

Rhythm Necklace &
Hemiola:
Hidden Meter in
Radiohead and Björk

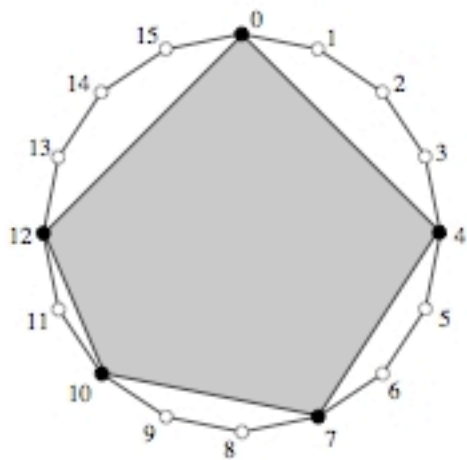
Stephen Taylor, University of Illinois at
Urbana-Champaign
Bellairs, Barbados, February 6-8, 2010

Rhythm ... is a closed, timelike
loop.

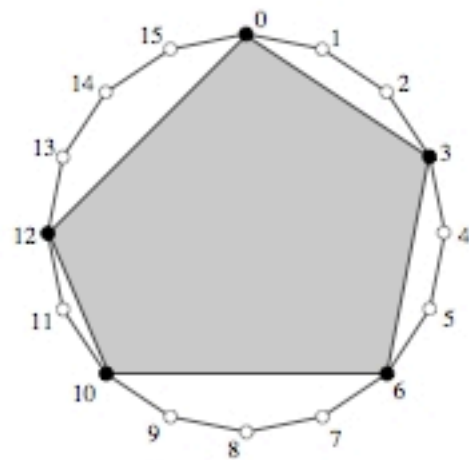
Richard Powers, *The Time of Our Singing* (2003)

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

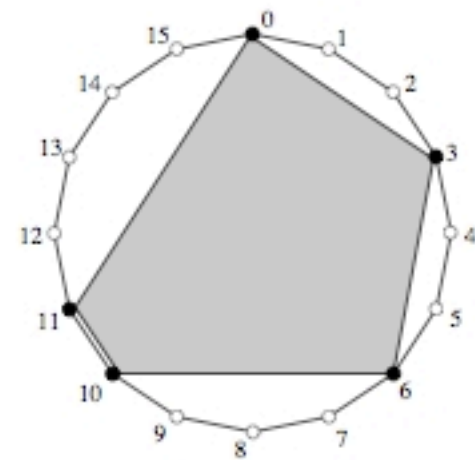
William Sethares, *Rhythm and Transforms* (2007)



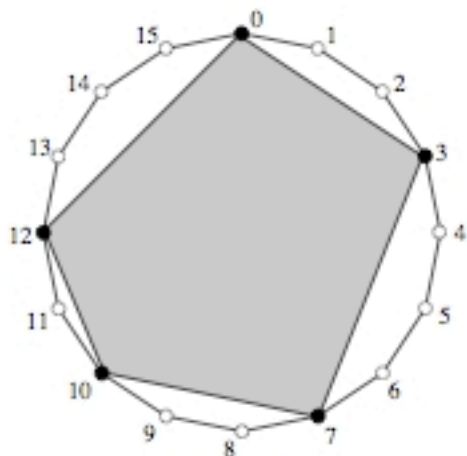
(a) Shiko



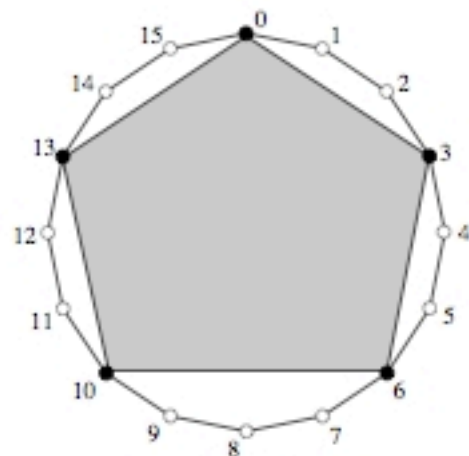
(b) Son



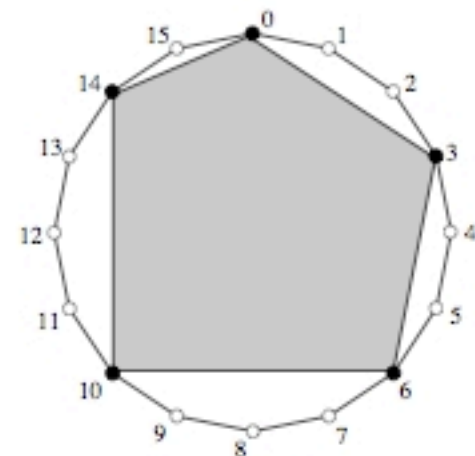
(c) Soukous



(d) Rumba

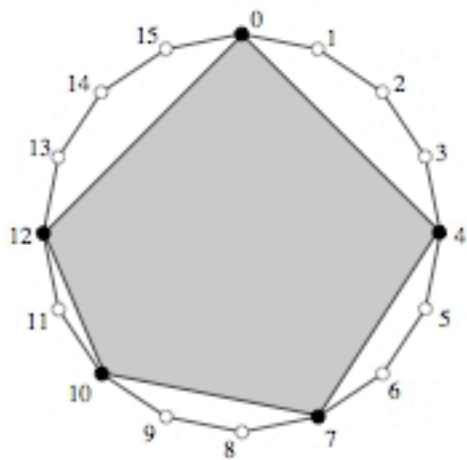


(e) Bossa-Nova

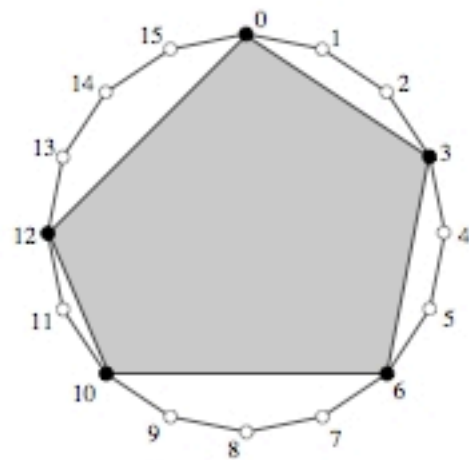


(f) Gahu

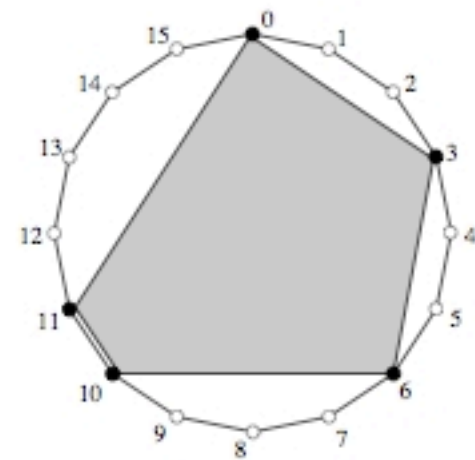
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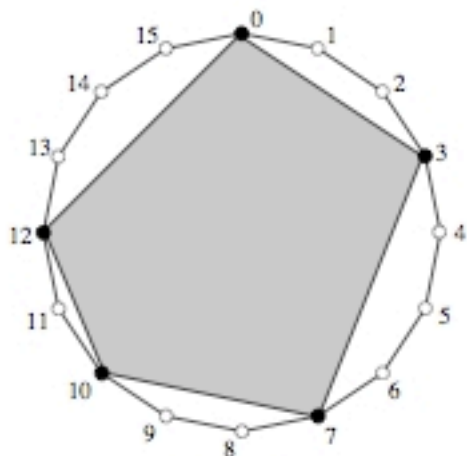
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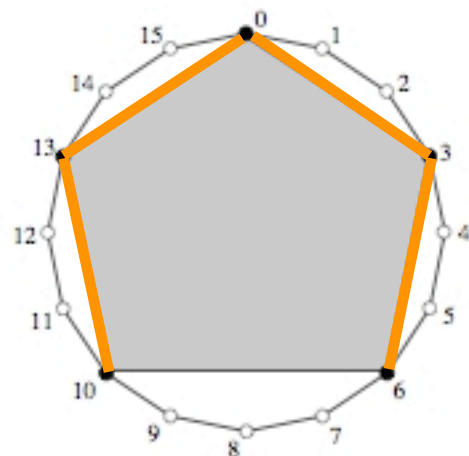
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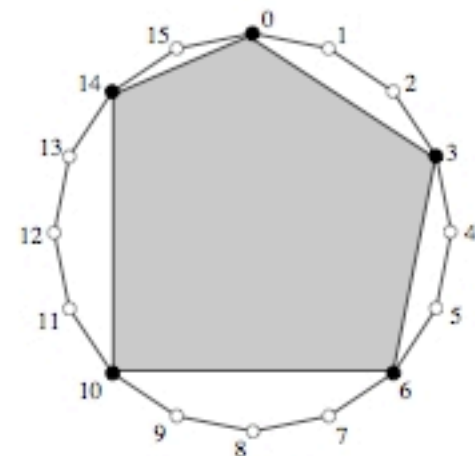
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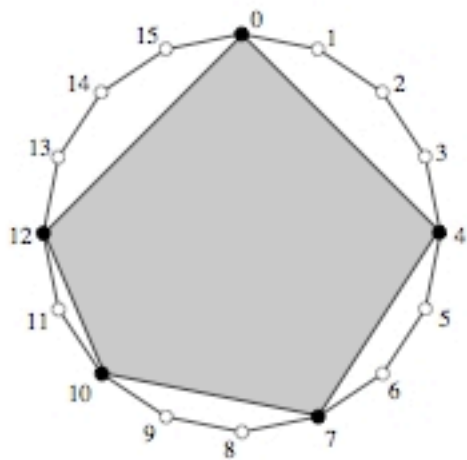


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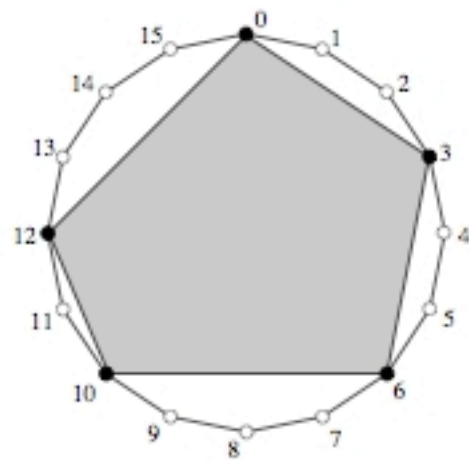


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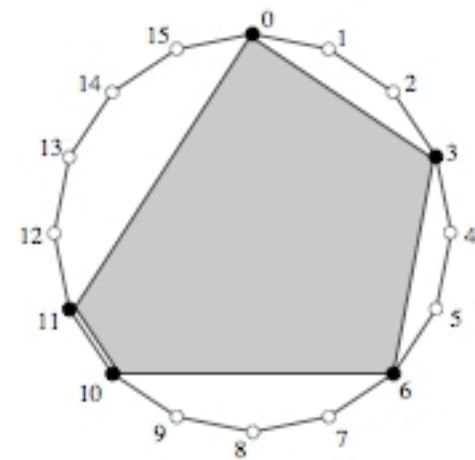
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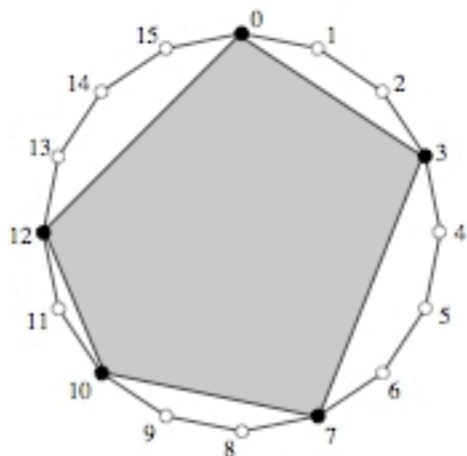
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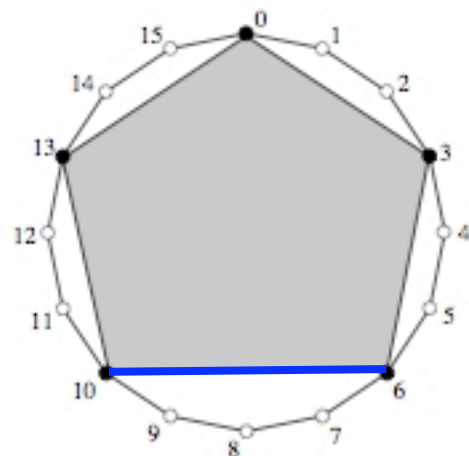
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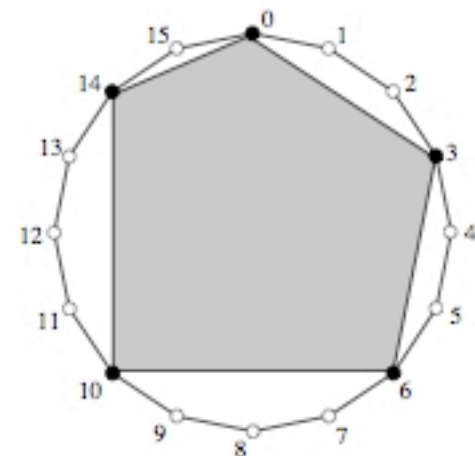
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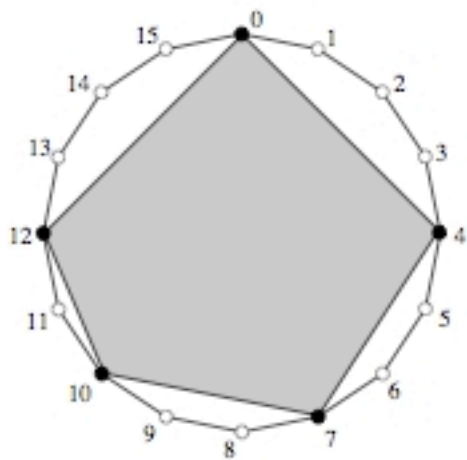


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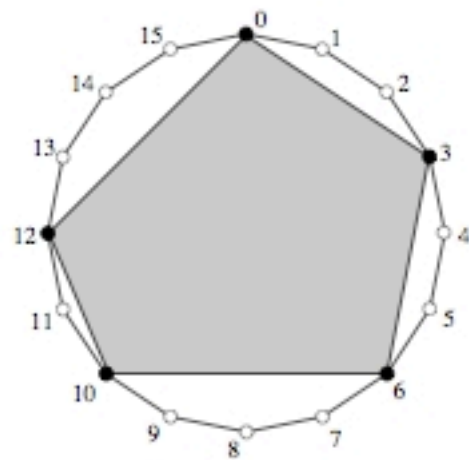


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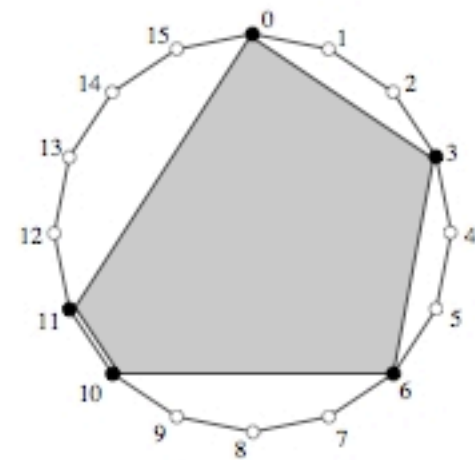
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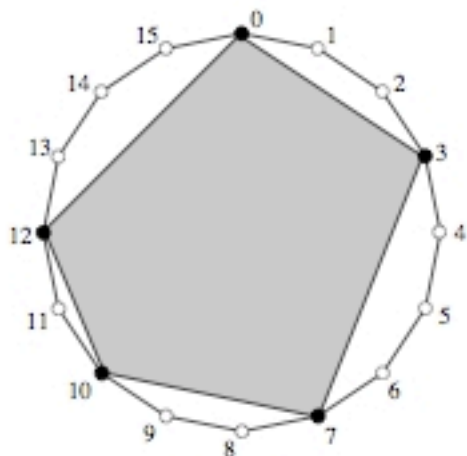
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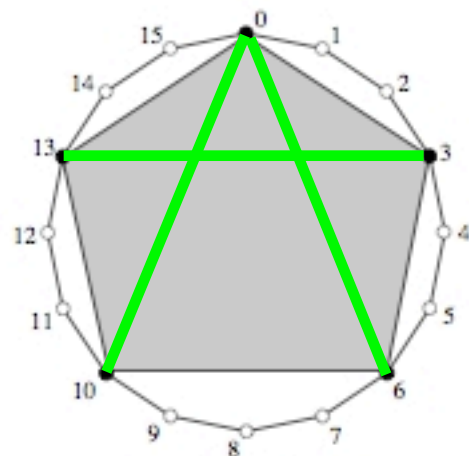
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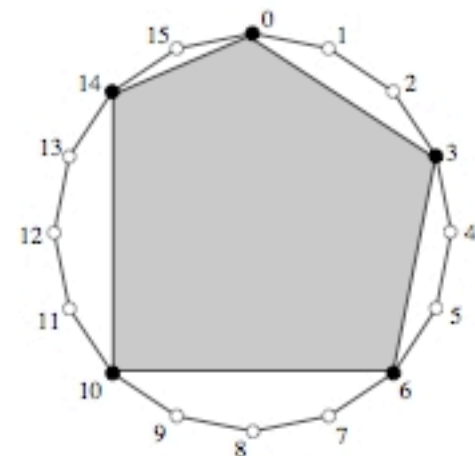
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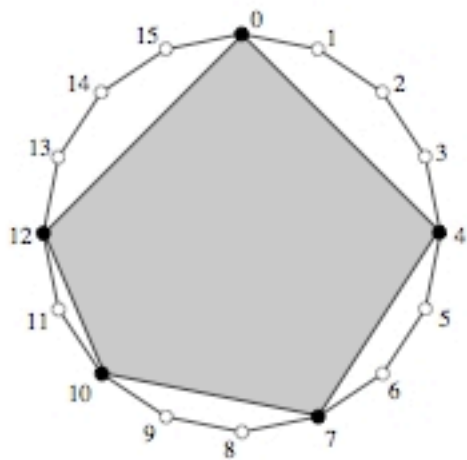


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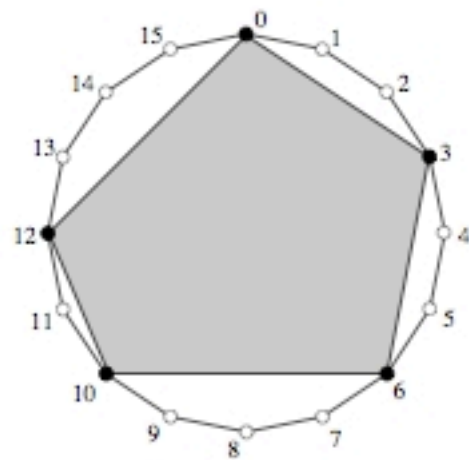


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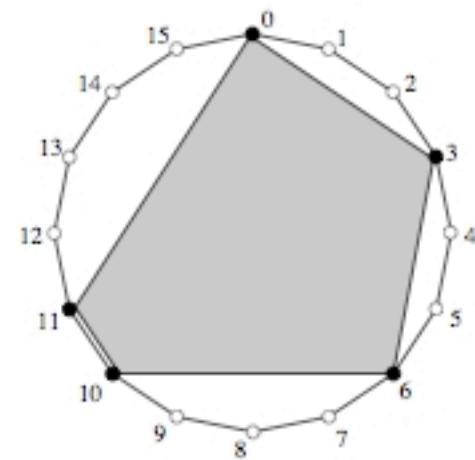
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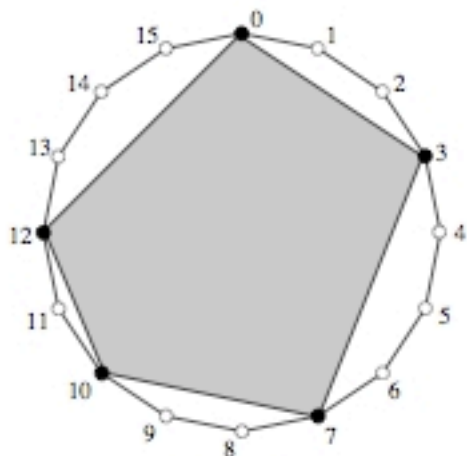
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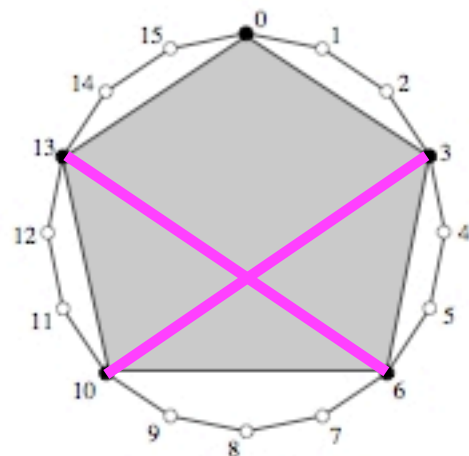
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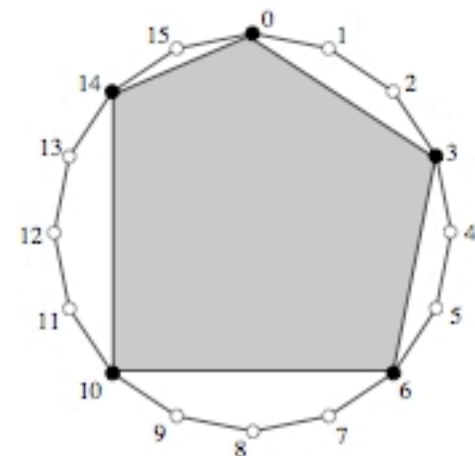
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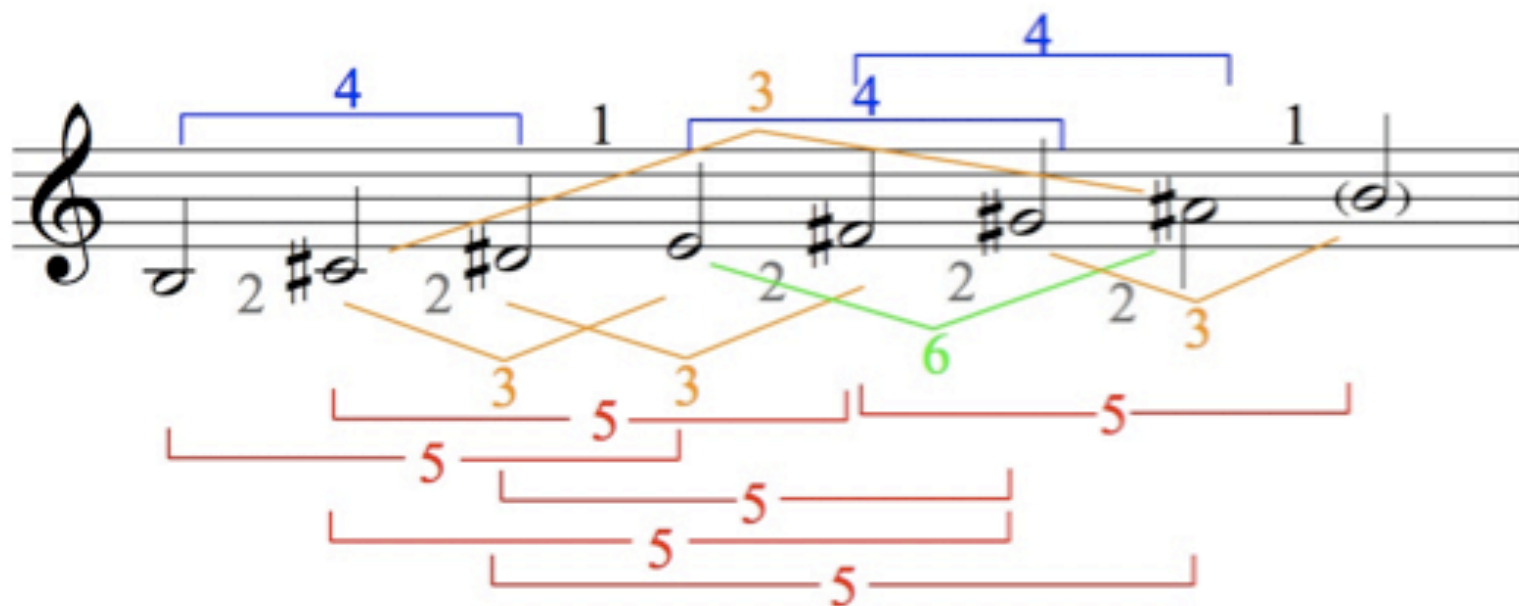
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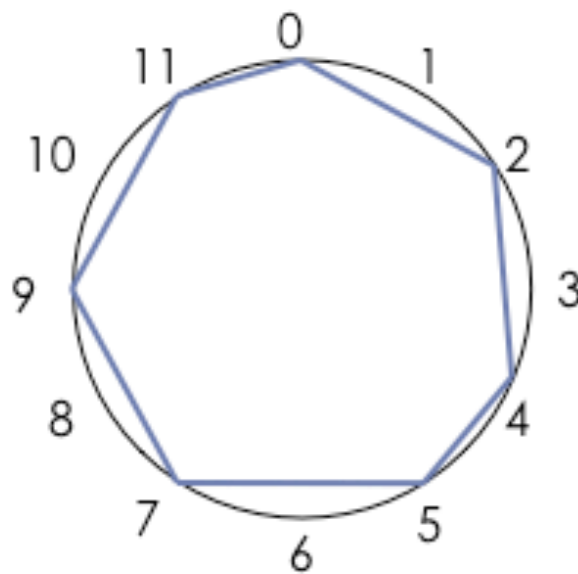
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Example 2. The “Erdős-deep” property of the diatonic mode



interval vector
for diatonic
scale:
<254361>



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

radiohead,
pyramid song

(from Amnesiac, 2001)

i jumped in the river
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
there was nothing to fear and nothing to doubt
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there was nothing to fear and nothing to doubt

Pyramid Song, partial transcription

Radiohead

$\text{♩} = 104$

The image displays a partial transcription of the song "Pyramid Song" by Radiohead. It consists of three systems of music. The first system shows the piano accompaniment for measures 1 through 4, with a tempo marking of 104 beats per minute. The piano part features a complex, rhythmic accompaniment with many beamed notes. The second system, starting at measure 5, includes a vocal line labeled "Refrain" and "(vocalise)". The vocal line has a long, sweeping melodic line with a sharp sign above a note. The piano accompaniment continues. The third system, starting at measure 9, includes a vocal line labeled "(4x) Verse" with the lyrics "jumped in the river and what did i see" and "black-eyed an-gels swam with me". The piano accompaniment continues. Various annotations like 'a', 'a'', and 'b' are placed under the piano parts, and a circled 'i' is under the vocal line in the third system.

5 Refrain
(vocalise)

9 (4x) Verse
jumped in the river and what did i see — black-eyed an-gels swam with me —

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

1 ♩ = 104

2 (anticipation) (UN) 3 (appoggiatura reinforces sense of downbeat) 4 (static harmony creates effect of 2-chord ext.)

b) recomposed

1

I bII III bII

Example 4: Pyramid Song, recomposed

Radiohead

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

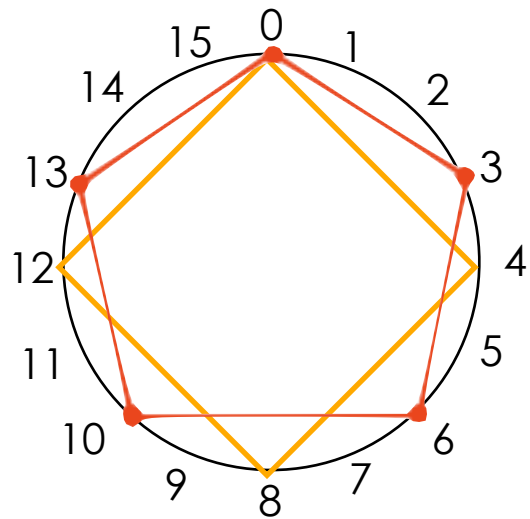
1 $\text{♩} = 104$ 2 (anticipation) (UN) 3 (appoggiatura reinforces sense of downbeat) 4 (static harmony creates effect of 2-chord ext.)

b) recomposed

1 2 (two-chord extension unexpectedly inserted) (ant.) 3 (UN) 4 (appoggiatura reinforces sense of downbeat) 5 6 (etc.)

I ♭II III ♭II

rhythm necklace rotation



$$n = 16$$

$$k = 5$$

Pyramid Song, re-barred and recomposed

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

Radiohead
(static harmony creates effect of 2-chord ext.)

♩ = 104

1 2 (anticipation) (UN) 3 (appoggiatura reinforces sense of downbeat) 4

(two-chord extension unexpectedly inserted)

d) original, mm. 5-8 (notated in 8/8)

Refrain

♩ = 104

5 6 7 8

(vocalise)

(the melody here sounds like an ornamented repetition, not pickups to a downbeat)

(sounds like downbeat) (as in m. 2 - sounds like two chords too many) (extension, as in m.4)

I

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

Pyramid Song, partial transcription

Radiohead

$\text{♩} = 104$

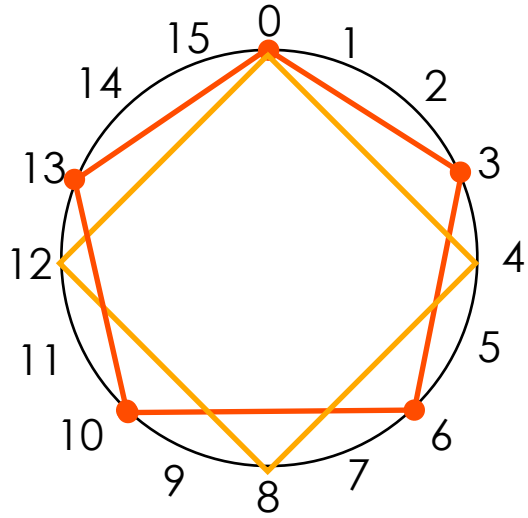
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5 Refrain
(vocalise)

9 (4x) Verse
jumped in the river and what did i see — black-eyed an-gels swam with me —

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

rhythm necklace

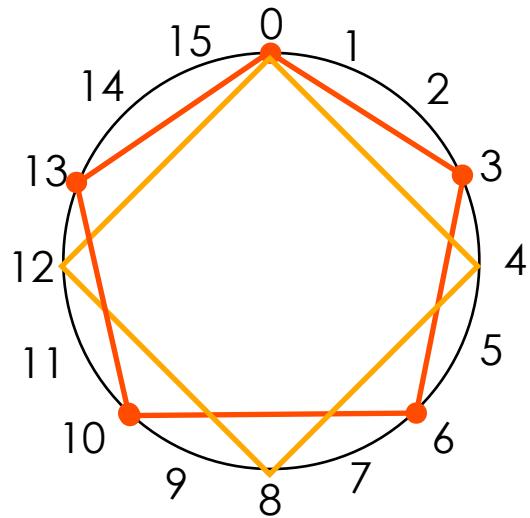


$$n = 16$$

$$k = 5$$

$$p = 4$$

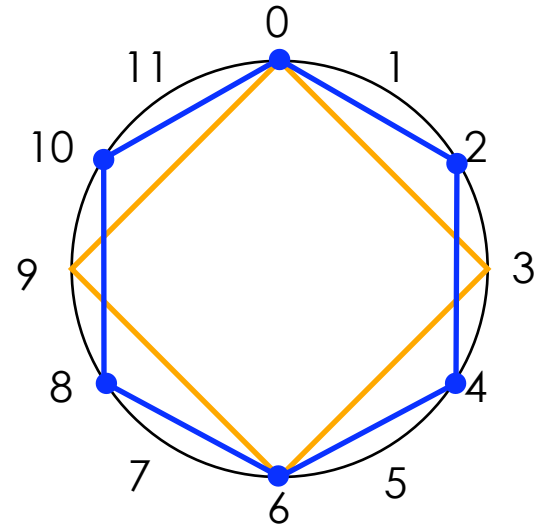
rhythm necklace vs. hemiola



$$n = 16$$

$$k = 5$$

$$p = 4$$



$$n = 12$$

$$k = 6$$

$$p = 4$$

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)

Desired Constellation

rhythmic interpretation 1

Olivier Alary / Björk

♩ = 165

The musical score is divided into two systems. The first system features a piano part with a treble and bass clef and a drum part below. The piano part starts with a '(fade in)' annotation and includes triplets of eighth notes in the right hand and eighth notes in the left hand. The drum part begins with a 4/4 time signature, followed by a '(clicks)' annotation and a change to 3/4 time. The second system continues the piano part with 'appoggiatura' markings and includes the lyrics 'It's trick y' with a '(vocals rubato, behind the beat)' annotation. The piano part includes chords marked '2x' and '(6x)'. The drum part continues with a consistent rhythmic pattern.

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

when (4x) you feel some one

This system contains the first five measures of the piece. The vocal line begins with a half note 'when' followed by four measures of rests, then a quarter note 'you feel' and a quarter note 'some one'. The piano accompaniment features a steady eighth-note bass line and chords in the right hand. A '(4x)' annotation is placed above the piano part in the fourth measure.

has done (lots of reverb, hard to hear the exact rhythm)

This system contains the final five measures. The vocal line has a half note 'has' and a half note 'done'. The piano accompaniment continues with the eighth-note bass line and chords. An '(app.)' annotation is placed above the piano part in the second measure. A note at the end of the system reads '(lots of reverb, hard to hear the exact rhythm)'. The piece concludes with a double bar line.

g# - B (uncertain rhythm)
E 6x (quarter notes)
g# 4x (4:3, dotted 8^{ths})
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.

Desired Constellation

interlude: metric modulation

Björk / Olivier Alary

♩ = 165 (felt in one)

How am I going to make it right?

The first system of the score consists of a vocal line and a piano accompaniment. The vocal line is in a 3/4 time signature with a tempo of 165 beats per minute, where each quarter note is felt as a single beat. The piano accompaniment features a steady eighth-note bass line and a treble line with chords and eighth-note patterns.

(D# minor, or G# minor, 2nd inv.)

← ♩ = ♩ →

(1) ♩ = 110 (felt in four)

(2)

The second system of the score is a piano interlude. It is marked with a tempo of 110 beats per minute, where each quarter note is felt as a single beat. The music is in a 4/4 time signature and features a complex, rhythmic piano accompaniment with dense chordal textures in both hands.

(G# Aeolian mode)

(3)

(4)

The third system of the score continues the piano interlude. It maintains the 4/4 time signature and the 110 bpm tempo. The piano accompaniment continues with its complex, rhythmic patterns, showing further development of the chordal textures.

Example 7. "Desired Constellation," interlude and metric modulation.

(3) (4)

! (5)

With a palm full of stars

Desired Constellation

rhythmic interpretation 2 (after hearing the whole song)

Björk / Olivier Alary

♩ = 110

The musical score is presented in three systems. The first system shows the piano introduction in 3/4 time, marked with a tempo of 110. It features a 'fade in' annotation over the first two measures. The piano part consists of chords in the right hand and a bass line in the left hand. The drum part includes a 7/4 time signature and a 'clicks' annotation. The second system continues the piano part with triplets in both hands and the drum part with eighth-note triplets. The third system shows the piano part with more triplets and the drum part with eighth-note triplets. The score is written in treble and bass clefs with a key signature of three sharps (F#, C#, G#).

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

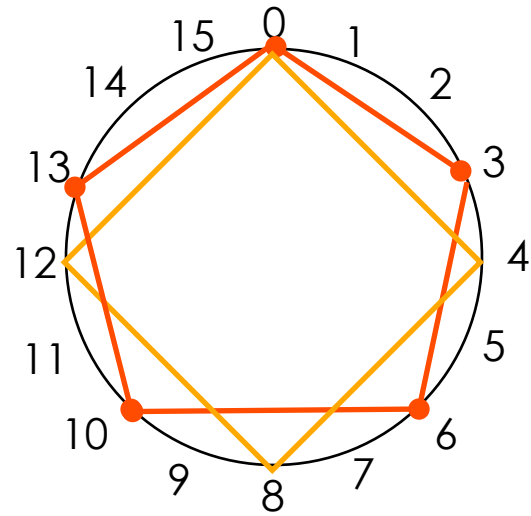
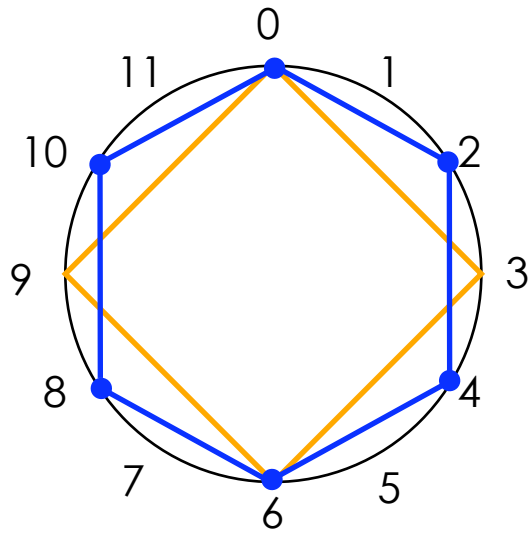
9 (vocal transcription is not rhythmically identical to Ex. 5)

Musical score for measures 9-12. The score is in 7/8 time and features a vocal line and a piano accompaniment. The vocal line includes the lyrics: "It's trick-y when you feel some - one". The piano accompaniment consists of a right hand with triplets of chords and a left hand with a rhythmic pattern of eighth notes and triplets.

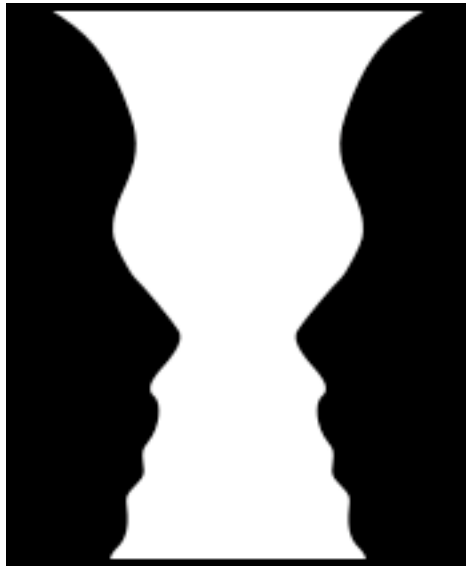
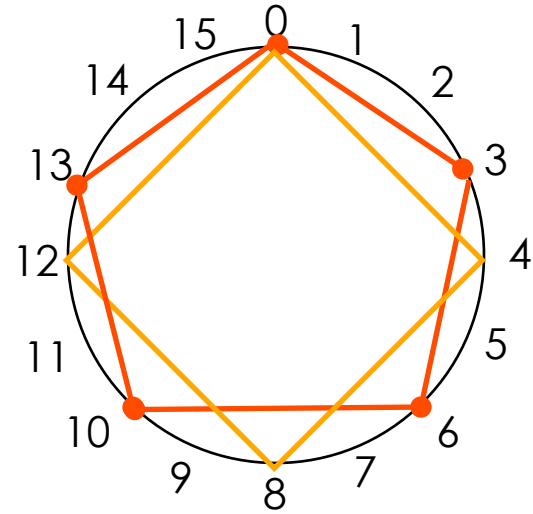
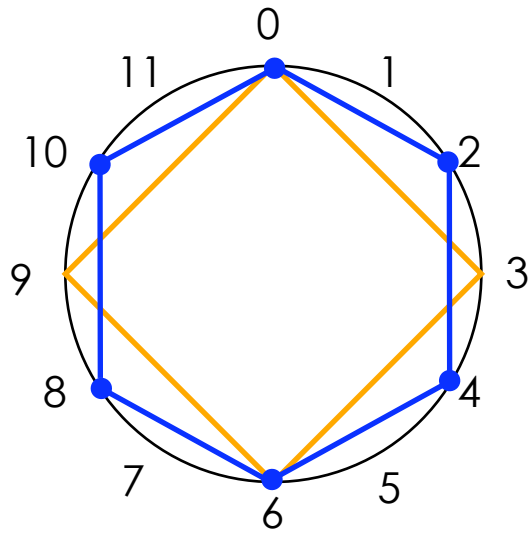
13

Musical score for measures 13-16. The score is in 7/8 time and features a vocal line and a piano accompaniment. The vocal line includes the lyrics: "has done". The piano accompaniment continues with a right hand of triplets and a left hand of eighth notes and triplets.

hemiola, rhythm necklace and illusion



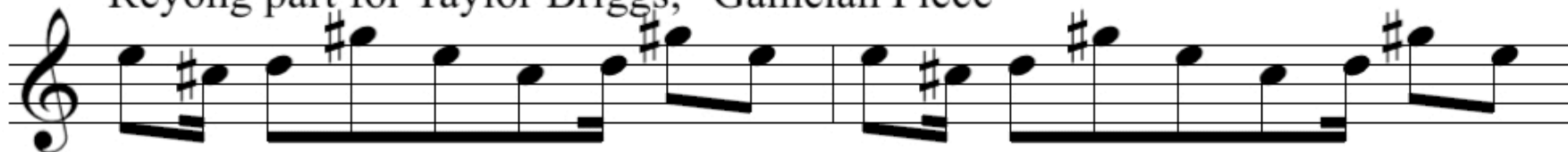
hemiola, rhythm necklace and illusion



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

Flauto piccolo

$\text{♩} = \text{♩} = 76$ F 34

Flauto

Clarinetto

Clarinetto basso

$(3+2+2+2 \quad 3+2+2)$
8 + 8

Perc. ^{xrl}

MARIMBA. [Leertakt]

VN. SOLO

Vn. con scord.

Vn. 1

2

Vn. 3/4 uni sono

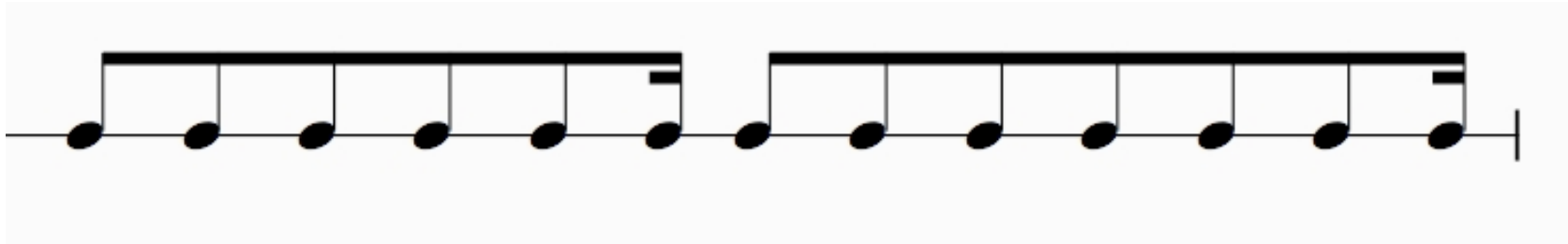
$\text{♩} = \text{♩} = 76$
4 $(3+2+2+2 \quad 3+2+2)$
2 (8 + 8)

pizz. molto ritmico
p secco

4
2

$\text{♩} = 76$

2 2 2 2 2 1 2 2 2 2 2 2 1



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

♩ = 116 **Rhythmic and expressive**

very light, high-pitched and resonant (with fingers) - top drum mostly, with lower drum ad lib.

Tabla (or Bongos)

p

pizz.

f

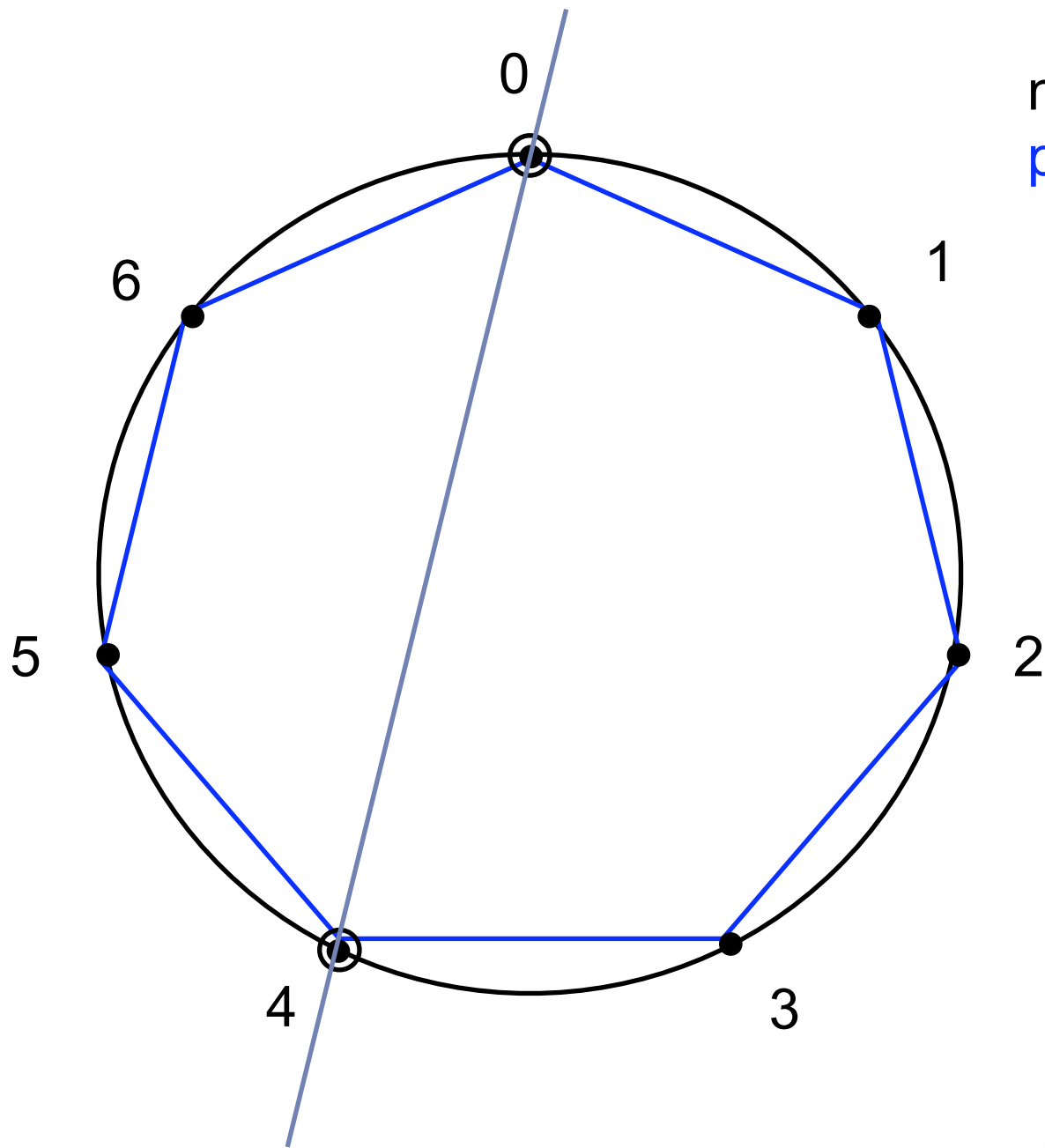
dim.

Tabla

mf

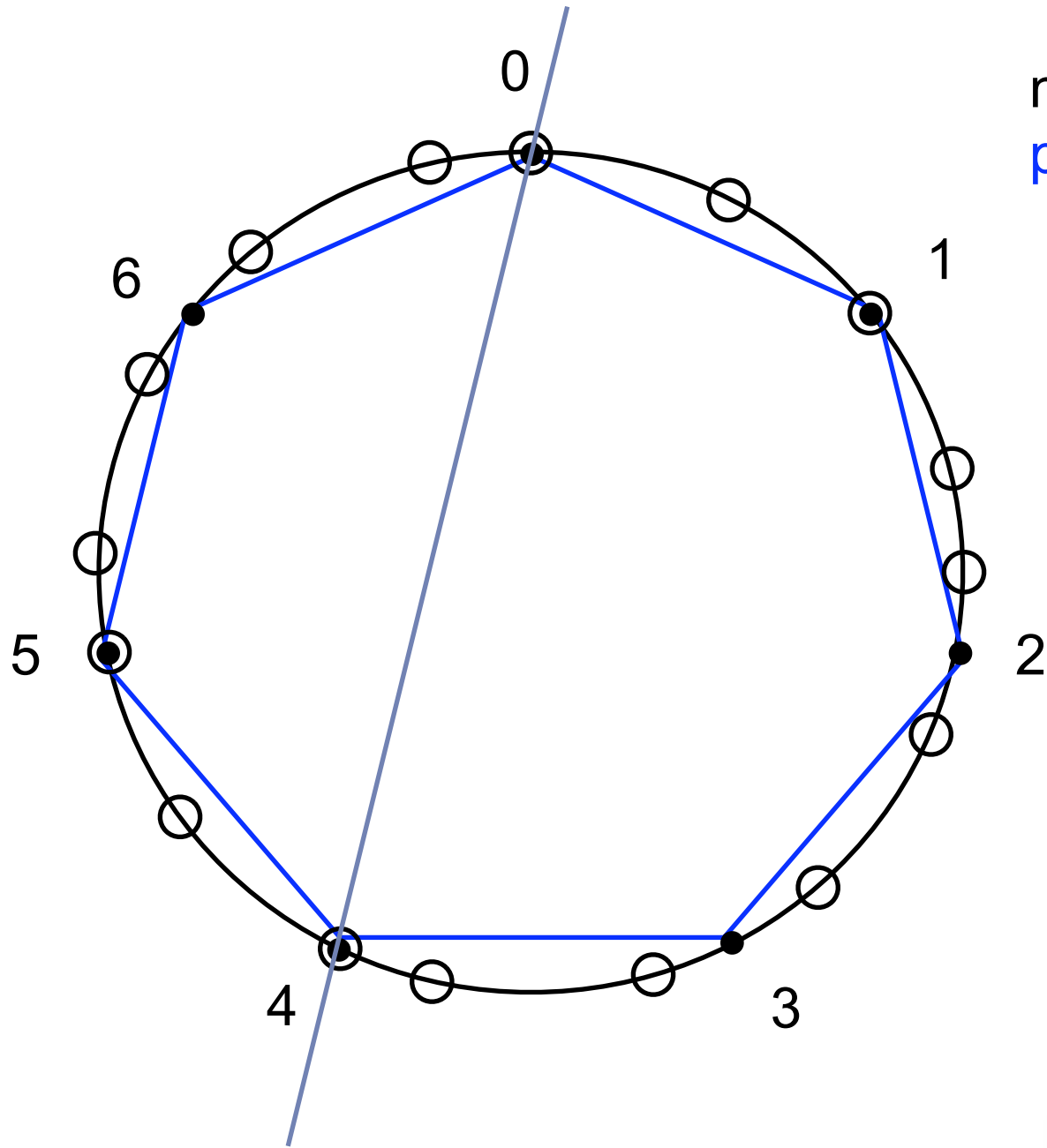
mf

$n = 28$
 $p = 7$

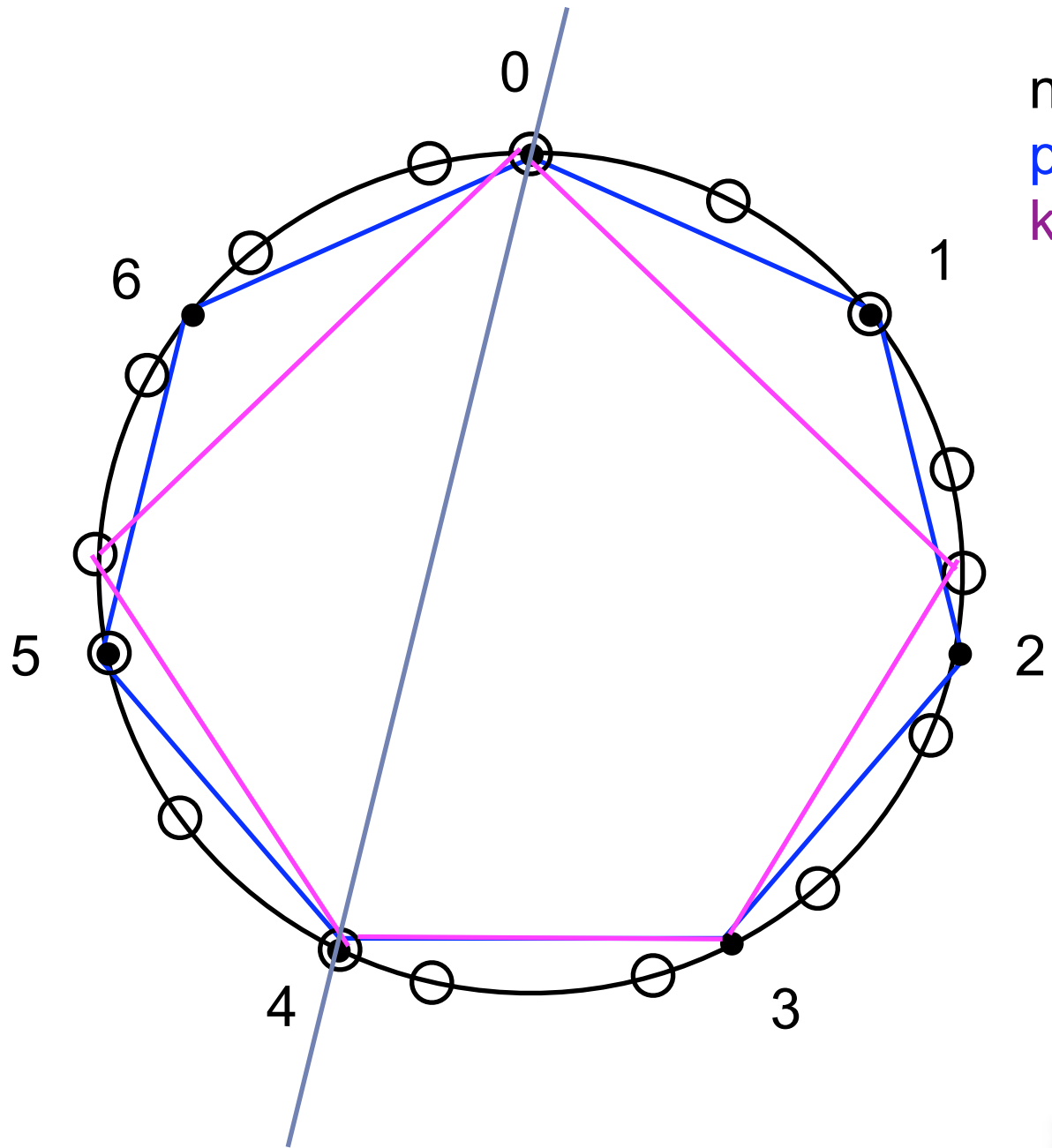


33

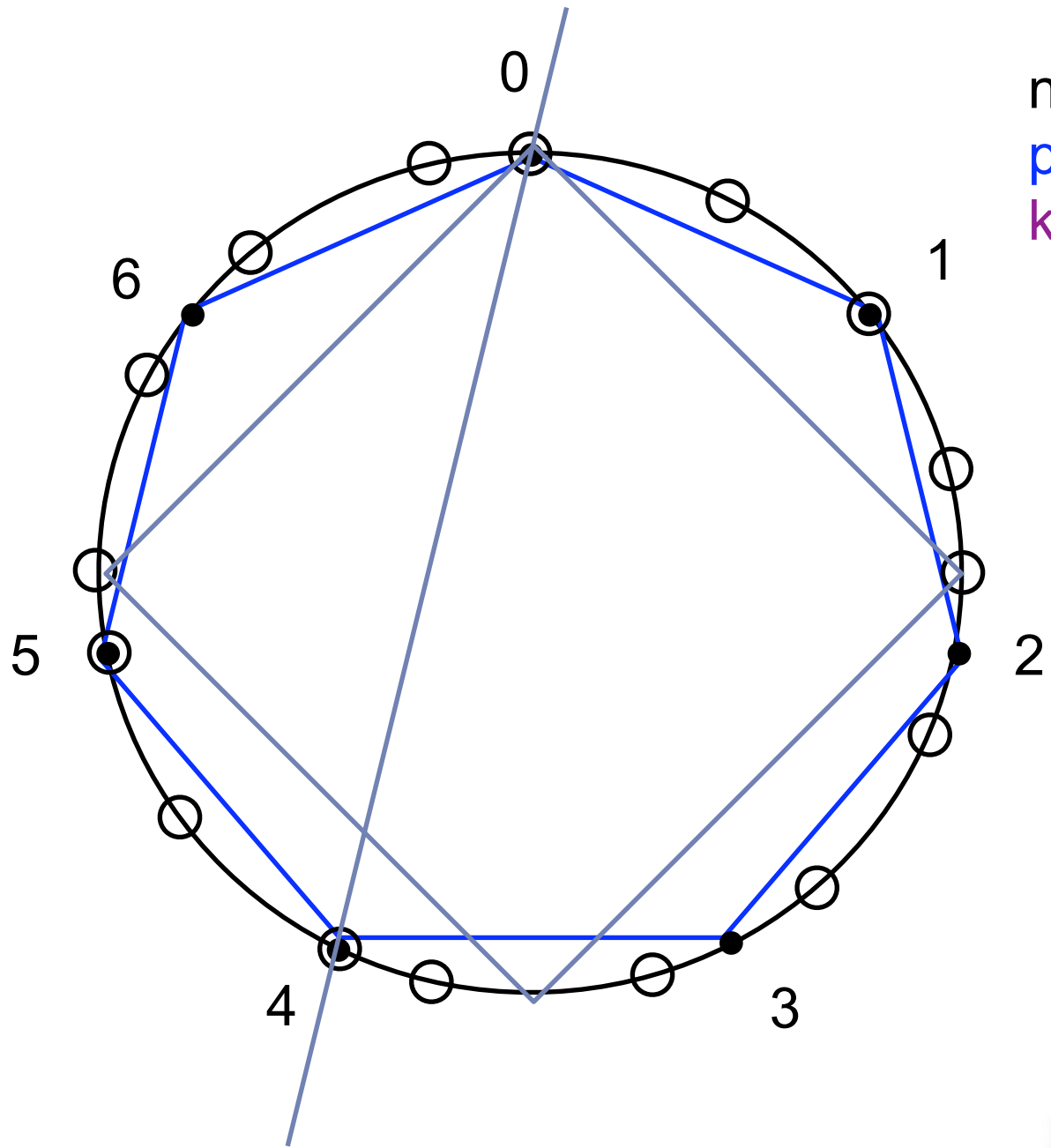
$n = 28$
 $p = 7$



34



$n = 28$
 $p = 7$
 $k = 5$



$n = 28$
 $p = 7$
 $k = 5$

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

Words by Richard Powers, from *Galatea* 2.2

151

poco a poco cresc.

The Great Wall The Great Wall and the Bur ma Road

156

The Great Wall and the Bur - ma

160

Road and and and and and and and

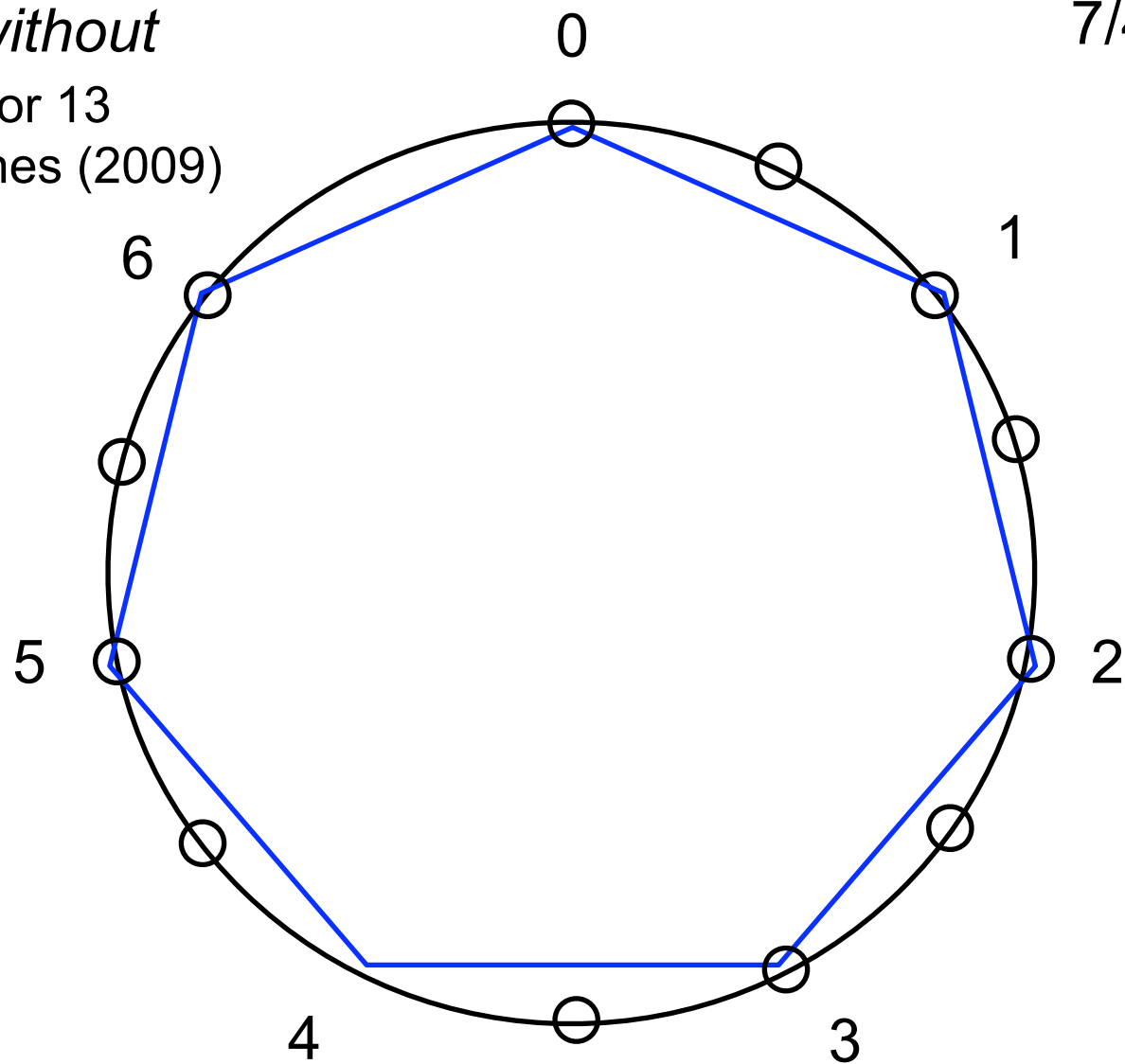
p *poco a poco cresc.*

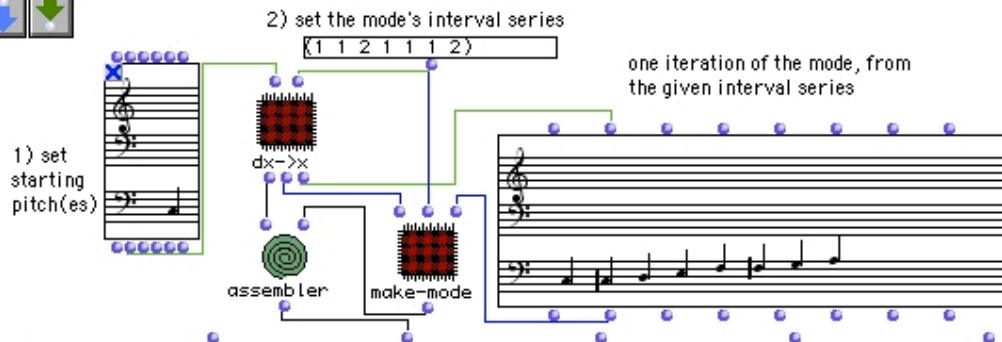
World without Words for 13 saxes (2009)

The musical score is for a piece titled "World without Words" for 13 saxophones, composed in 2009. The score is written in 3/4 time and is divided into three measures. The instruments are grouped into Alto, Tenor, and Bari sections. The Alto section consists of three staves, the Tenor section consists of two staves, and the Bari section consists of two staves. The Bass part is represented by a single staff at the bottom. The score includes various articulations and dynamics, such as "slap tongue, hollow tone - little pitch" and "non dim., stop suddenly". The first measure is in 3/4 time, and the second and third measures are in 7/4 time. The Alto and Tenor parts have a "stop suddenly on downbeat" instruction in the first measure. The Bari part has a "stop suddenly on downbeat" instruction in the first measure. The score is written in treble clef for Alto and Tenor, and bass clef for Bari and Bass. The Alto and Tenor parts have a key signature of one flat (B-flat), while the Bari and Bass parts have a key signature of two flats (B-flat and E-flat). The Alto and Tenor parts have a dynamic marking of *p* (piano) in the second measure. The Bari and Bass parts have a dynamic marking of *p* (piano) in the second measure. The Alto and Tenor parts have a dynamic marking of *p* (piano) in the third measure. The Bari and Bass parts have a dynamic marking of *p* (piano) in the third measure. The Alto and Tenor parts have a dynamic marking of *p* (piano) in the third measure. The Bari and Bass parts have a dynamic marking of *p* (piano) in the third measure. The Alto and Tenor parts have a dynamic marking of *p* (piano) in the third measure. The Bari and Bass parts have a dynamic marking of *p* (piano) in the third measure.

*World without
Words* for 13
saxophones (2009)

7/4 time sig





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

