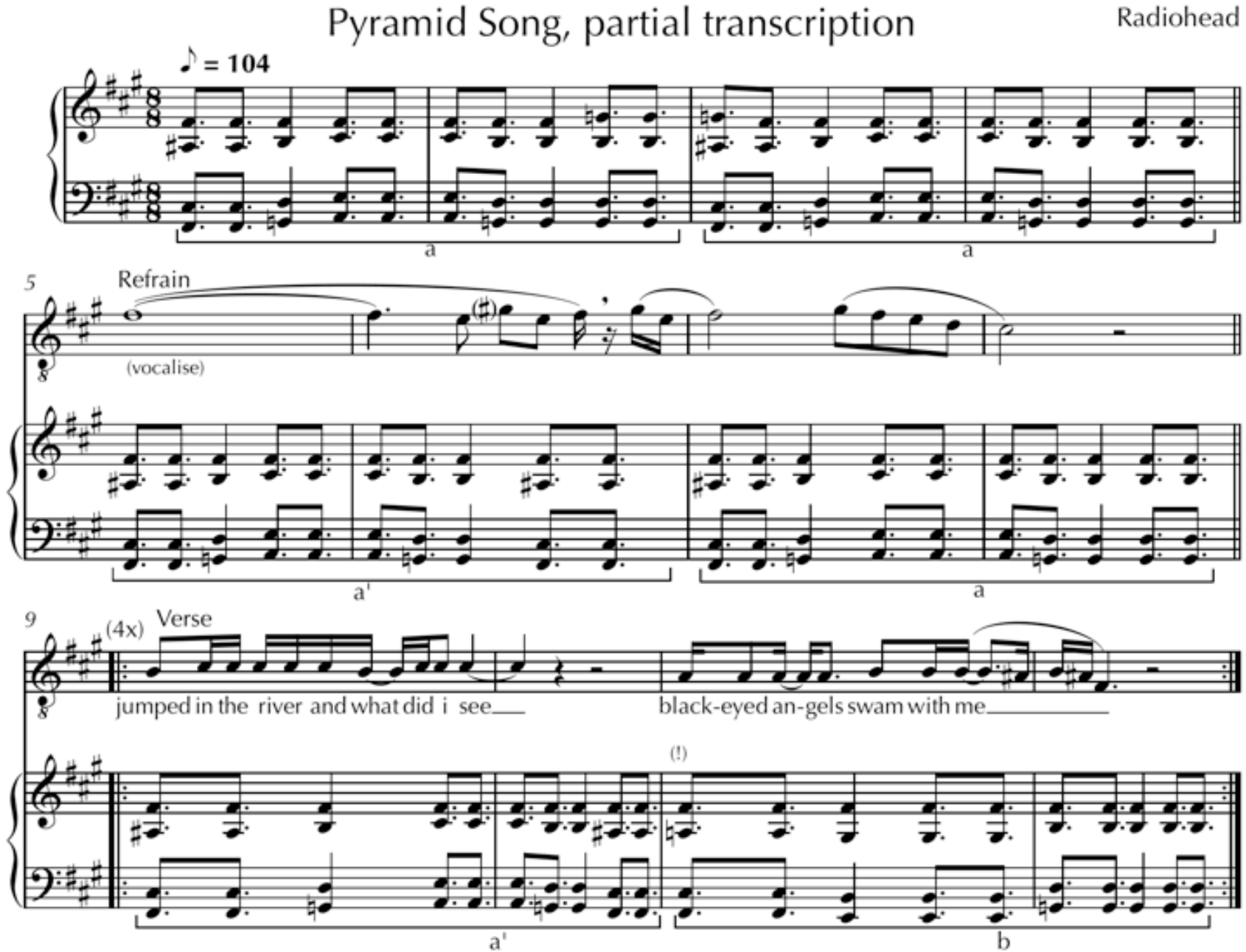
there was nothing to fear and nothing to doubt
there was nothing to fear and nothing to doubt

radiohead,
pyramid song

(from Amnesiac, 2001)

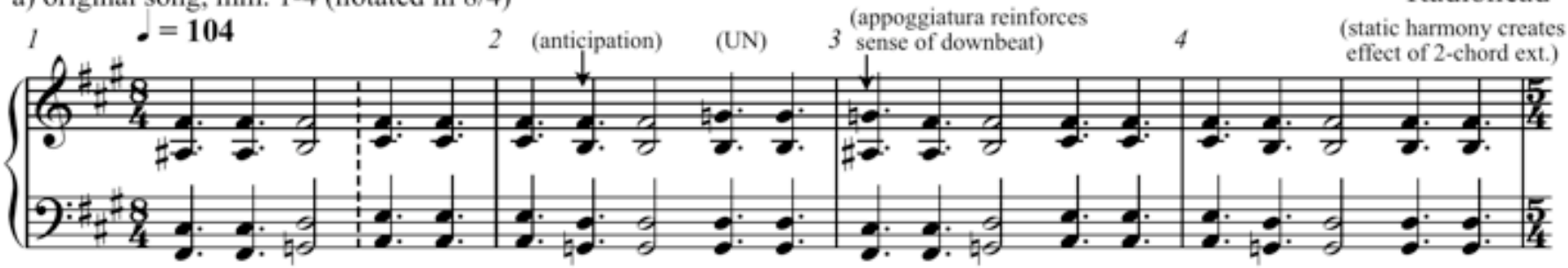


Example 3. Partial transcription of Radiohead's "Pyramid Song."

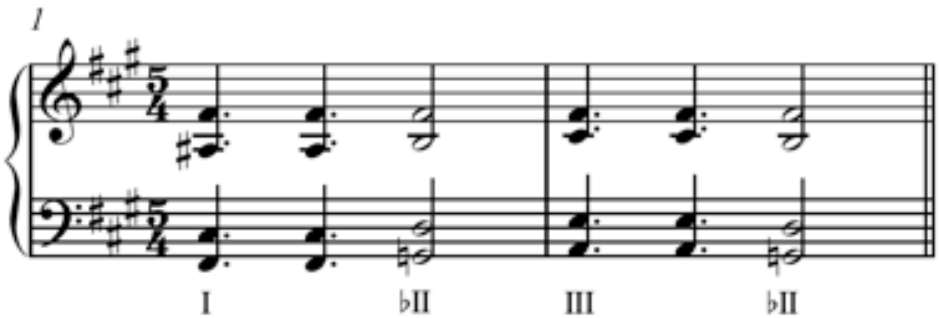
Example 4: Pyramid Song, recomposed

a) original song, mm. 1-4 (notated in 8/4)

Radiohead



b) recomposed



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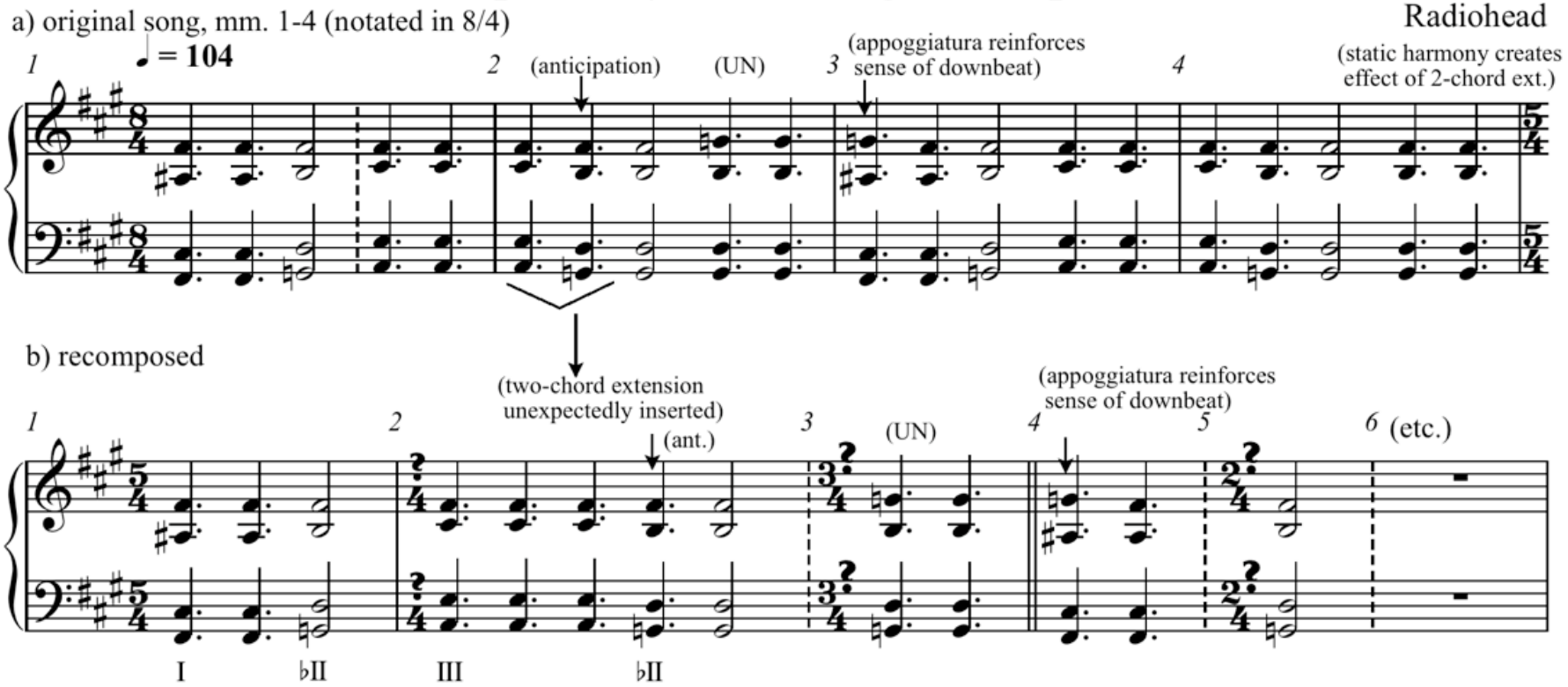
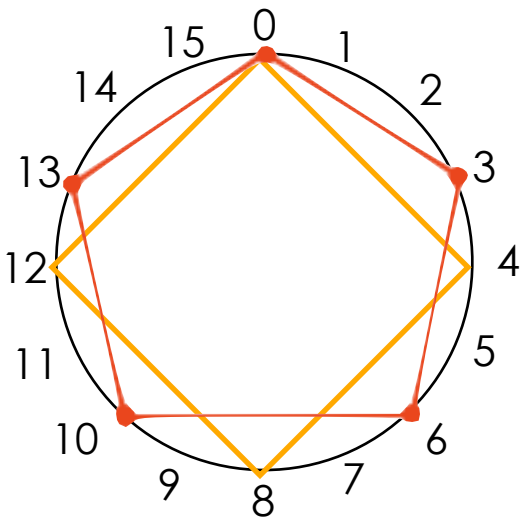
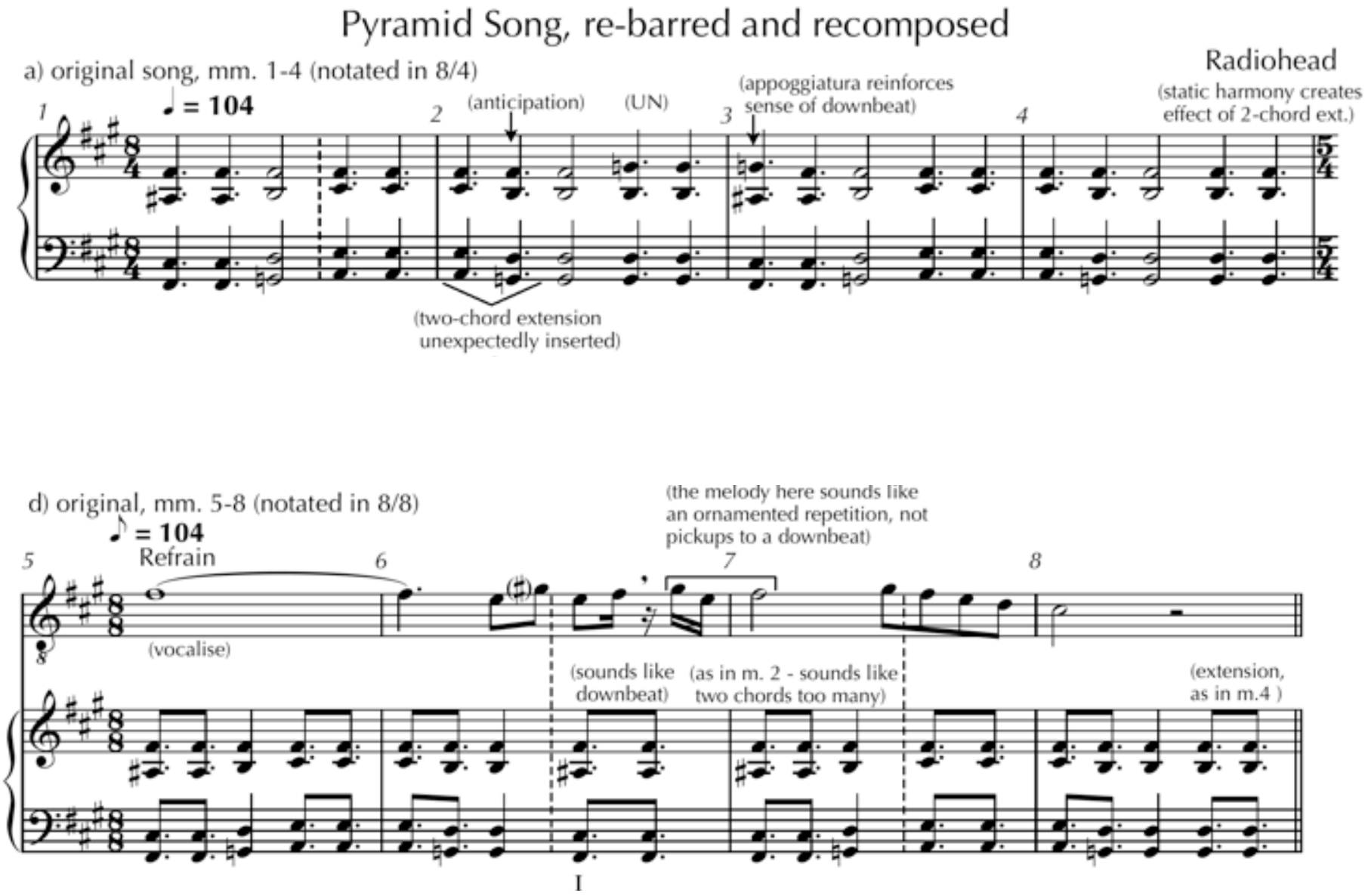


rhythm necklace rotation

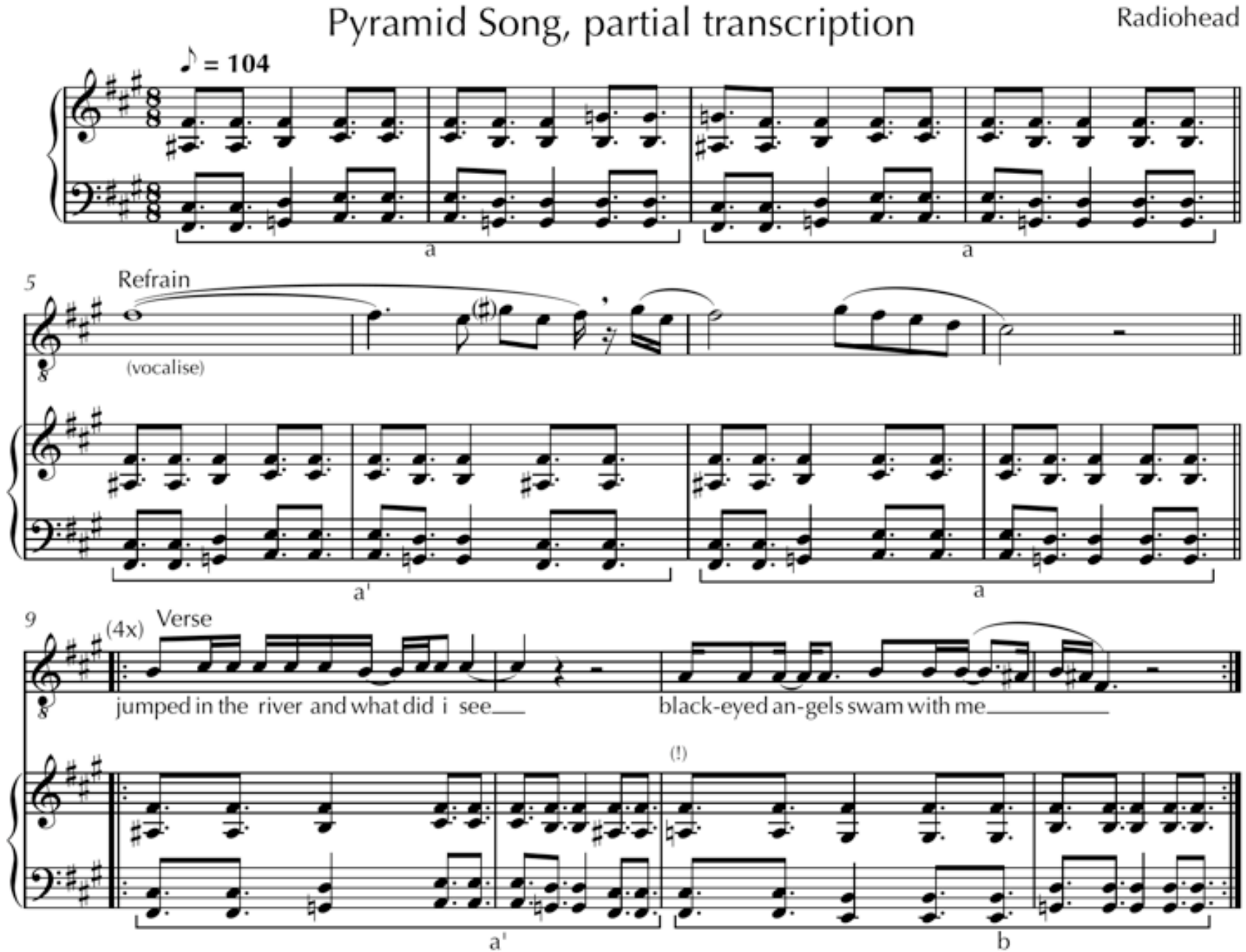


n = 16

k = 5

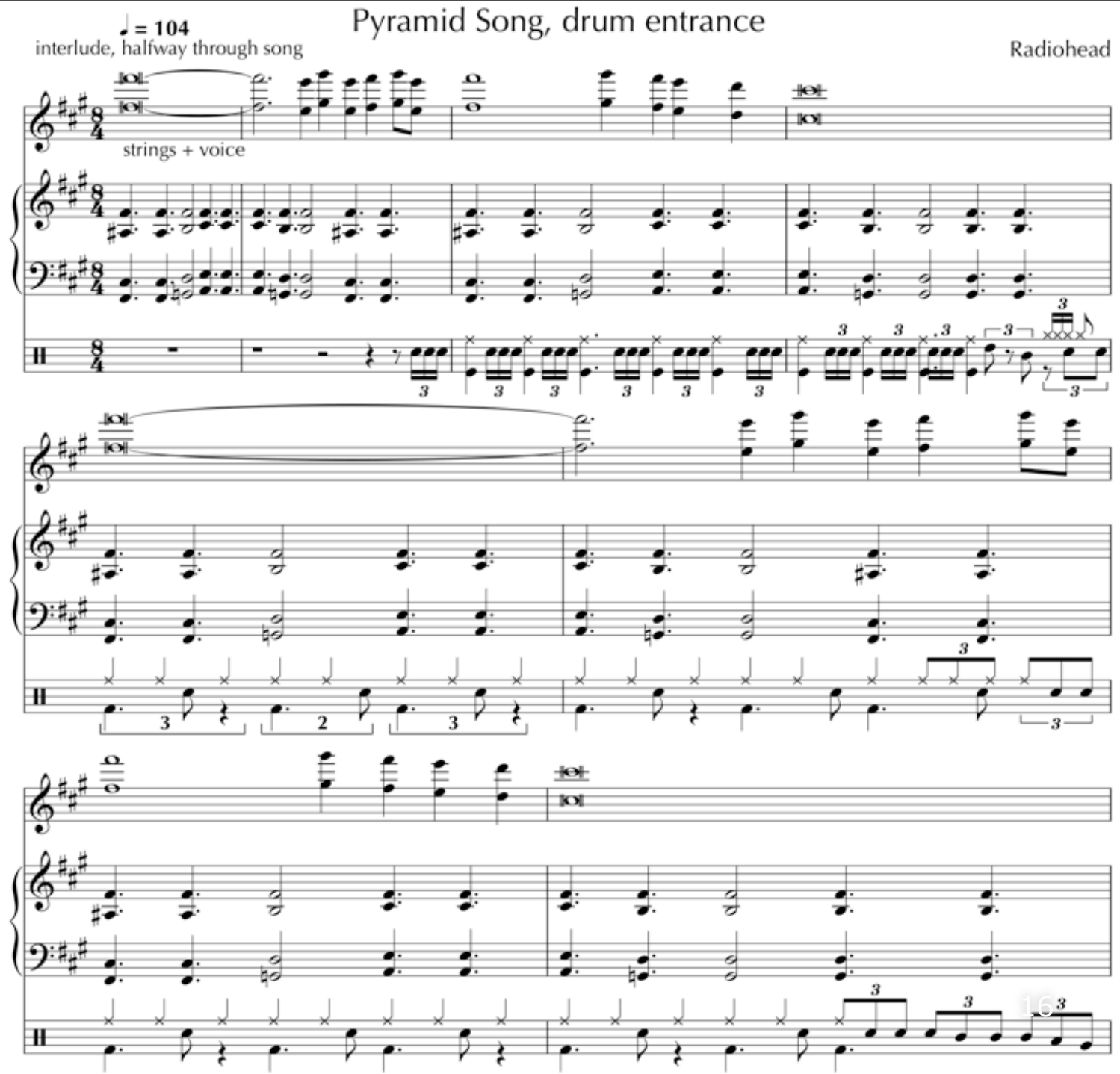


Example 4. Partial transcription of Radiohead's "Pyramid Song."

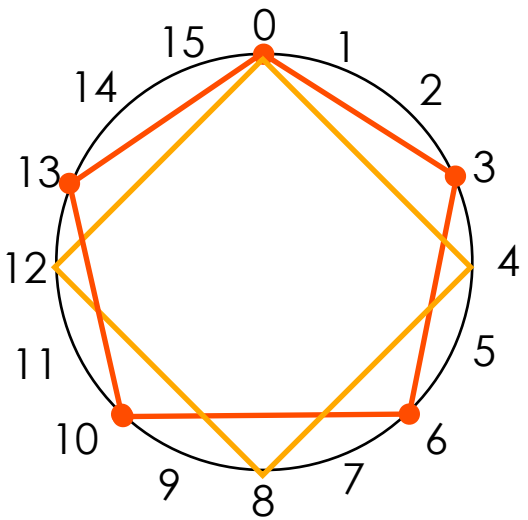


Example 3. Partial transcription of Radiohead's "Pyramid Song."

Ex. 5


Pyramid Song, drum entrance
♩ = 104
interlude, halfway through song
Radiohead
strings + voice

rhythm necklace

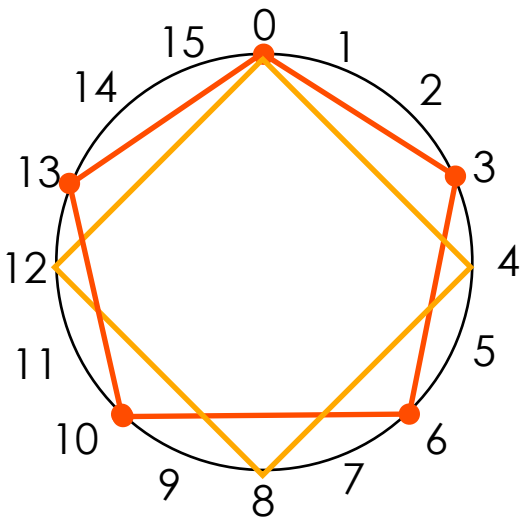


n = 16

k = 5

p = 4

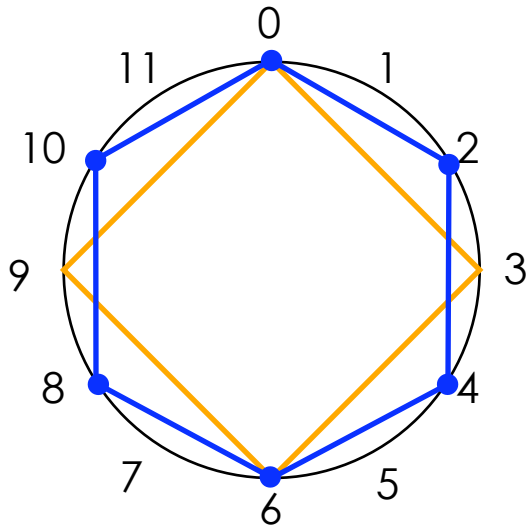
rhythm necklace vs. hemiola



n = 16

k = 5

p = 4



n = 12

k = 6

p = 4

It's tricky when
You feel someone
Has done something
On your behalf

It's slippery when
Your sense of justice
Murmurs underneath
And is asking you:

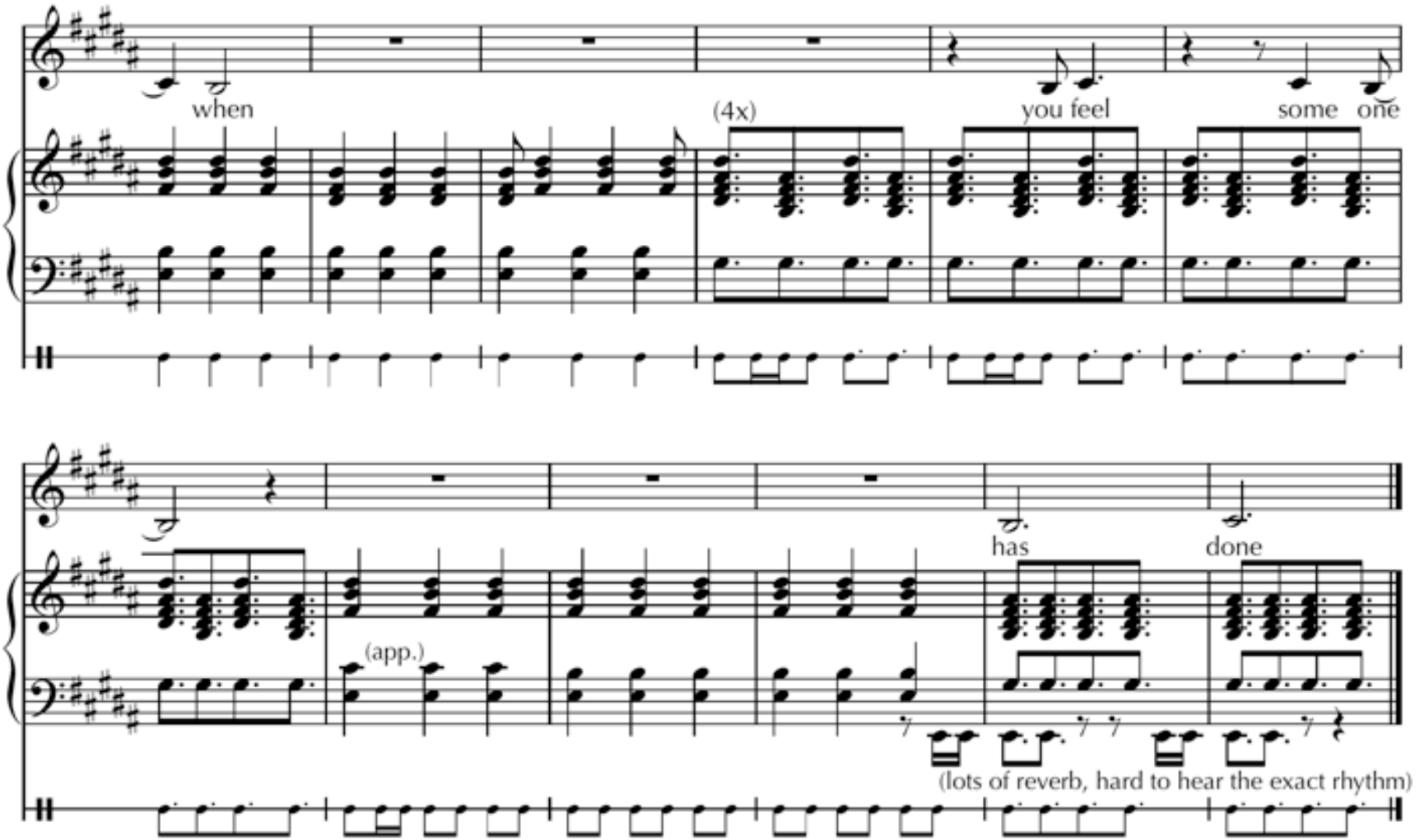
How am I going to make it right?

With a palm full of stars
I throw them like dice
Repeatedly
I shake them like dice
And throw them on the table
Repeatedly
Repeatedly
Until the desired constellation
appears
And I ask myself:

How am I going to make it right?
And you hear
How am I going to make it right?

Björk, Desired Constellation (from Medúlla, 2004)

Example 6. Partial transcription of "Desired Constellation" by Björk and Olivier Alary.


when
(4x)
you feel
some one
has
done
(app.)
(lots of reverb, hard to hear the exact rhythm)

g# - B (uncertain rhythm)
E 6x (quarter notes)
g# 4x (4:3, dotted 8ths)
E 3x (with inner voice appoggiatura)

g# 4x
E 6x **It's tricky when**
g# 4x **you feel someone**
E 3x (inner appoggiatura)

(g#/E) 4x (bass) **has done something**
E 6x **on your behalf**
g# 4x **It's**
E 3x **slippery**

(g#/E) 4x (bass) **when your sense of**
E 6x **justice murmurs**
g# 4x **underneath**
E 3x **and it's**
d# 3x **asking you** (transition)

CHORUS

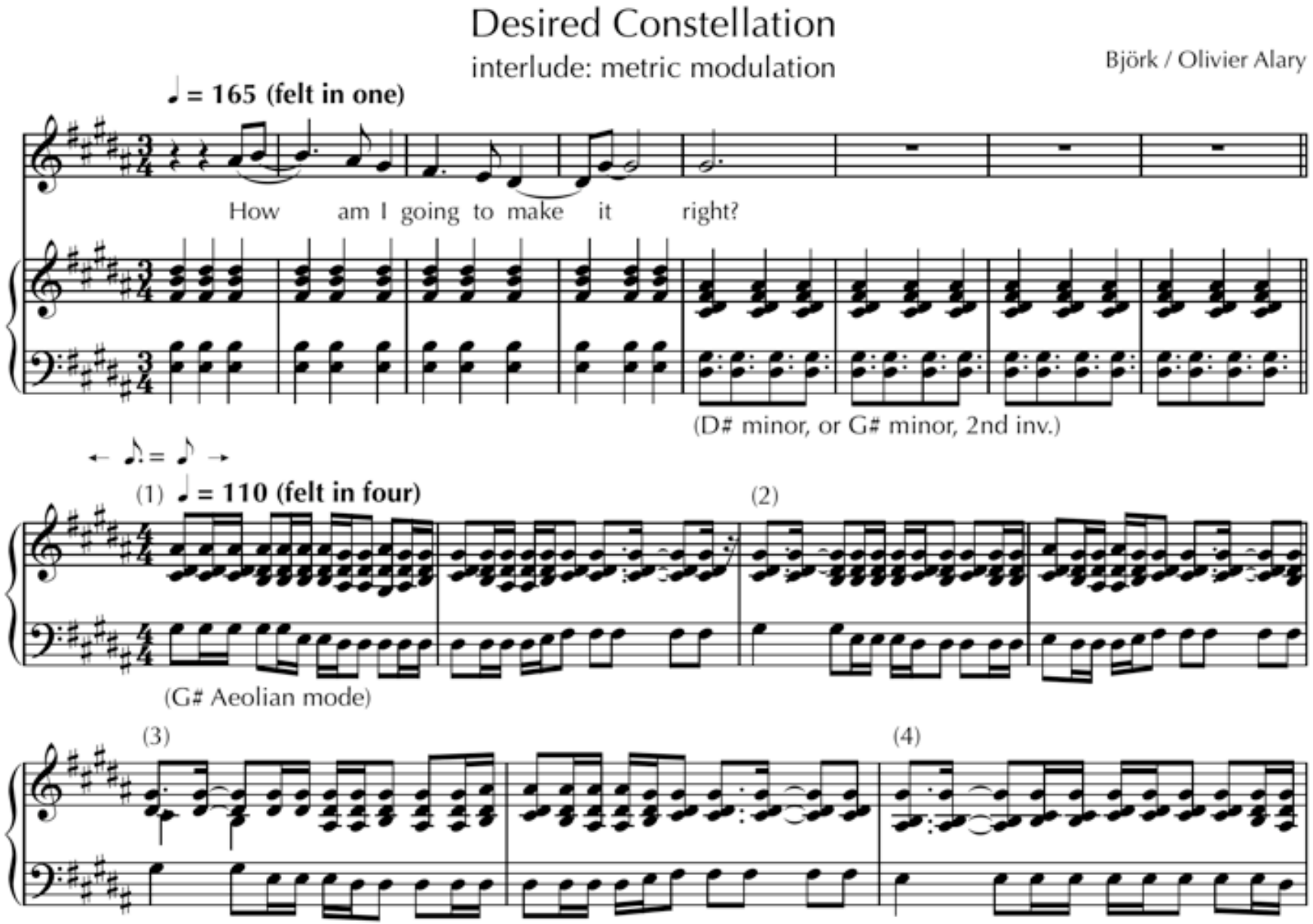
E 3x **How am I going to make it**
d# 3x **right?**

E 3x
d# 3x

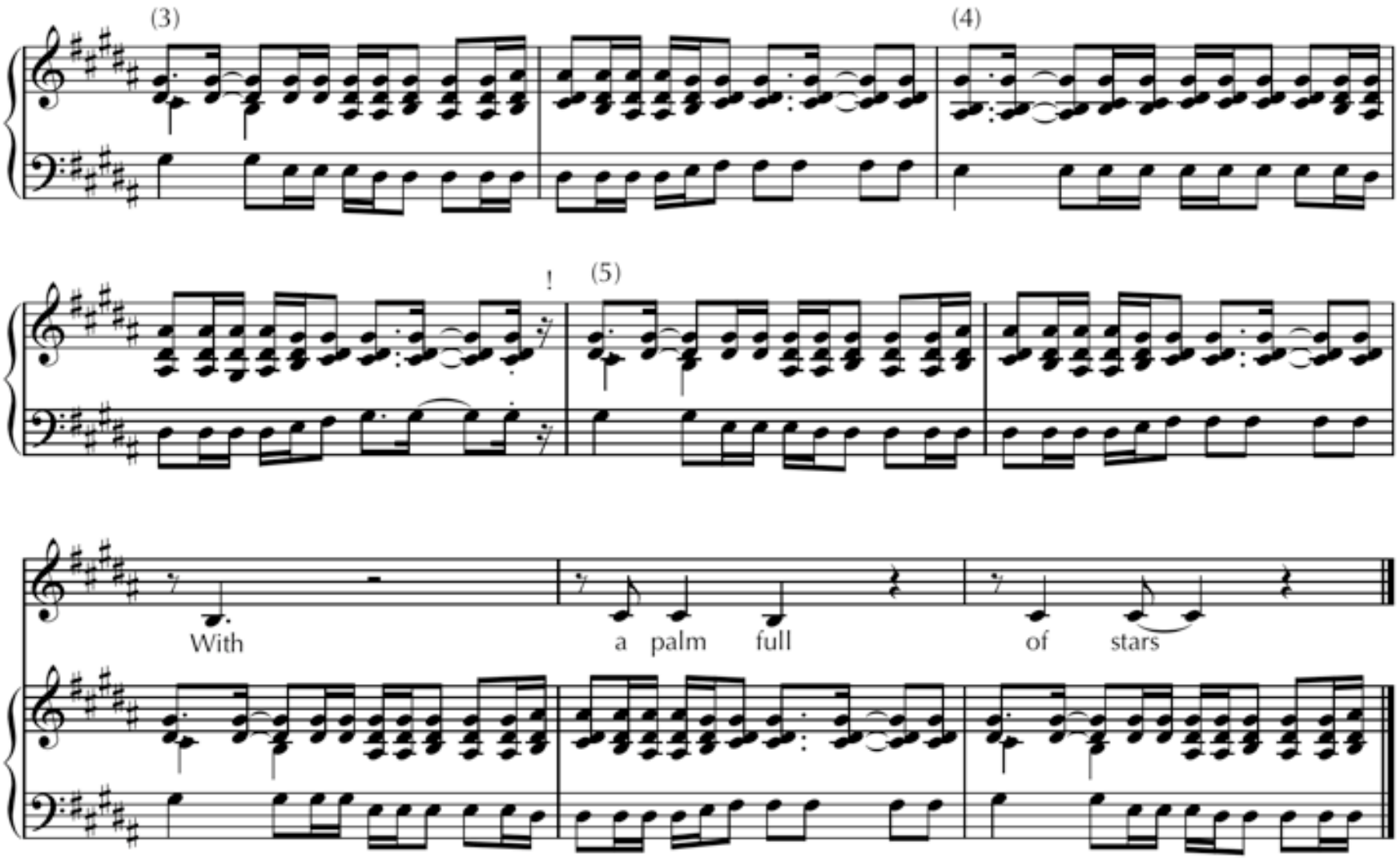
E 3x **How am I going to make it**
d# 4x **right?**

INTERLUDE - metric modulation

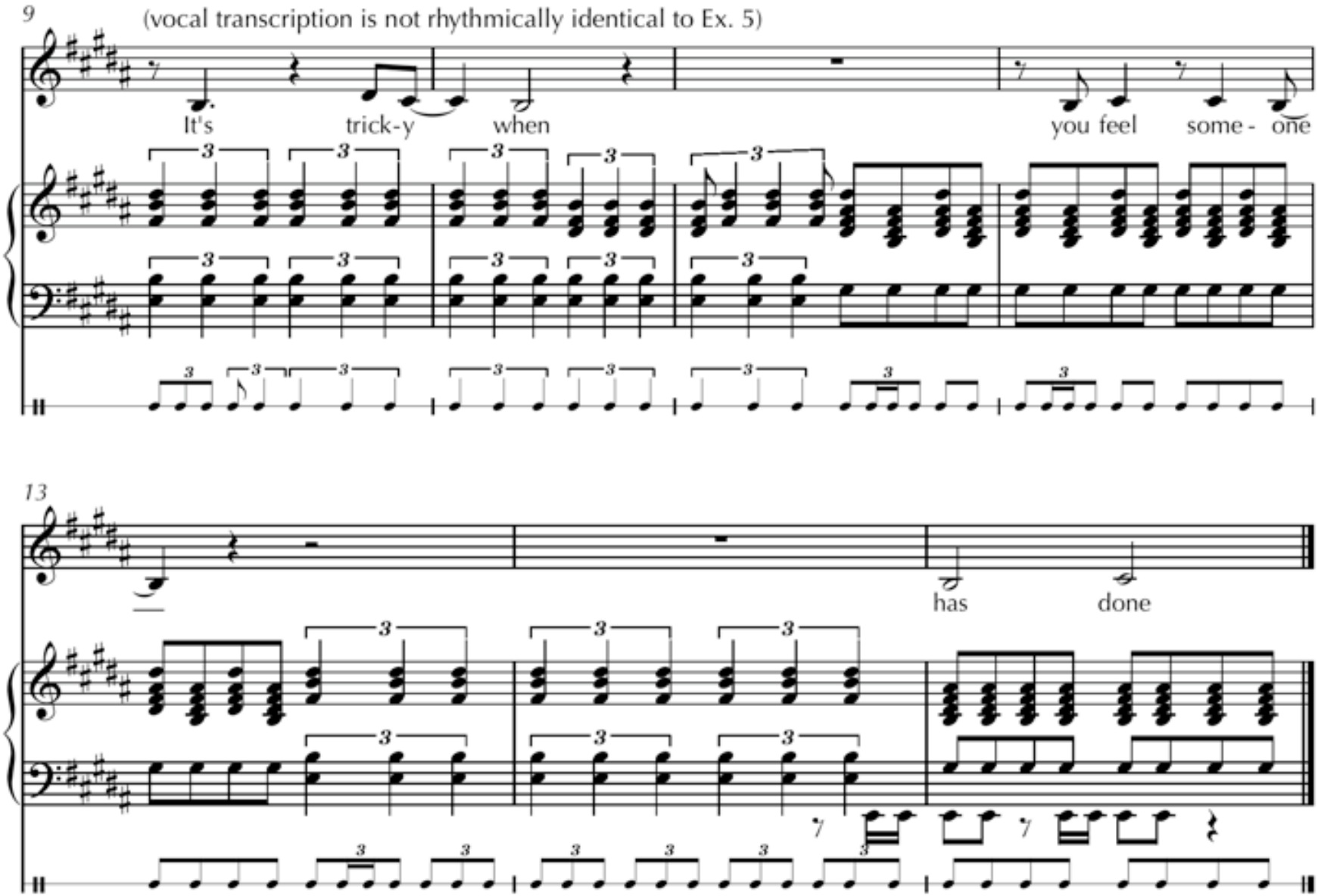
Example 7.
"Desired Constellation," first verse and chorus. The numbers show how many bars a chord is repeated; the chorus' pattern is more regular than the verse's.



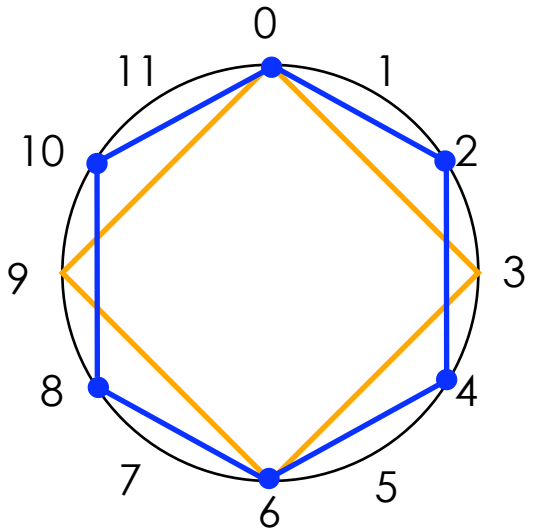
Example 7. “Desired Constellation,” interlude and metric modulation.

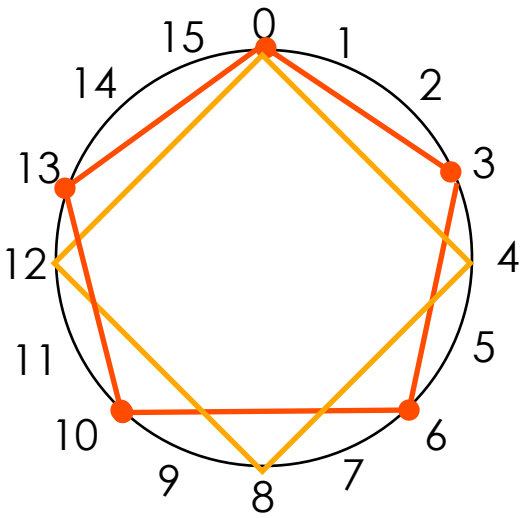

(3)
(4)
!
(5)
With
a palm full
of stars

Example 9. “Desired Constellation,” intro and part of first verse; rhythmic interpretation 2, after hearing the whole song.

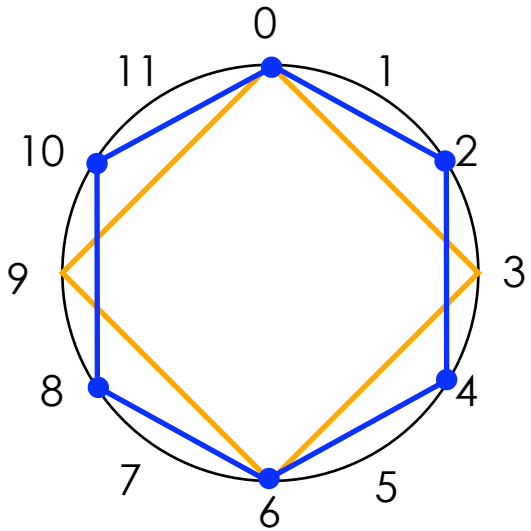

9
(vocal transcription is not rhythmically identical to Ex. 5)
It's
trick-y
when
you feel
some - one
13
has
done

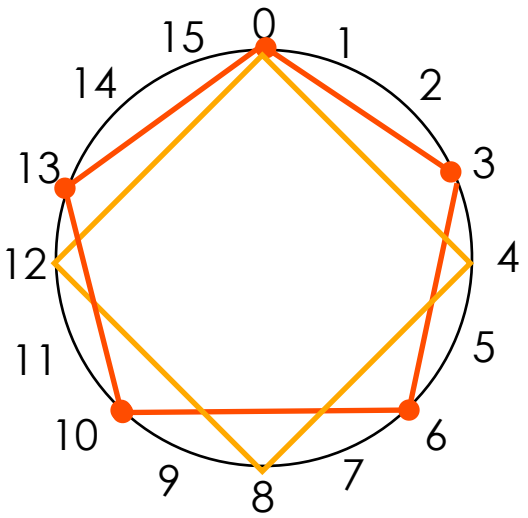
hemiola, rhythm necklace and illusion

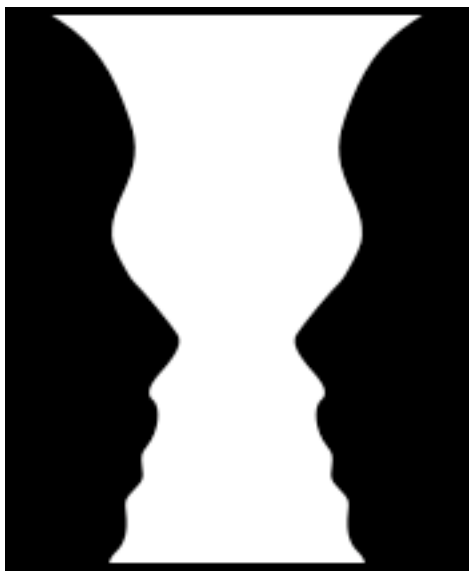




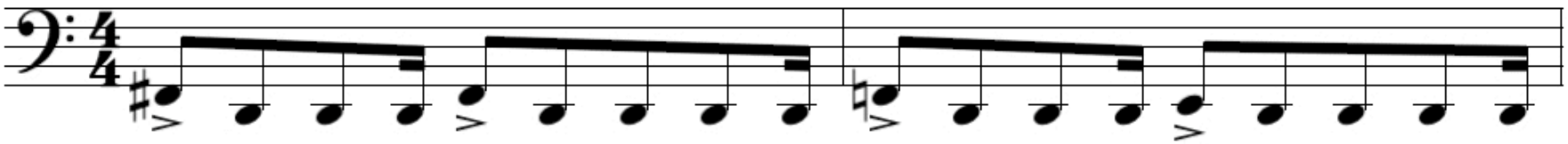
hemiola, rhythm necklace and illusion



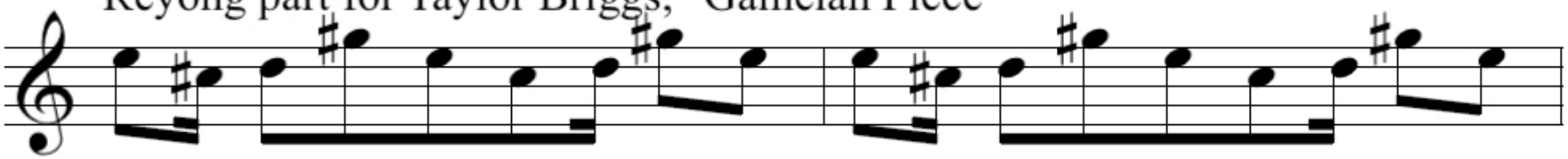




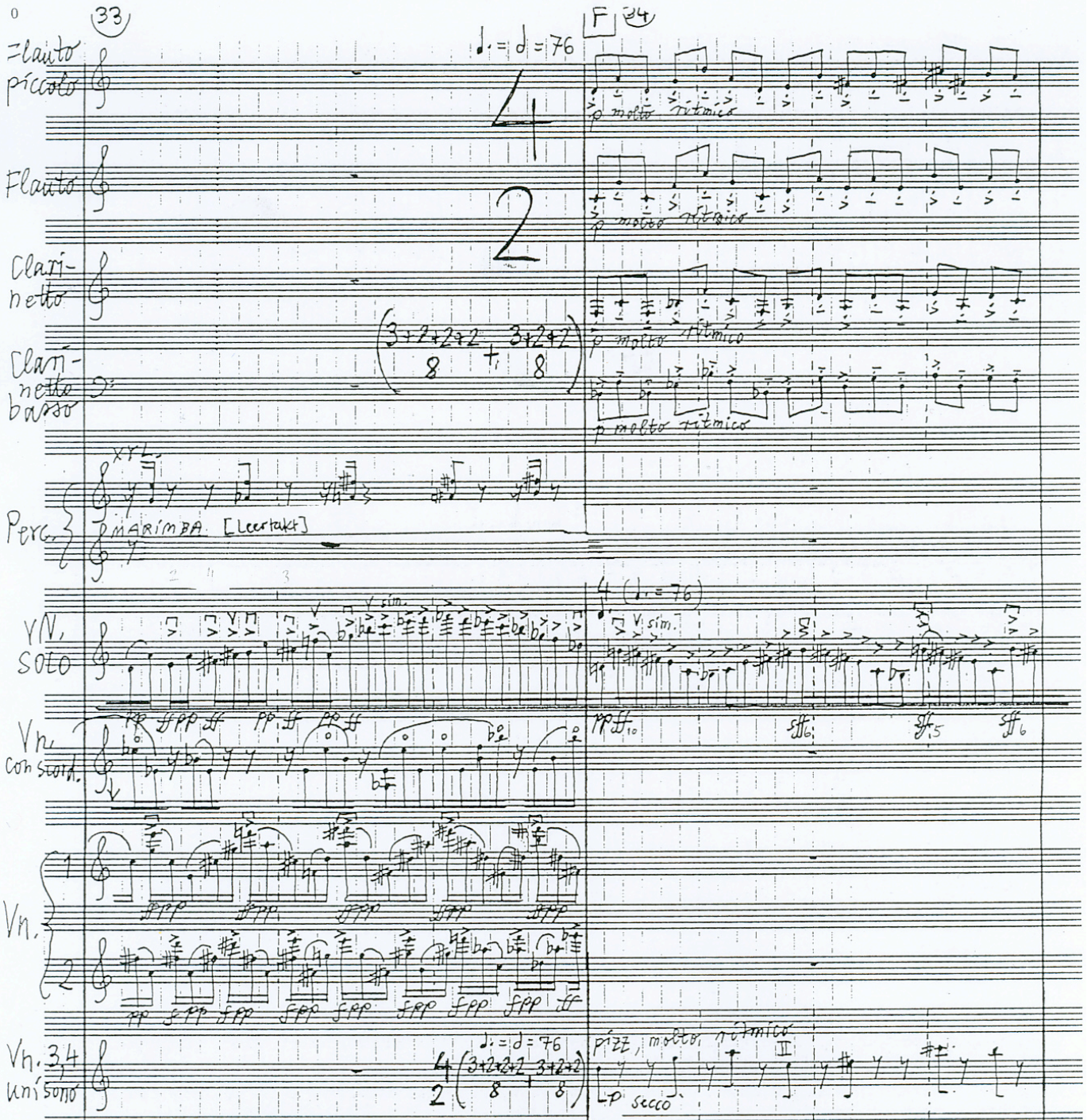
Bass part for Radiohead, "The National Anthem" from Kid A

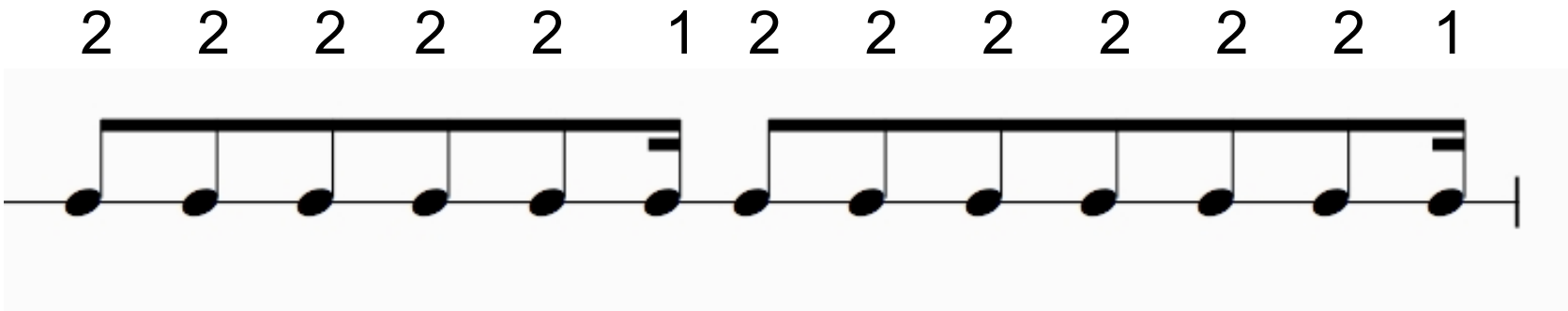


Reyong part for Taylor Briggs, "Gamelan Piece"



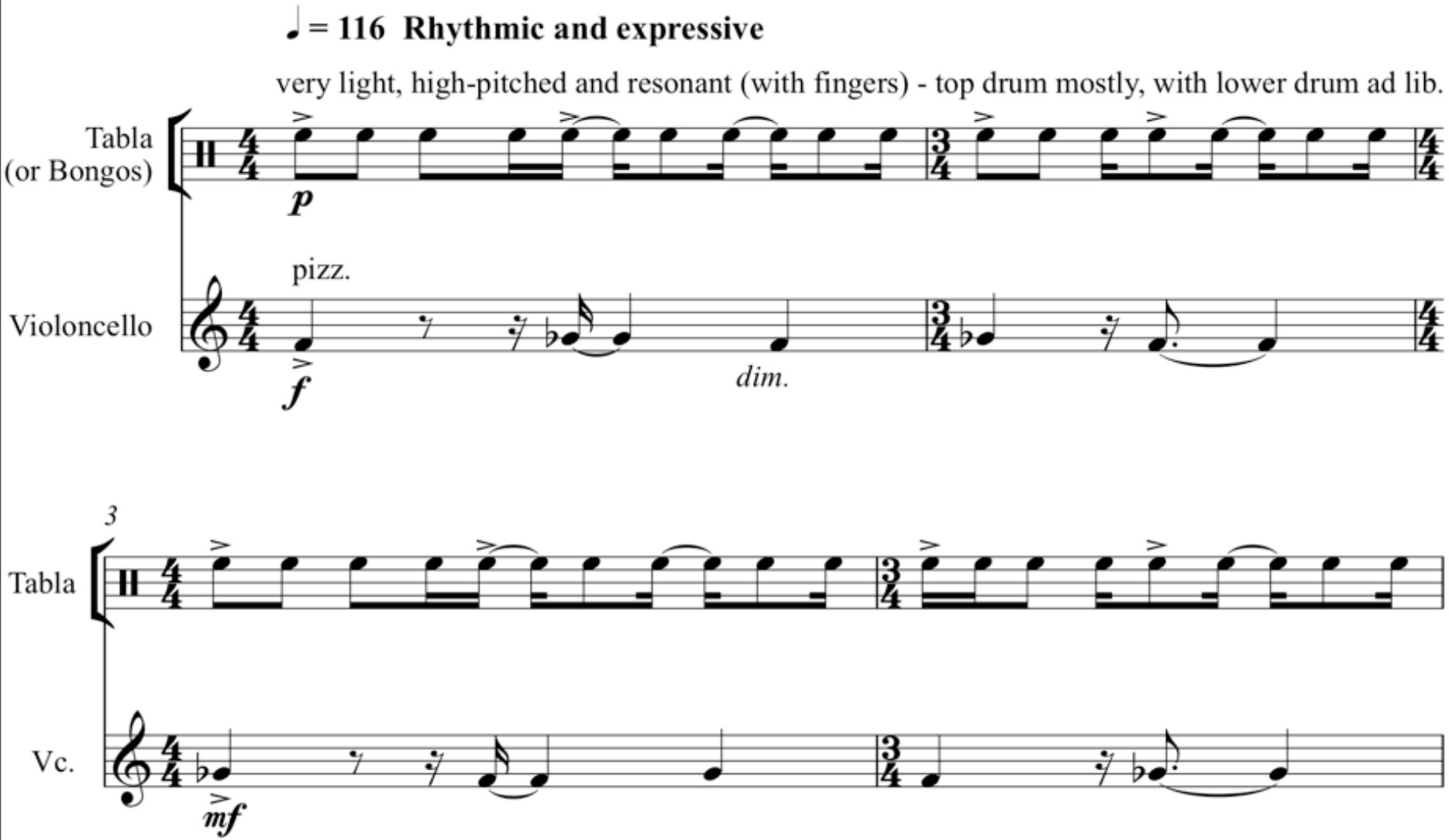
rhythm necklace [2 2 2 1 2 2 2 2 1] in Radiohead and UI student composer Taylor Briggs

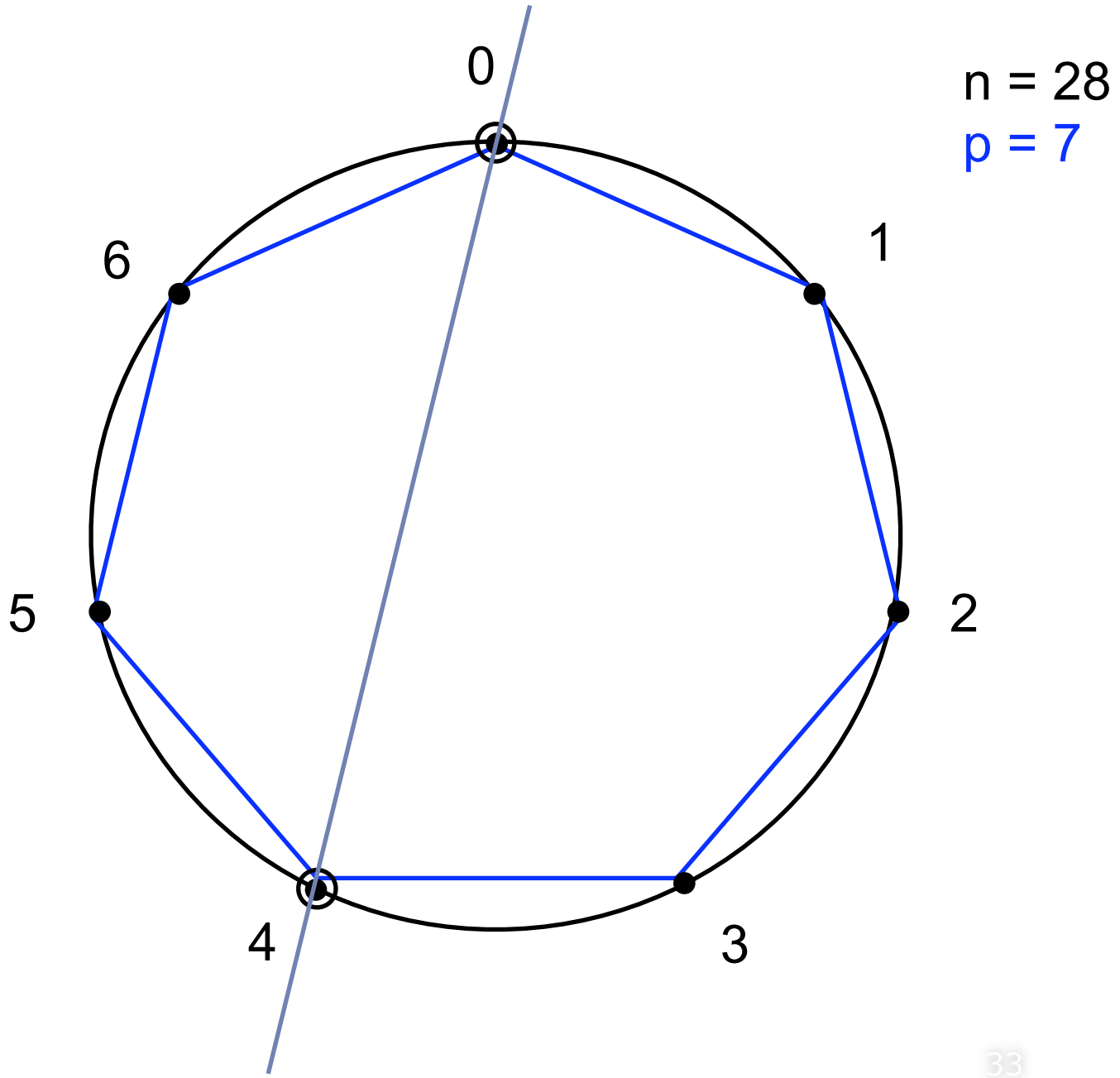

33
F
24
♩. = ♩ = 76
Flauto piccolo
Flauto
Clari-netto
Clari-netto basso
Perc.
MARIMBA [Leertakt]
Vn. SOLO
Vn. con sord.
Vn. 1
Vn. 2
Vn. 3,4 unisono
molto ritmico
pizz. molto ritmico
arco

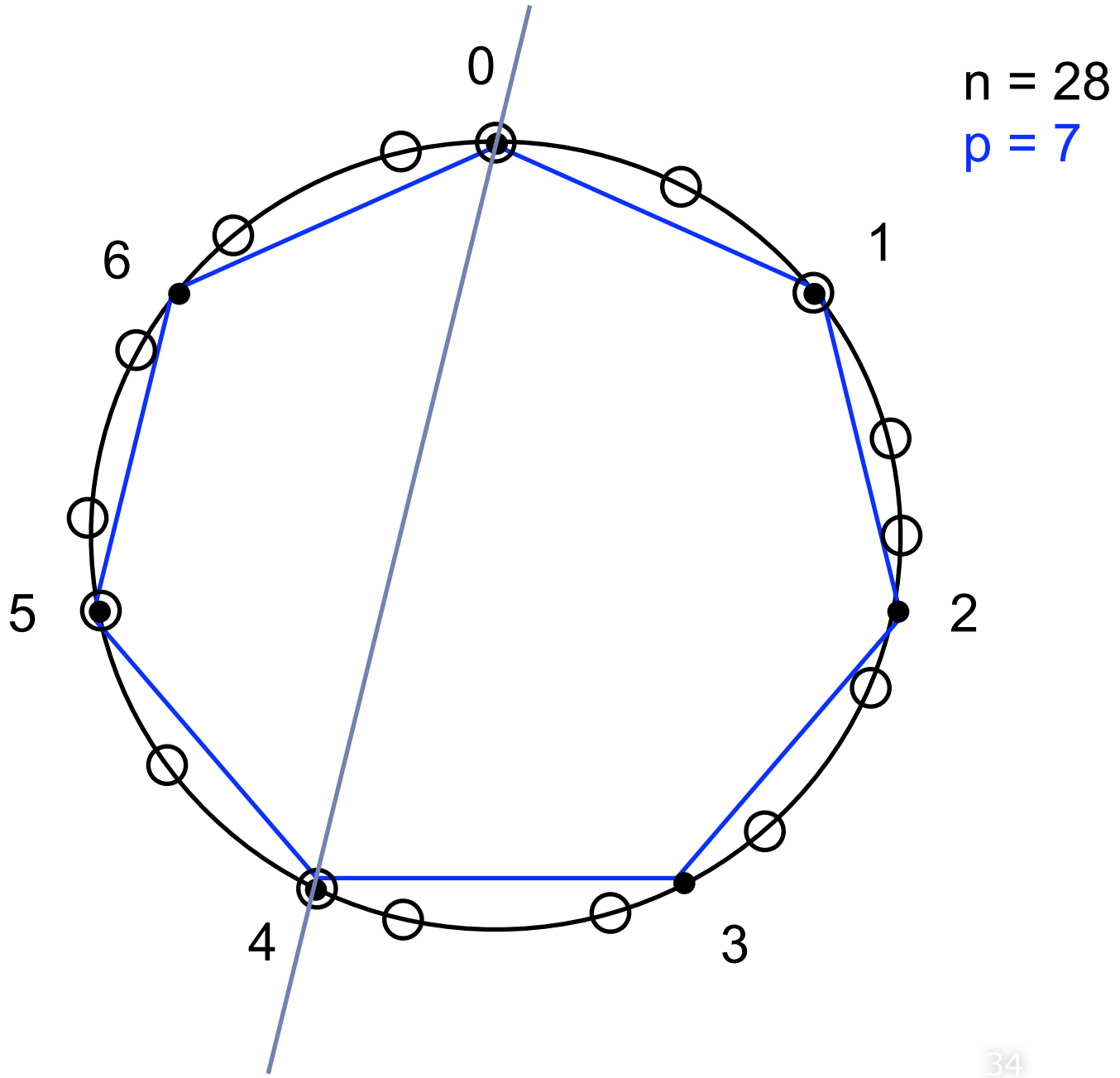


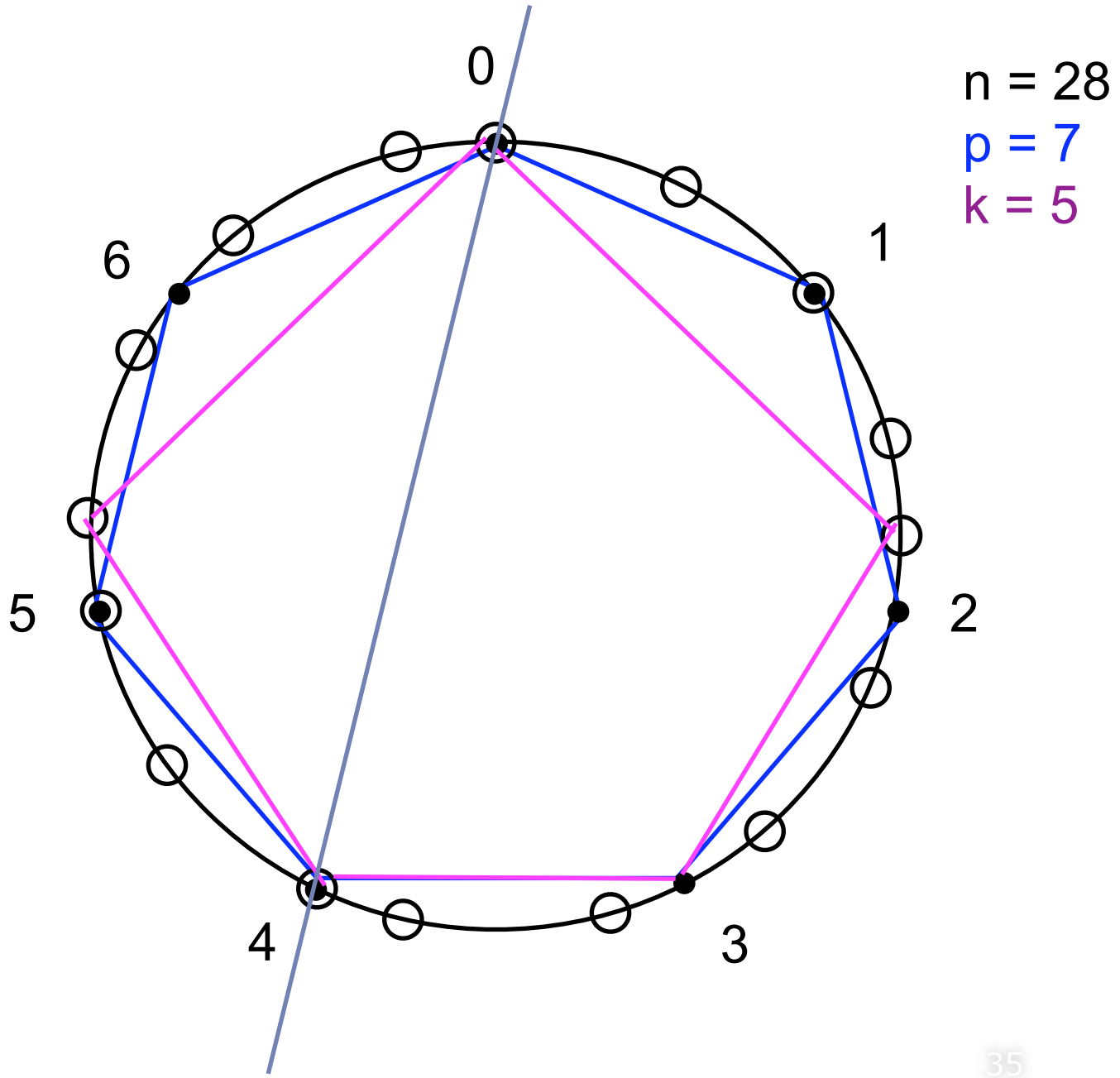
Bell pattern from Zoboko, a song by the Aka Pygmies from the CD "Ligeti and Africa"

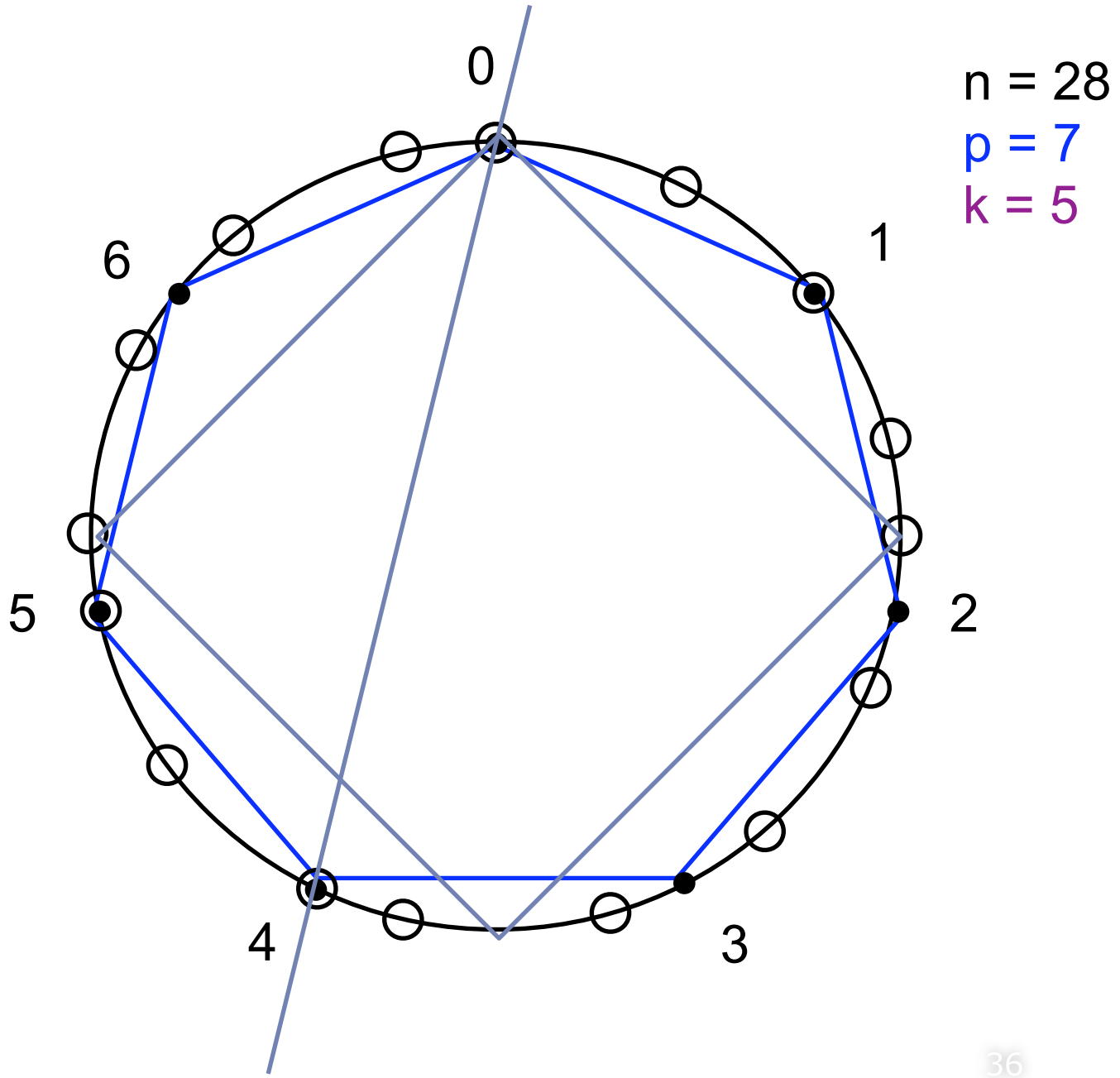
Rhythm ostinato for *Flow* (2006) for recorder quartet and chamber orchestra




0
1
2
3
4
5
6
n = 28
p = 7

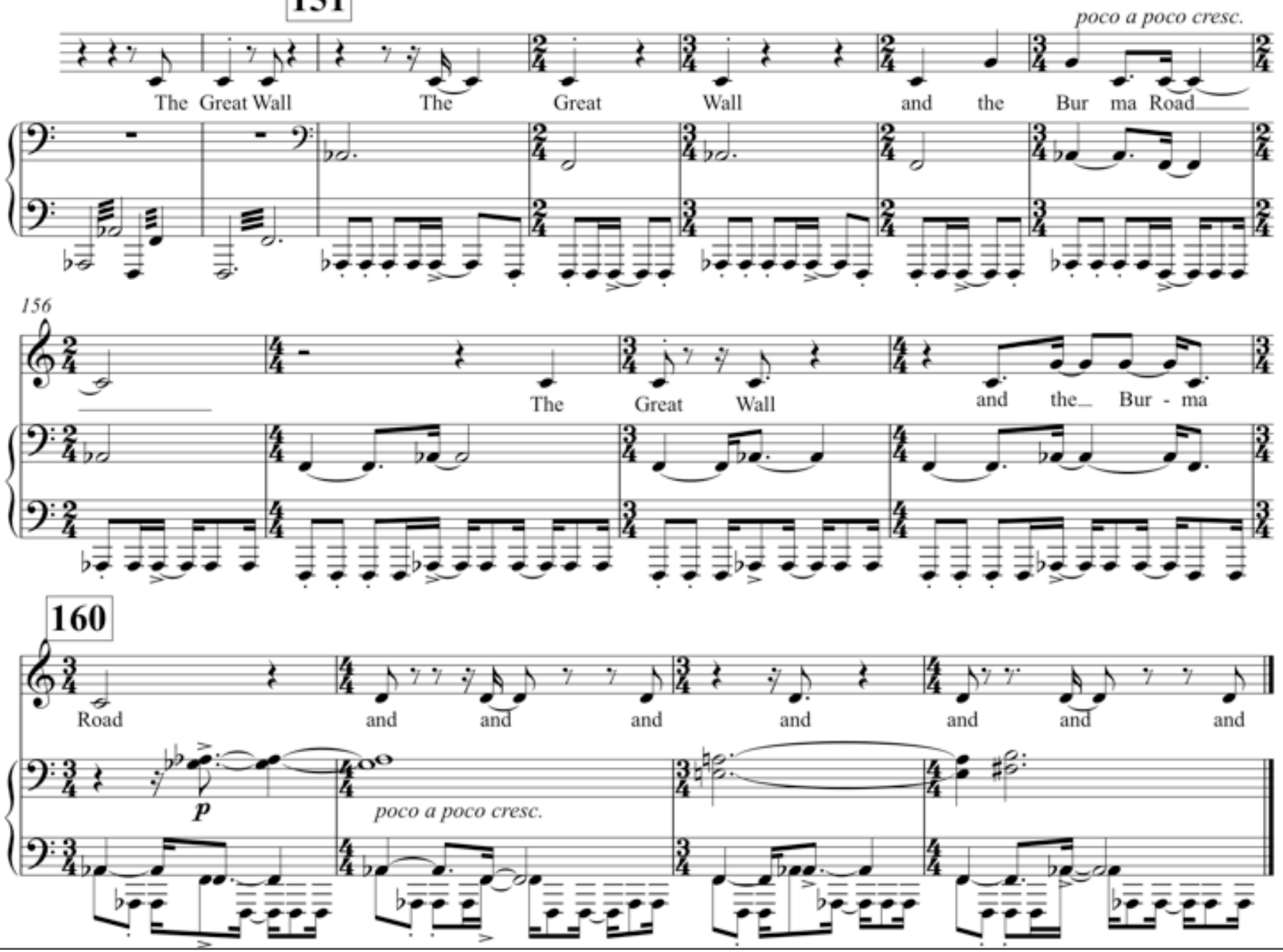

0
1
2
3
4
5
6
n = 28
p = 7


0
1
2
3
4
5
6
n = 28
p = 7
k = 5


0
1
2
3
4
5
6
n = 28
p = 7
k = 5

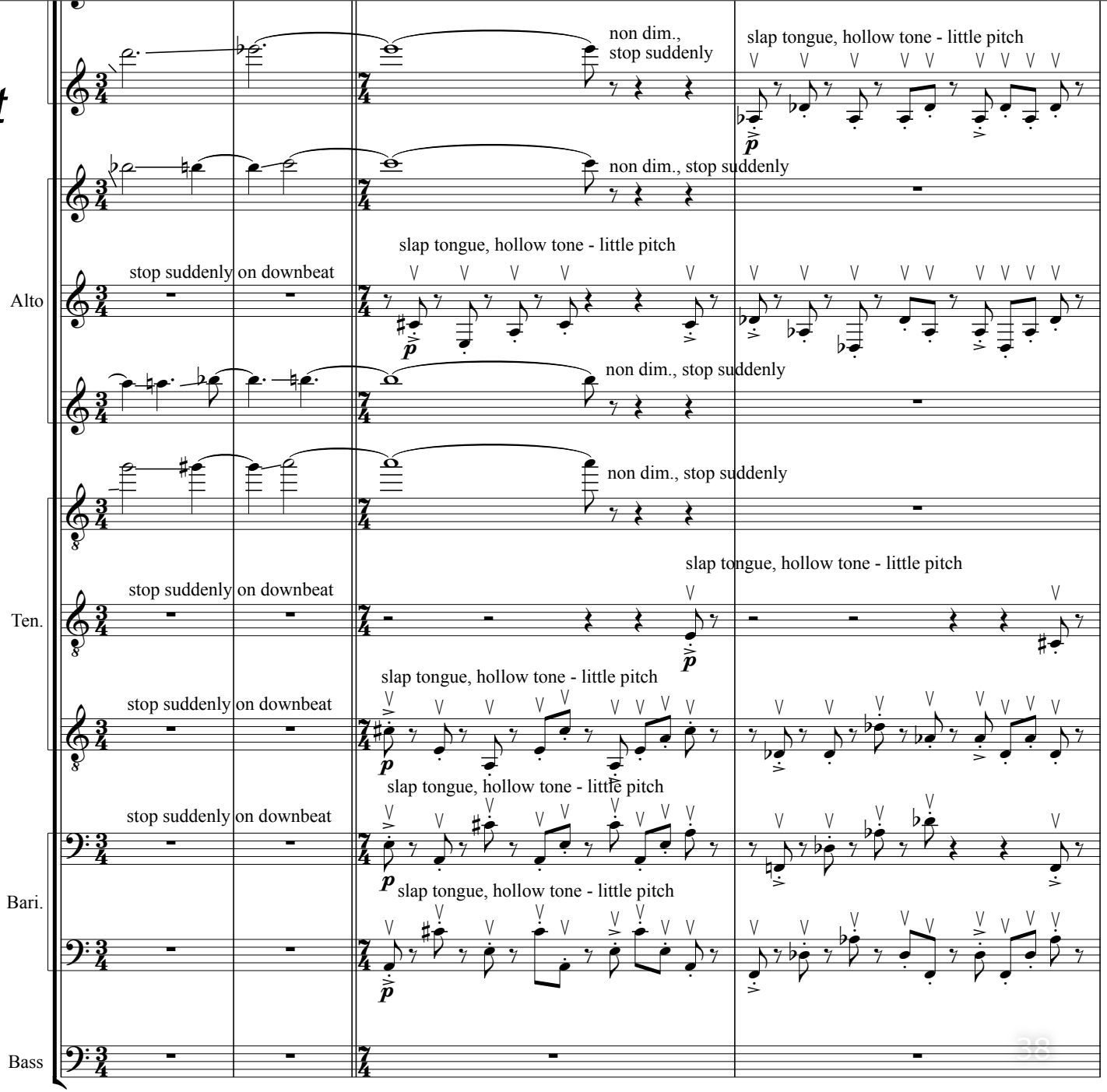
The Machine Awakes for soprano & chamber orchestra, 2007/09

Words by Richard Powers, from *Galatea 2.2*



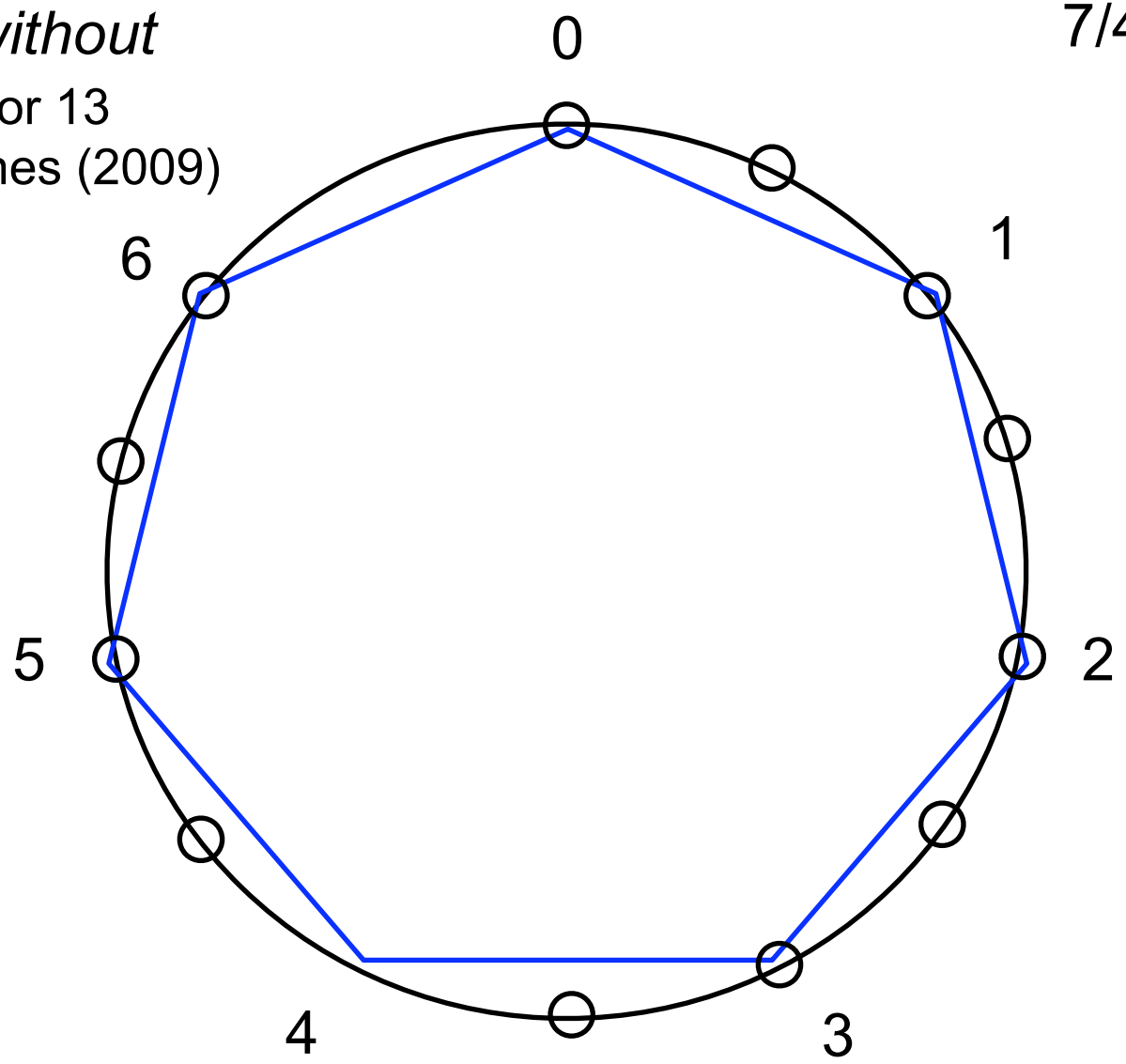
World without Words

for 13 saxes (2009)

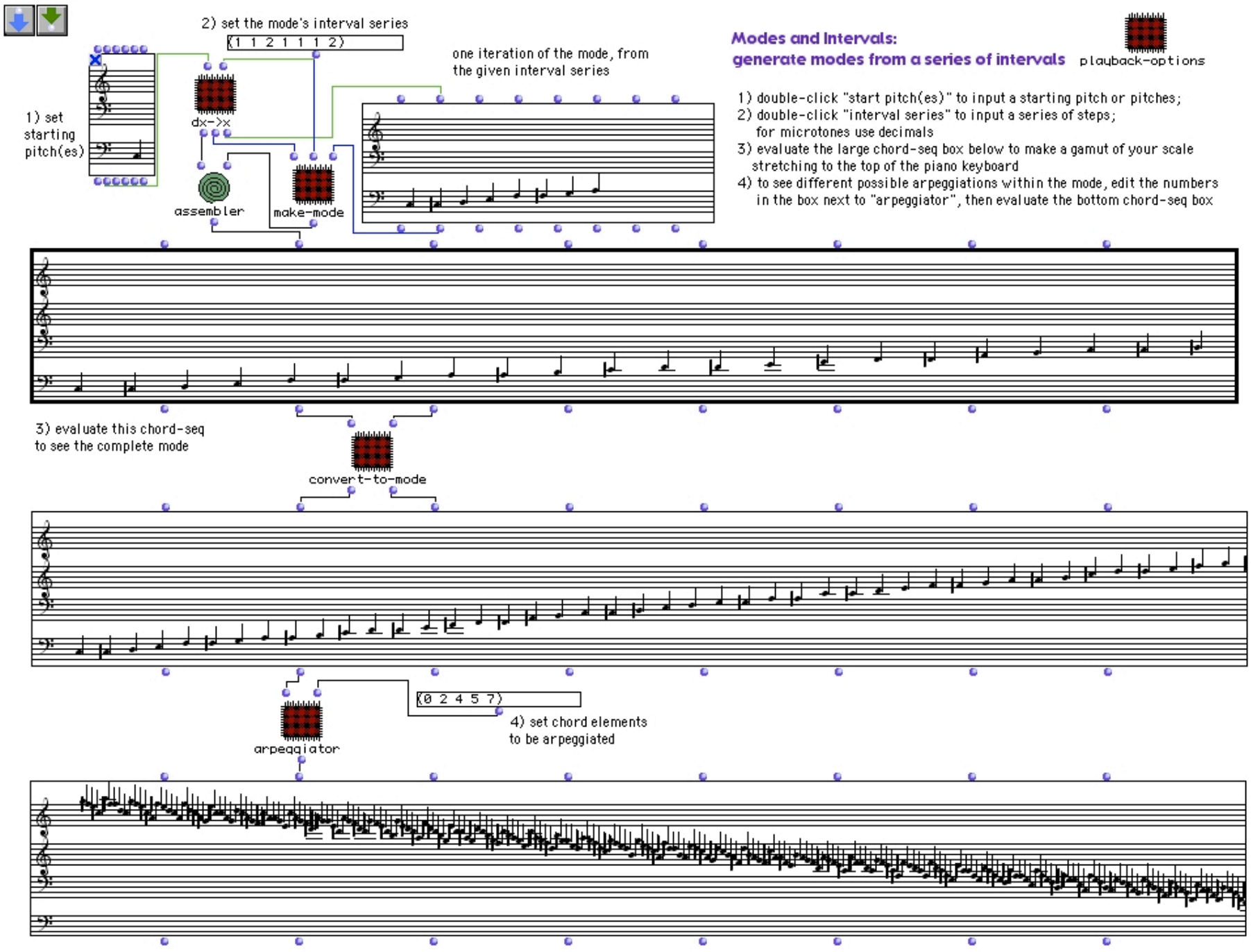


World without Words for 13 saxophones (2009)

7/4 time sig



n = 14
k = 12


2) set the mode's interval series
(1 1 2 1 1 1 2)
one iteration of the mode, from the given interval series
Modes and Intervals:
generate modes from a series of intervals
playback-options
1) double-click "start pitch(es)" to input a starting pitch or pitches;
2) double-click "interval series" to input a series of steps;
for microtones use decimals
3) evaluate the large chord-seq box below to make a gamut of your scale stretching to the top of the piano keyboard
4) to see different possible arpeggiations within the mode, edit the numbers in the box next to "arpeggiator", then evaluate the bottom chord-seq box
1) set starting pitch(es)
dx->x
assembler
make-mode
3) evaluate this chord-seq to see the complete mode
convert-to-mode
(0 2 4 5 7)
4) set chord elements to be arpeggiated
arpeggiator

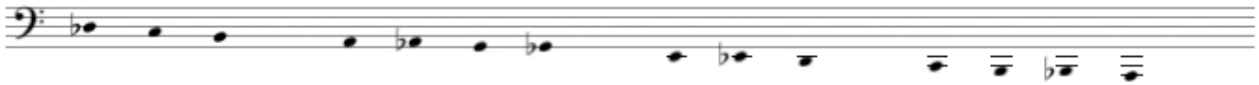
Seven Memorials for piano

Stephen Andrew Taylor, 2003

6. Black Smoker

(The ocean floor)

For this movement: use four short strips of Blu-Tac (or equivalent) to mute the following piano strings.



♩ = 154 **Dark and submerged**

(unmuted)

(muted) *mf*

Pedal almost constantly; give the muted notes resonance, while keeping the non-muted notes distinct.

4

mf

(sempre mf)

7

8vb