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MTO 25.2 Examples: Smither, Guide-Tone Space

(Note: audio, video, and other interactive examples are only available online)

<http://mtosmt.org/issues/mto.19.25.2/mto.19.25.2.smither.html>

Example 1. Lead sheet showing the chord changes and melody to “Tune Up” (Miles Davis)

A lead sheet for the jazz standard "Tune Up" by Miles Davis, written in 4/4 time. The sheet consists of four staves of music, each with a key signature change and a series of chords indicated above the staff. The melody is written in treble clef. The first staff (measures 1-4) has a key signature of one sharp (F#) and chords E-7, A7, and DΔ7. The second staff (measures 5-8) has a key signature of two sharps (F#, C#) and chords D-7, G7, and CΔ7. The third staff (measures 9-12) has a key signature of two flats (Bb, Eb) and chords C-7, F7, BbΔ7, and EbΔ7. The fourth staff (measures 13-16) has a key signature of one sharp (F#) and chords E-7, A7, BbΔ7, E-7, and A7. The melody features various rhythmic patterns, including eighth and sixteenth notes, and rests.

Example 2. Smooth guide-tone voice leading in “Tune Up”; ties indicate common tones

Example 2 shows a sequence of chords in 4/4 time, with guide tones (3rds and 7ths) written for each. Ties indicate common tones between adjacent chords.

Chord progression: E⁻⁷, A⁷, D^{Δ7}, D⁻⁷, G⁷, C^{Δ7}, C⁻⁷, F⁷, B^{bΔ7}, E^{bΔ7}, E⁻⁷, A⁷, B^{bΔ7}, E⁻⁷, A⁷.

Example 3a. Voice leading between thirds and sevenths in a fifths progression

Example 3a shows a sequence of chords in 4/4 time, with guide tones (3rds and 7ths) written for each. The progression is a fifths progression.

Chord progression: E⁻⁷, A⁻⁷, D⁻⁷, G⁷, C^{Δ7}.

Voice leading: The 7th of one chord moves to the 3rd of the next, and the 3rd of one chord moves to the 7th of the next.

Example 3b. Voice leading when tritone substitutes replace chords in the progression from Example 3a

Example 3b shows a sequence of chords in 4/4 time, with guide tones (3rds and 7ths) written for each. The progression is a fifths progression, but the second and fourth chords are replaced by tritone substitutes.

Chord progression: E⁻⁷, E^{b7}, D⁻⁷, D^{b7}, C^{Δ7}.

Voice leading: The 7th of one chord moves to the 3rd of the next, and the 3rd of one chord moves to the 7th of the next.

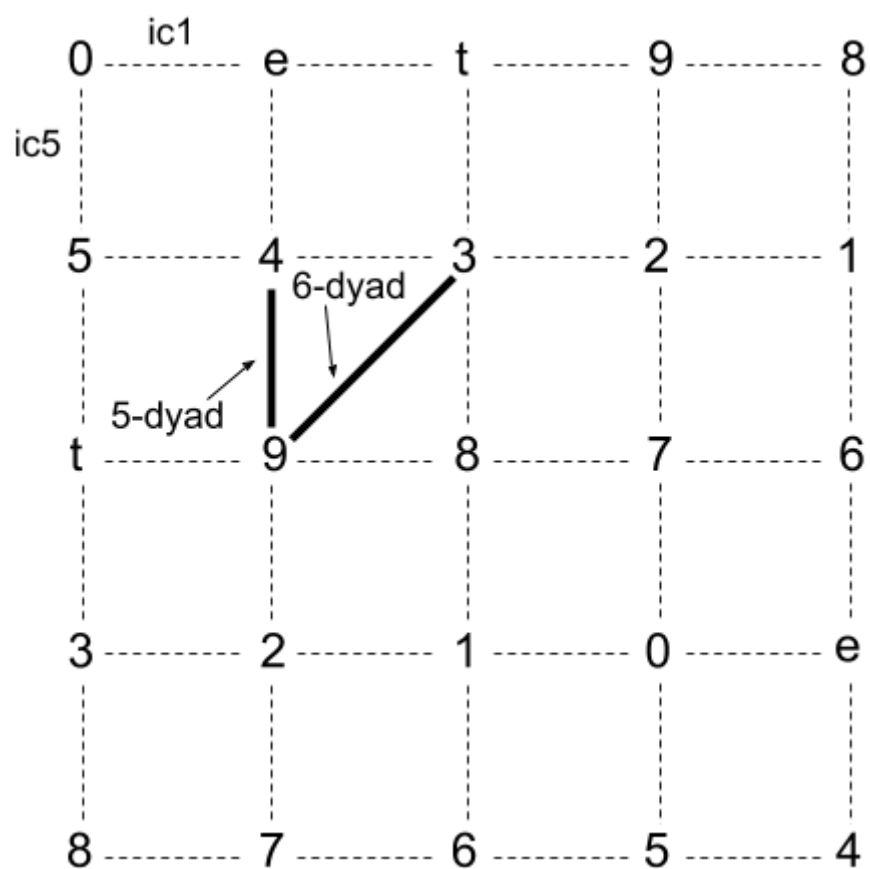
Example 4. Guide tone dyads in various seventh chord qualities

Example 4 shows a sequence of chords in 4/4 time, with guide tones (3rds and 7ths) written for each. The progression is a sequence of seventh chords.

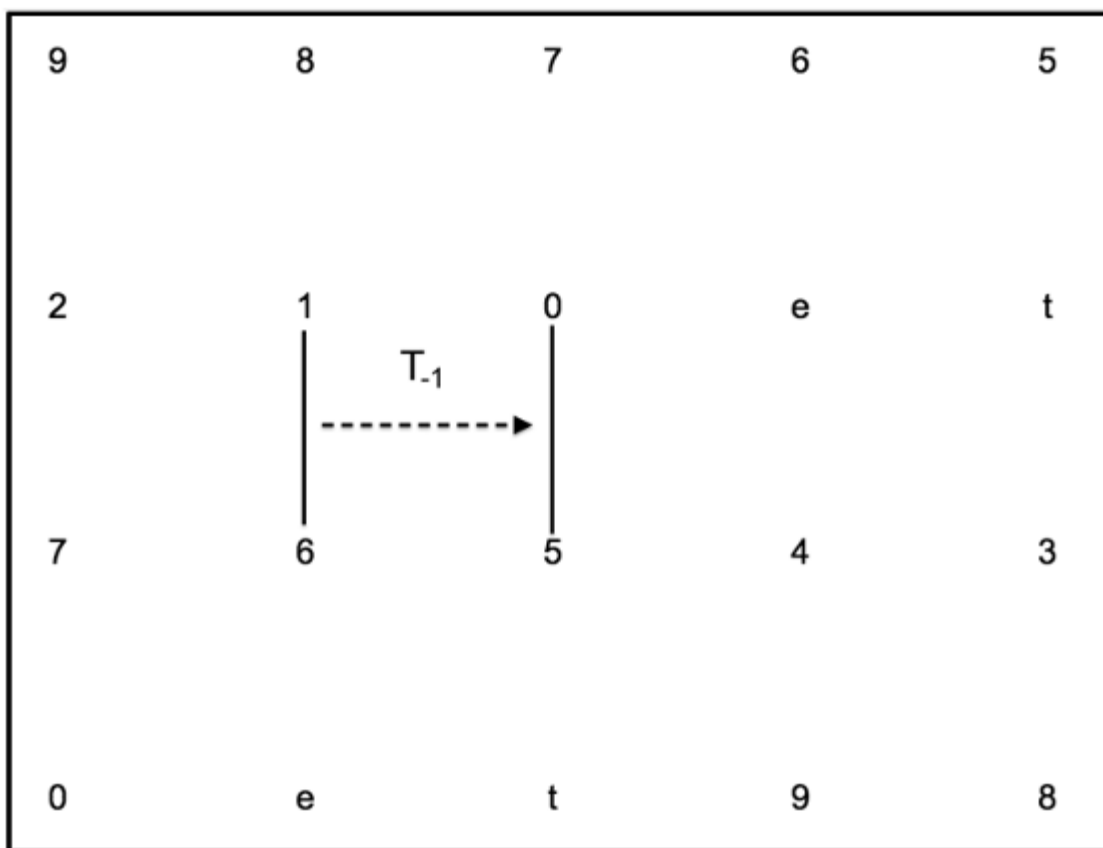
Chord progression: C^{Δ7}, C⁻⁷, C^{-7b5}, C^{7sus4}, C⁷, C^{o7}.

Guide tone dyads: 5-dyad, 5-dyad, 5-dyad, 5-dyad, 6-dyad, 6-dyad.

Example 5. An excerpt of the ic1/ic5 *Tonnetz*, the grid underlying *gt space*



Example 6a. T_n operation on 5-dyads, where $n = -1$



Sample harmonizations:

T_{-1}

→

(6, 1):

D Δ 7

E b -7

E b -7^{b5}

A b 7sus4

(5, 0):

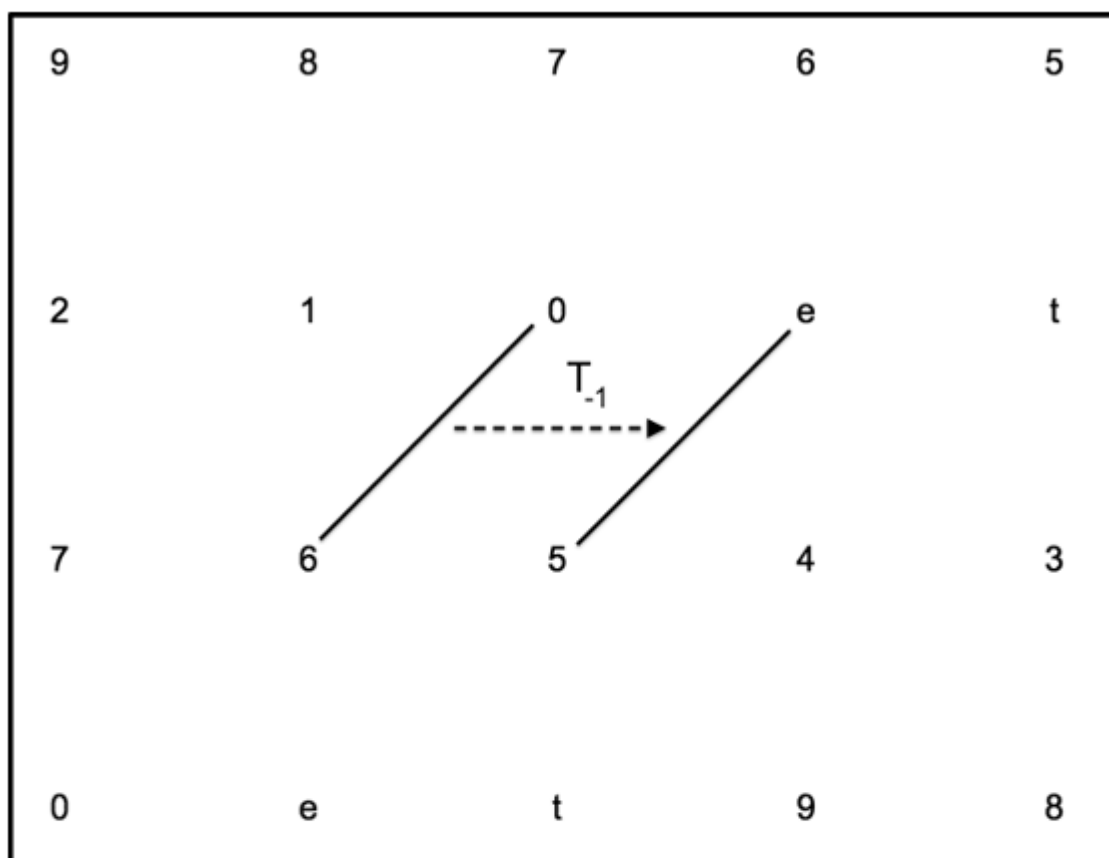
D b Δ 7

D-7

D-7^{b5}

G7sus4

Example 6b. T_n operation on 6-dyads, where $n = -1$



Sample harmonizations:

T_{-1}

→

(6, 0):

D7

Ab7

D[°]7

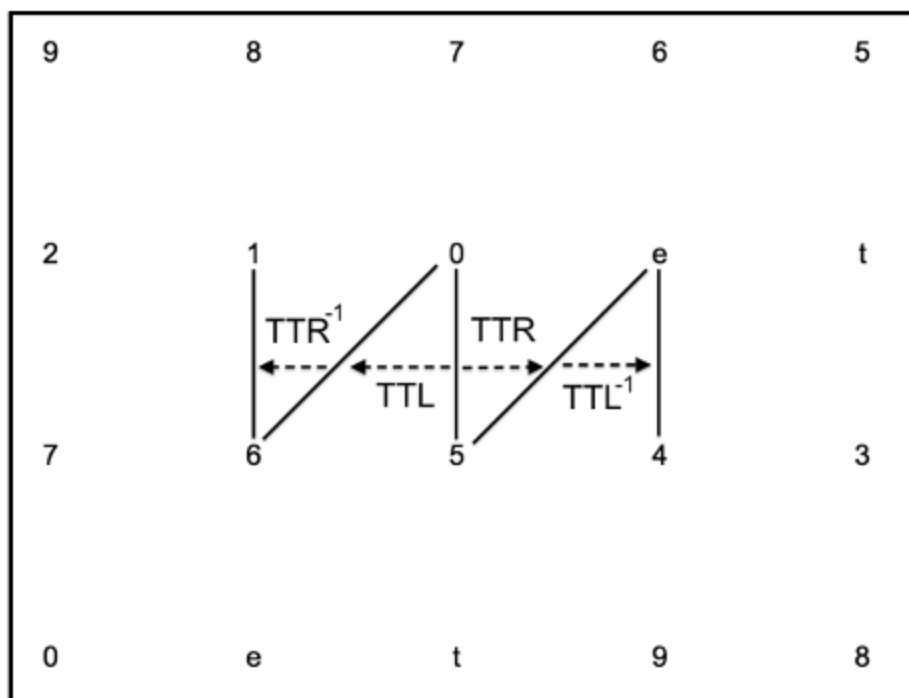
(5, e):

G7

Db7

D[°]7

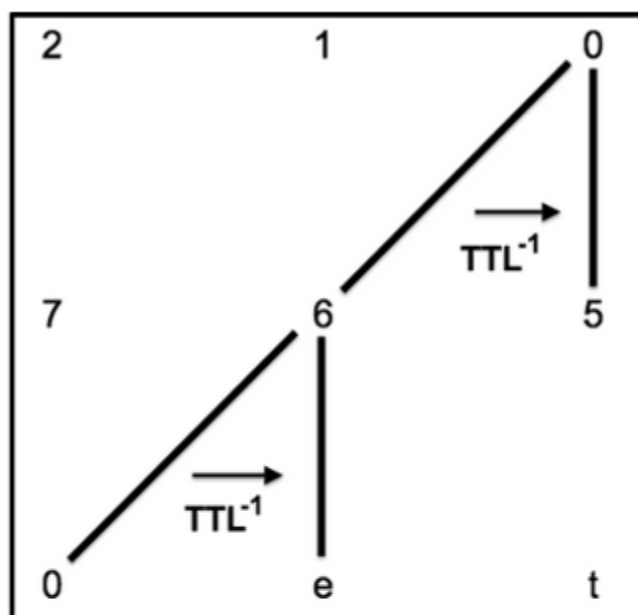
Example 7. TTR and TTL operations and their inverses modeled on the *gt Tonnetz*



Sample harmonizations:

TTR ⁻¹	TTL	TTR	TTL ⁻¹	
←	←	→	→	
(1, 6):	(6, 0):	(5, 0):	(5, e):	(4, e):
DΔ7	D7	DbΔ7	Db7	CΔ7
Eb-7	Ab7	D-7	G7	C#-7
Eb-7 ^{b5}	D#°7	D-7 ^{b5}	D°7	C#-7 ^{b5}
Ab7sus4		G7sus4		F#7sus4

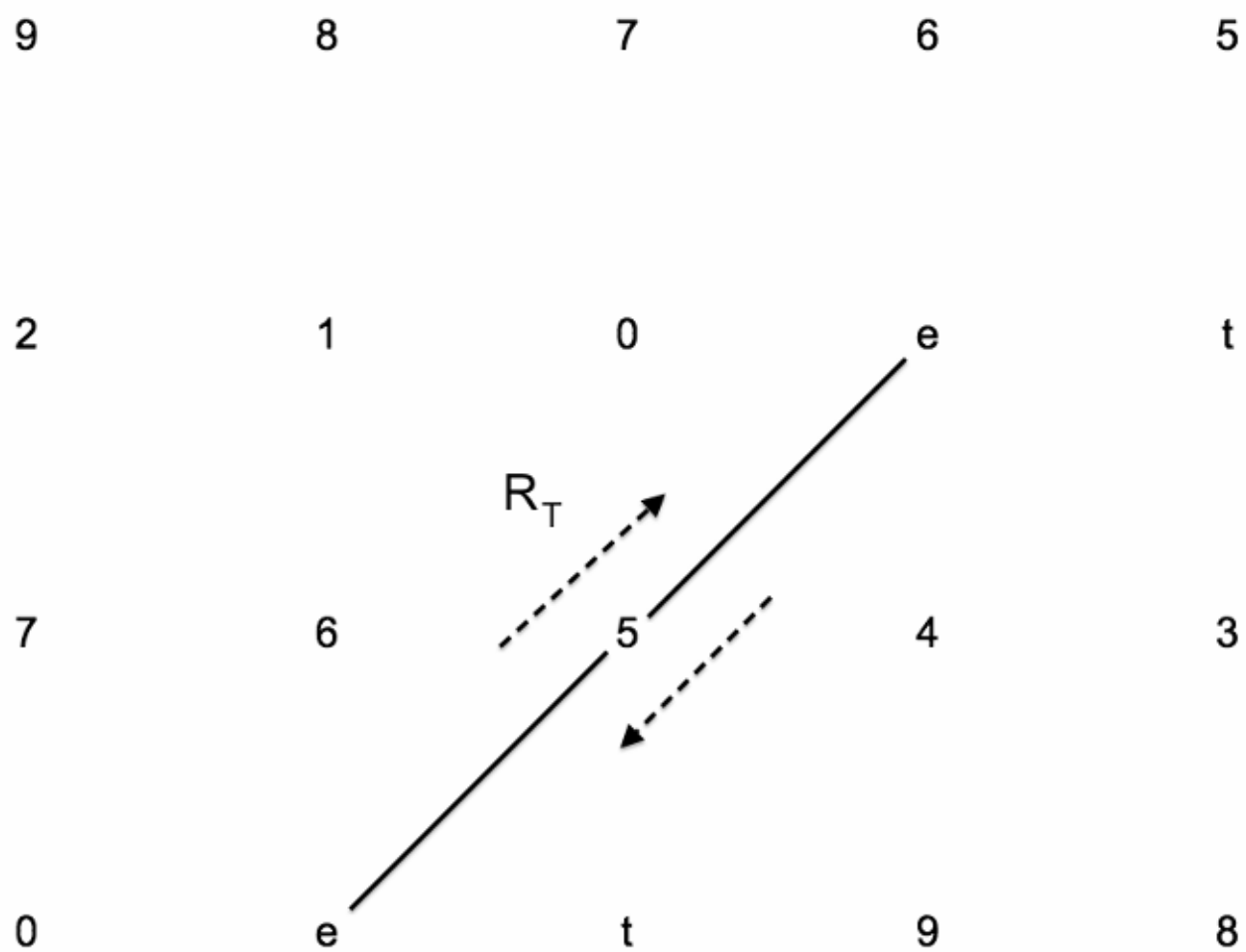
Example 8. 6-dyads (0, 6) and (6, 0) may lead to different 5-dyads using the same (TTL^{-1}) operation



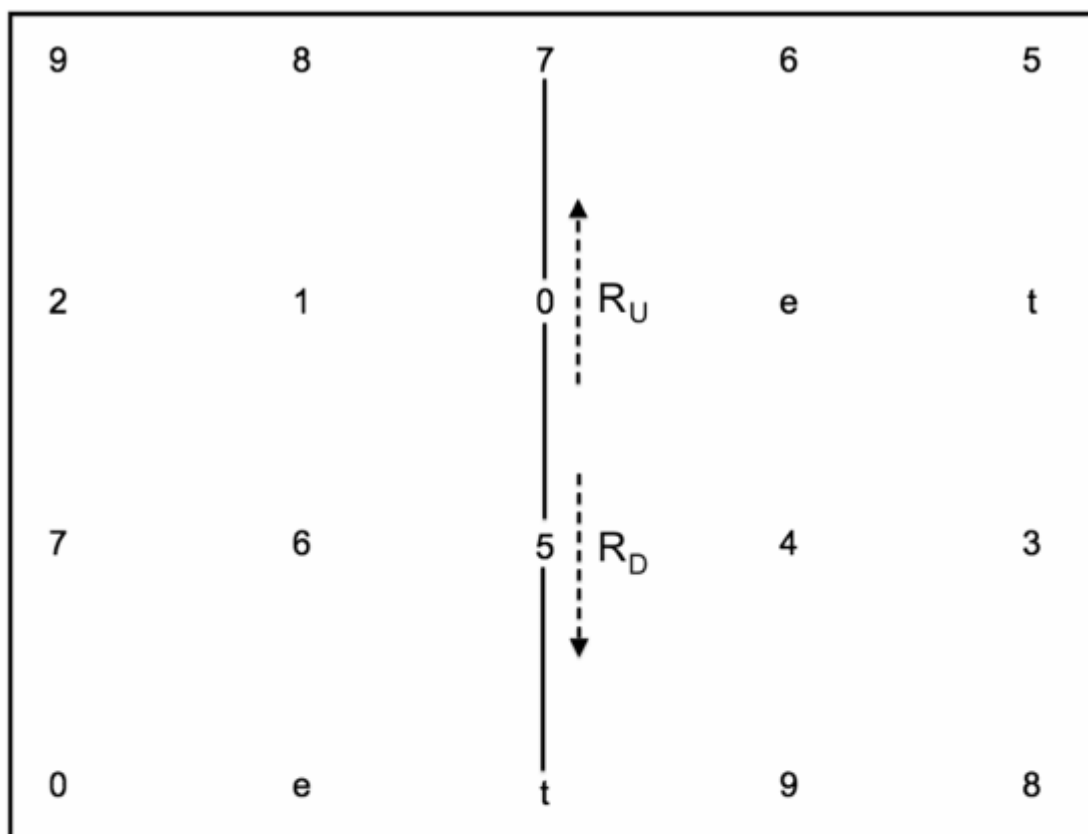
Sample harmonizations:

	TTL^{-1}		TTL^{-1}
	\rightarrow		\rightarrow
(0, 6):	(e, 6):	(6, 0):	(5, 0):
D7	G Δ 7	Ab7	Db Δ 7
Ab7	Ab-7	D7	D-7

Example 9. R_t transformation along the ic6 axis of the gt *Tonnetz*



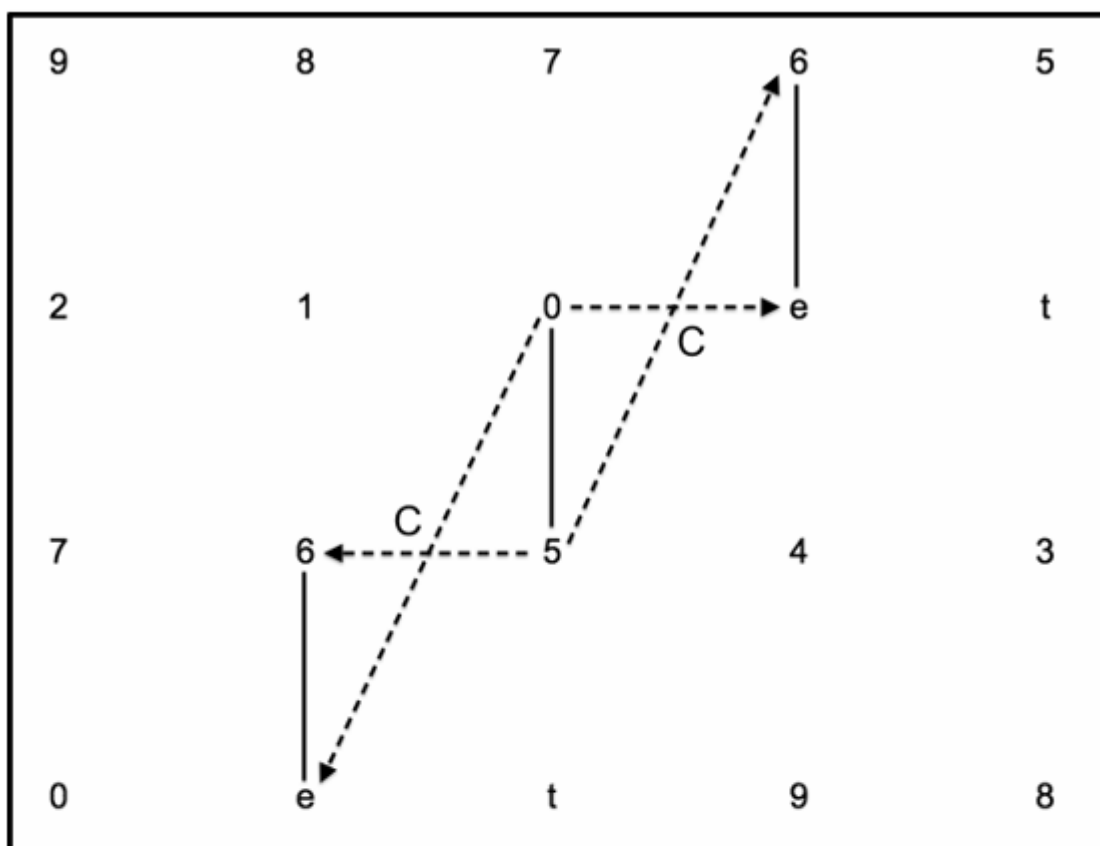
Example 10. R_U and R_D operations modeled on the *gt Tonnetz*



Sample harmonizations:

R_U		R_D
\leftarrow		\rightarrow
(0, 7):	(5, 0):	(t, 5):
Ab Δ 7	Db Δ 7	Gb Δ 7
A-7	D-7	G-7
A-7 ^{b5}	D-7 ^{b5}	G-7 ^{b5}
D7sus4	G7sus4	C7sus4

Example 11. C transformation modeled on the gt *Tonnetz*



Sample harmonizations:

C

↔

(5, 0):

DbΔ7

D-7

D-7^{b5}

G7sus4

(e, 6):

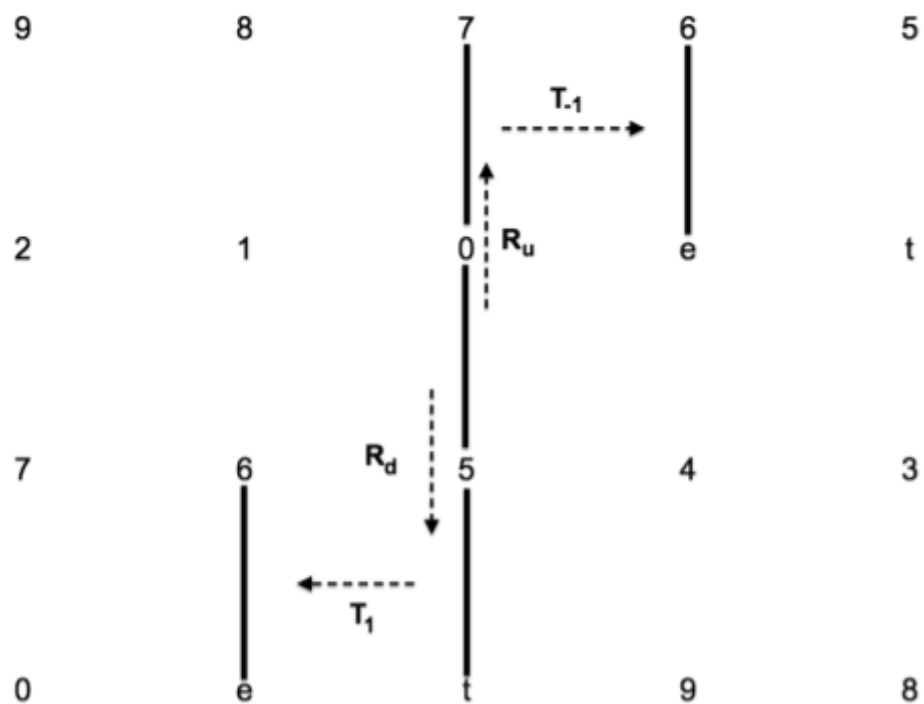
GΔ7

Ab-7

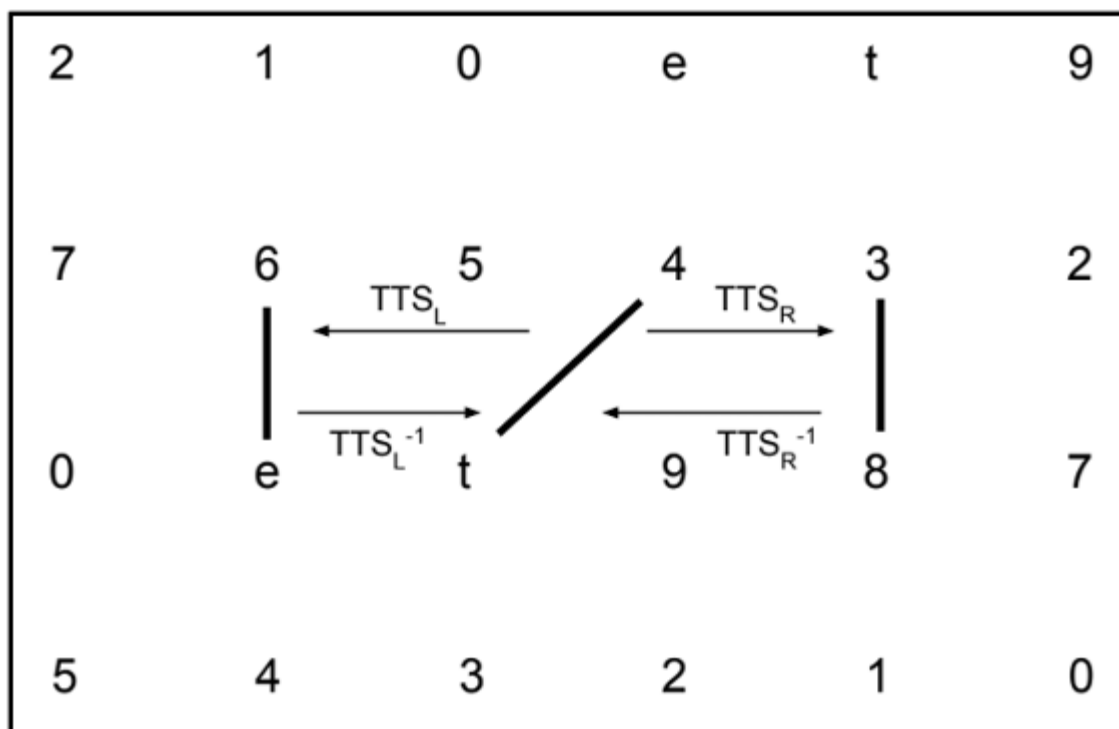
Ab-7^{b5}

Db7sus4

Example 12. C is equivalent to R_uT_{-1} or R_dT_1 , but neither of these capture semitonal contrary motion and both require more voice-leading work



Example 13. TTS operations modeled on the *gt Tonnetz*




Sample harmonizations:

TTS _L		TTS _R	
←		→	
(e, 6):	(t, 4):	(8, 3):	
GΔ7	F#7	EΔ7	
Ab-7	C7	F-7	
Ab-7 ^{b5}	C#°7	F-7 ^{b5}	
Db7sus4		Bb7sus4	

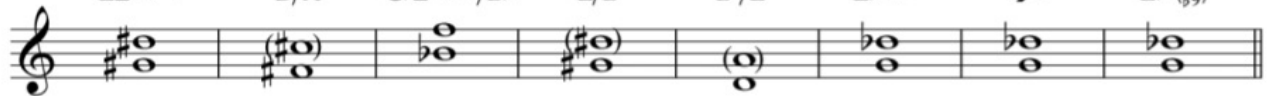
Example 14. Chord changes, gt dyads, and, voice-leading transformations in “Nefertiti” (Wayne Shorter)

1	2	3	4	5	6	7	8
$A\flat\Delta^7$	$E\flat-/D\flat$	$G-7(b5)$	$C7\sharp^9$	$C\flat\Delta^7$	$C\flat\Delta^7(\sharp^{11})$	$B\flat-7(b5)$	$E\flat^{13}(\sharp^{11}_{\flat^9})$



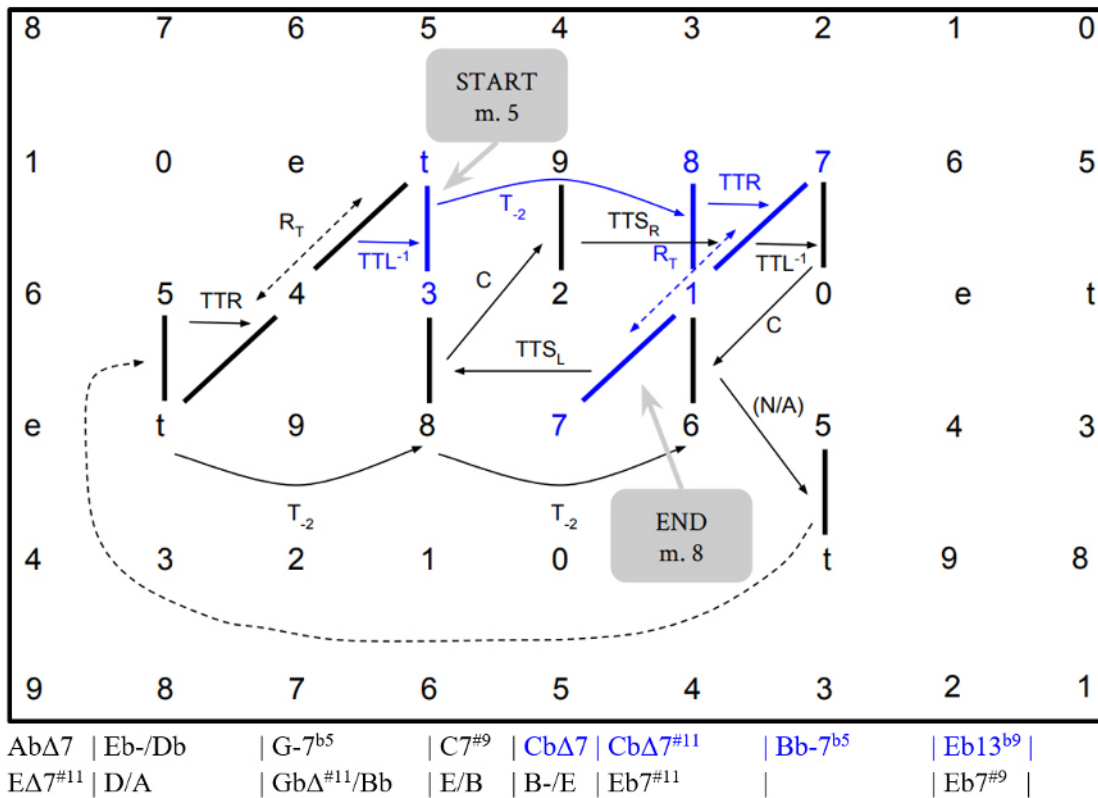
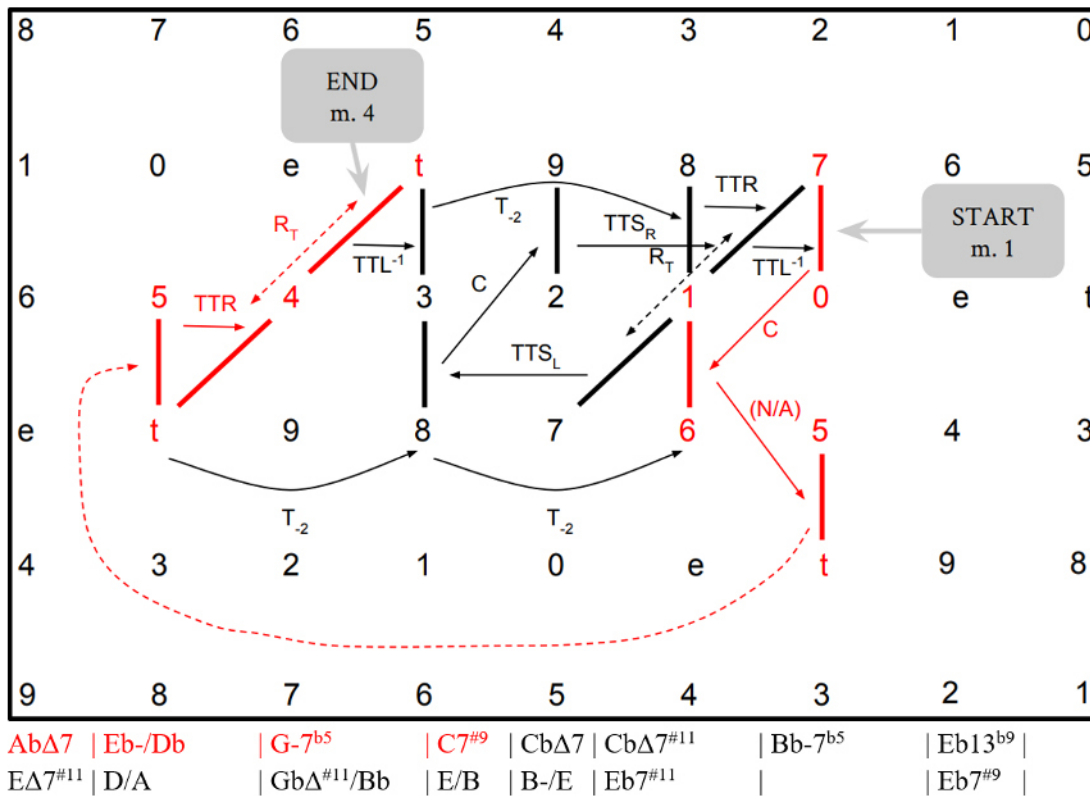
(0, 7)	→	(6, 1)	→	(t, 5)	→	(4, t)	→	(3, t)	→	(3, t)	→	(1, 8)	→	(7, 1)	→
C		N/A		TTR, R_T		TTL ⁻¹				T_{-2}		TTR, R_T		TTS _L	

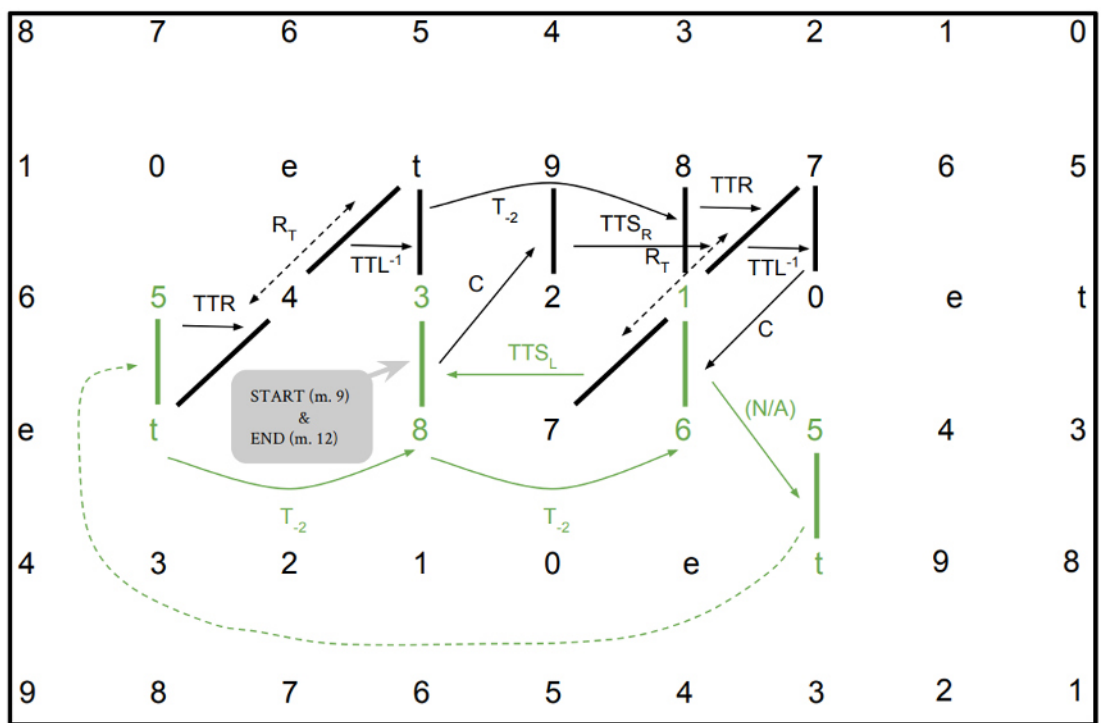
9	10	11	12	13	14	15	16
$E\Delta^7(\sharp^{11})$	D/A	$G\flat\Delta^7(\sharp^{11})/B\flat$	E/B	$B-/E$	$E\flat^7\sharp^{11}$	$\cancel{\quad}$	$E\flat^7(\sharp^9_{\flat^9})$



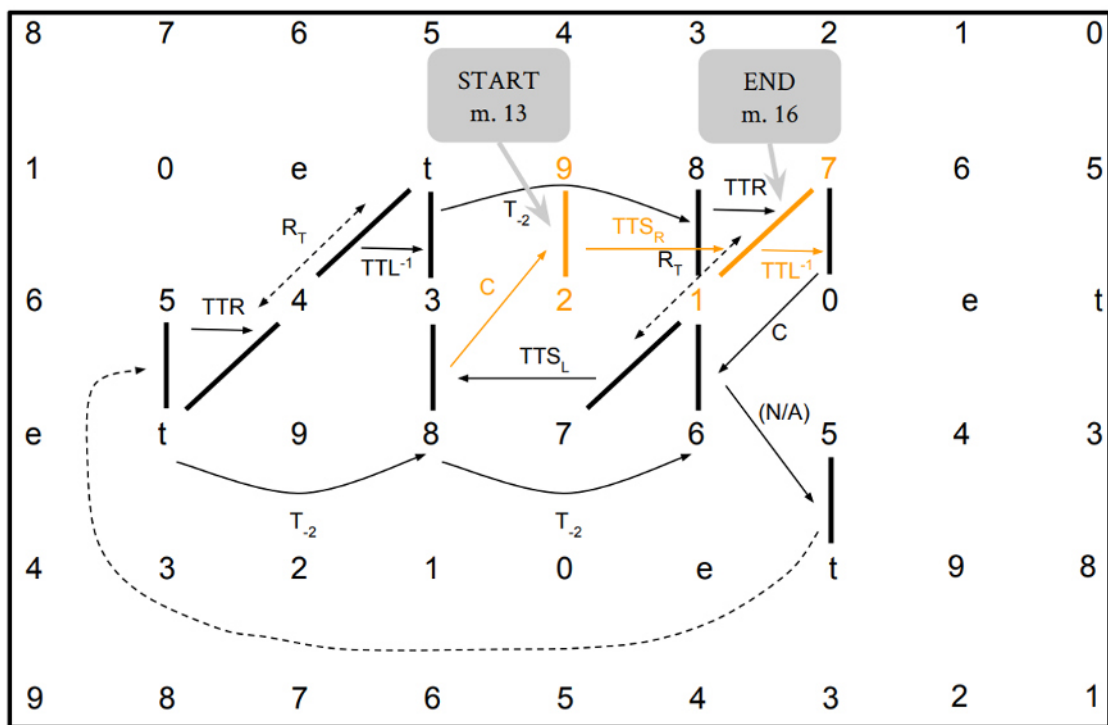
(8, 3)	→	(6, 1)	→	(t, 5)	→	(8, 3)	→	(2, 9)	→	(7, 1)	→	(7, 1)	→	(7, 1)	→
T_{-2}		N/A		T_{-2}		C		TTS _R						TTL ⁻¹	

Example 15. Guide-tone voice leading for “Nefertiti” (Wayne Shorter), plotted on the gt *Tonnetz*. Corresponding gt dyads and chord changes are highlighted in the same color.





AbΔ7 | Eb-/Db | G-7^{b5} | C7^{#9} | CbΔ7 | CbΔ7^{#11} | Bb-7^{b5} | Eb13^{b9} |
 EΔ7^{#11} | D/A | GbΔ^{#11}/Bb | E/B | B-/E | Eb7^{#11} | | Eb7^{#9} |



AbΔ7 | Eb-/Db | G-7^{b5} | C7^{#9} | CbΔ7 | CbΔ7^{#11} | Bb-7^{b5} | Eb13^{b9} |
 EΔ7^{#11} | D/A | GbΔ^{#11}/Bb | E/B | B-/E | Eb7^{#11} | | Eb7^{#9} |

Example 16. Chord changes, gt dyads, and voice-leading transformations in “Blues for Alice” (Charlie Parker)

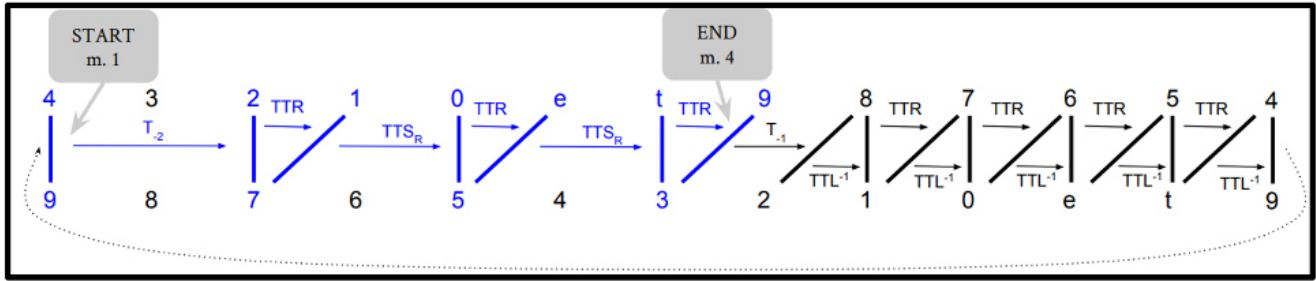
The musical score for "Blues for Alice" is presented in three systems, each with a treble clef staff. Above each staff, measures 1 through 12 are numbered. Chord symbols are placed above the staff for each measure. Below the staff, voice-leading transformations are indicated by arrows and labels. The transformations are as follows:

- Measure 1: $F\Delta^7$
- Measure 2: $E-7b5$
- Measure 3: $A7b9$
- Measure 4: $D-7$
- Measure 5: G^7
- Measure 6: $C-7$
- Measure 7: F^7
- Measure 8: Bb^7
- Measure 9: $Bb-7$
- Measure 10: Eb^7
- Measure 11: $A-7$
- Measure 12: D^7
- Measure 13: $Ab-7$
- Measure 14: Db^7
- Measure 15: $G-7$
- Measure 16: C^7
- Measure 17: $F\Delta^7$
- Measure 18: $D-7$
- Measure 19: $G-7$
- Measure 20: C^7

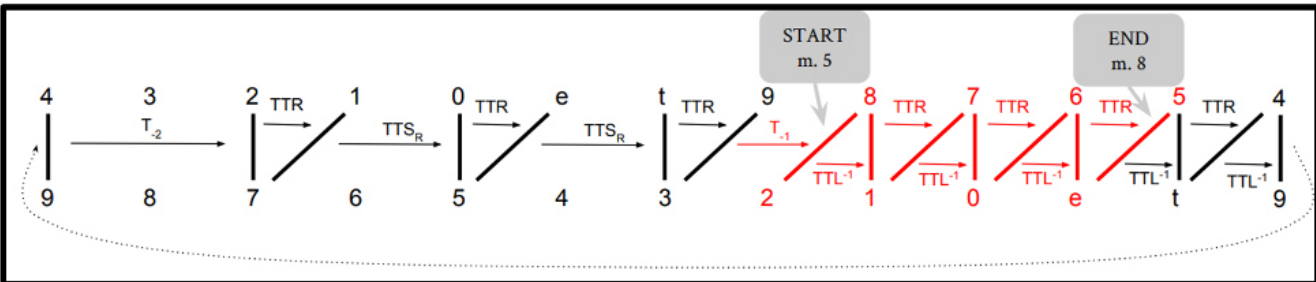
The voice-leading transformations are as follows:

- Measure 1 to 2: $(9, 4) \rightarrow (7, 2)$ via T_{-2}
- Measure 2 to 3: $(7, 2) \rightarrow (1, 7)$ via TTR
- Measure 3 to 4: $(1, 7) \rightarrow (5, 0)$ via TTS_R
- Measure 4 to 5: $(5, 0) \rightarrow (e, 5)$ via TTR
- Measure 5 to 6: $(e, 5) \rightarrow (3, t)$ via TTS_R
- Measure 6 to 7: $(3, t) \rightarrow (9, 4)$ via TTR
- Measure 7 to 8: $(9, 4) \rightarrow (2, 8)$ via T_{-1}
- Measure 8 to 9: $(2, 8) \rightarrow (1, 8)$ via TTL^{-1}
- Measure 9 to 10: $(1, 8) \rightarrow (7, 1)$ via TTR
- Measure 10 to 11: $(7, 1) \rightarrow (0, 7)$ via TTL^{-1}
- Measure 11 to 12: $(0, 7) \rightarrow (6, 0)$ via TTR
- Measure 12 to 13: $(6, 0) \rightarrow (e, 6)$ via TTL^{-1}
- Measure 13 to 14: $(e, 6) \rightarrow (5, e)$ via TTR
- Measure 14 to 15: $(5, e) \rightarrow (t, 5)$ via TTL^{-1}
- Measure 15 to 16: $(t, 5) \rightarrow (4, t)$ via TTR
- Measure 16 to 17: $(4, t) \rightarrow (9, 4)$ via TTL^{-1}
- Measure 17 to 18: $(9, 4) \rightarrow (5, 0)$ via N/A
- Measure 18 to 19: $(5, 0) \rightarrow (t, 5)$ via R_D
- Measure 19 to 20: $(t, 5) \rightarrow (4, t)$ via TTR
- Measure 20 to 21: $(4, t) \rightarrow (t, 5)$ via TTL^{-1}

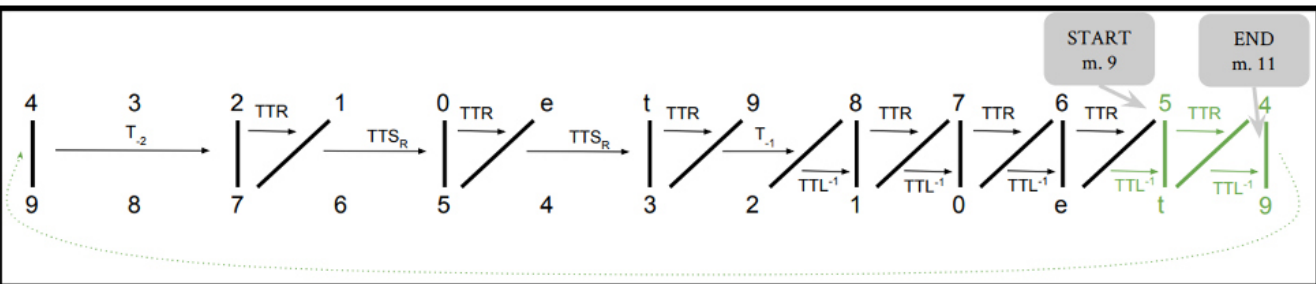
Example 17. Guide-tone voice leading for “Blues for Alice” (Charlie Parker) mm. 1–11, plotted on the gt *tonnetz*. Corresponding gt dyads and chord changes are highlighted in the same color.



FΔ7	E-7 ^{b5}	A7 ^{b9}	D-7	G7	C-7	F7
Bb7	Bb-7	Eb7	A-7	D7	Ab-7	Db7
G-7	C7		FΔ7	D-7	G-7	C7



FΔ7	E-7 ^{b5}	A7 ^{b9}	D-7	G7	C-7	F7
Bb7	Bb-7	Eb7	A-7	D7	Ab-7	Db7
G-7	C7	FΔ7	D-7	G-7	C7	



FΔ7	E-7 ^{b5}	A7 ^{b9}	D-7	G7	C-7	F7
Bb7	Bb-7	Eb7	A-7	D7	Ab-7	Db7
G-7	C7	FΔ7	D-7	G-7	C7	

Example 18. Chord changes, gt dyads, and voice-leading transformations in “Four” (Miles Davis)

1 Eb Δ^7 2 no symbol 3 Eb $^{-7}$ 4 Ab 7

(7, 0) \rightarrow (7, 0) $\xrightarrow{T_{-1}}$ (6, 1) \xrightarrow{TTR} (6, 0) $\xrightarrow{N/A}$

5 F $^{-7}$ 6 no symbol 7 Ab $^{-7}$ 8 Db 7

(8, 3) \rightarrow (8, 3) $\xrightarrow{N/A}$ (e, 6) \xrightarrow{TTR} (5, e) $\xrightarrow{TTL^{-1}}$

9 G $^{-7}$ 10 F \sharp^{-7} B 7 11 F $^{-7}$ 12 Bb 7

(t, 5) $\xrightarrow{T_{-1}}$ (9, 4) \xrightarrow{TTR} (3, 9) $\xrightarrow{TTL^{-1}}$ (8, 3) \xrightarrow{TTR} (2, 8) $\xrightarrow{N/A}$

13 14 15 16

1. G $^{-7}$ F \sharp^{-7} B 7 F $^{-7}$ Bb 7

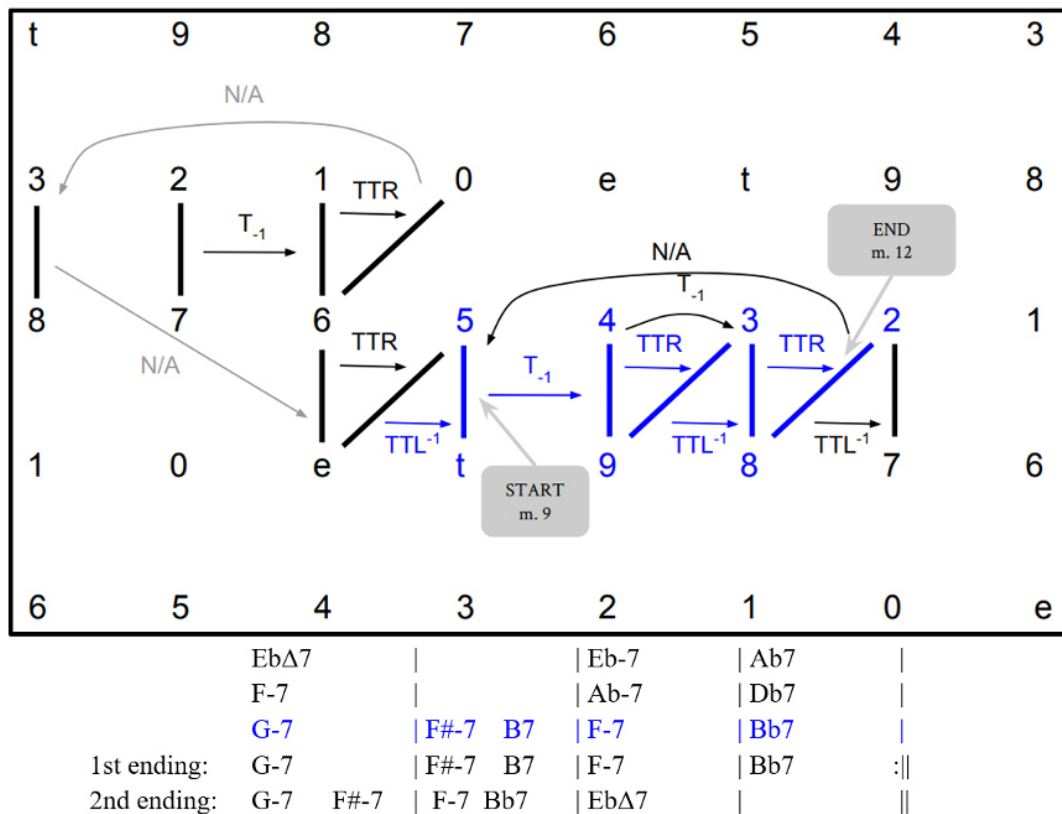
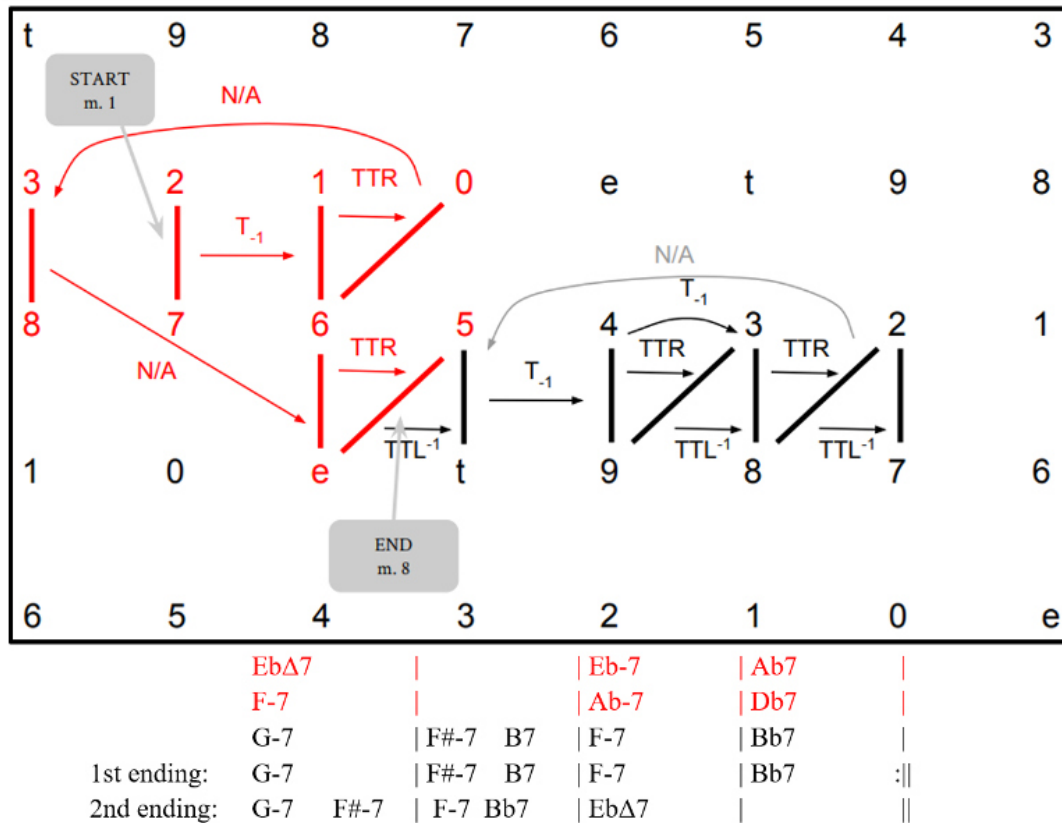
(t, 5) $\xrightarrow{T_{-1}}$ (9, 4) \xrightarrow{TTR} (3, 9) $\xrightarrow{TTL^{-1}}$ (8, 3) \xrightarrow{TTR} (2, 8) $\xrightarrow{TTL^{-1}}$

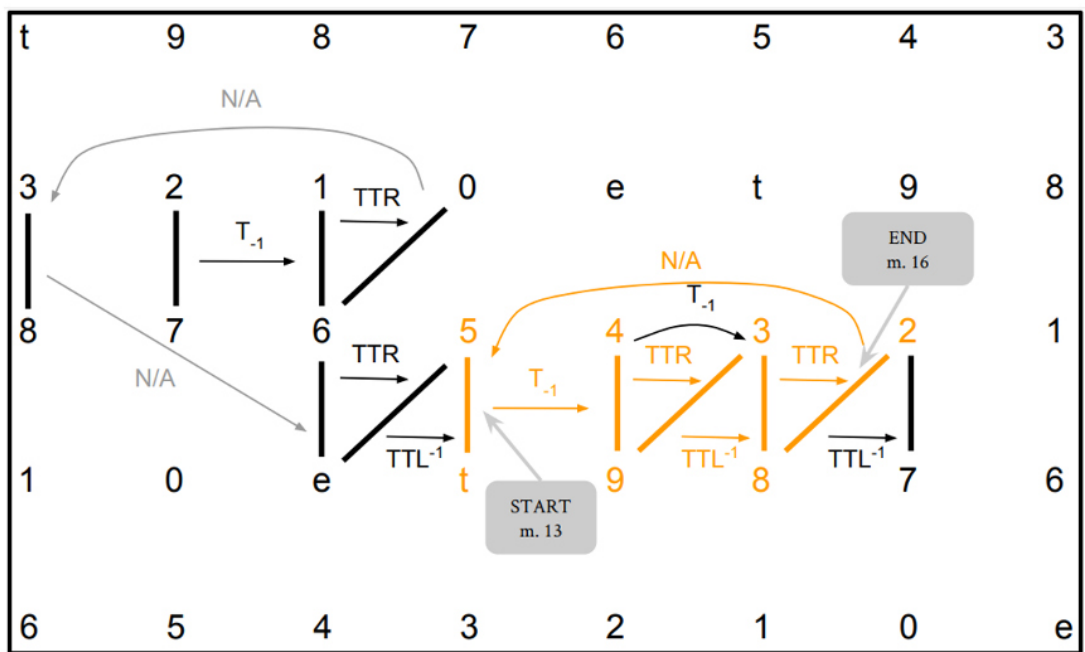
17 18 19 20

2. G $^{-7}$ F \sharp^{-7} F $^{-7}$ Bb 7 Eb Δ^7 no symbol

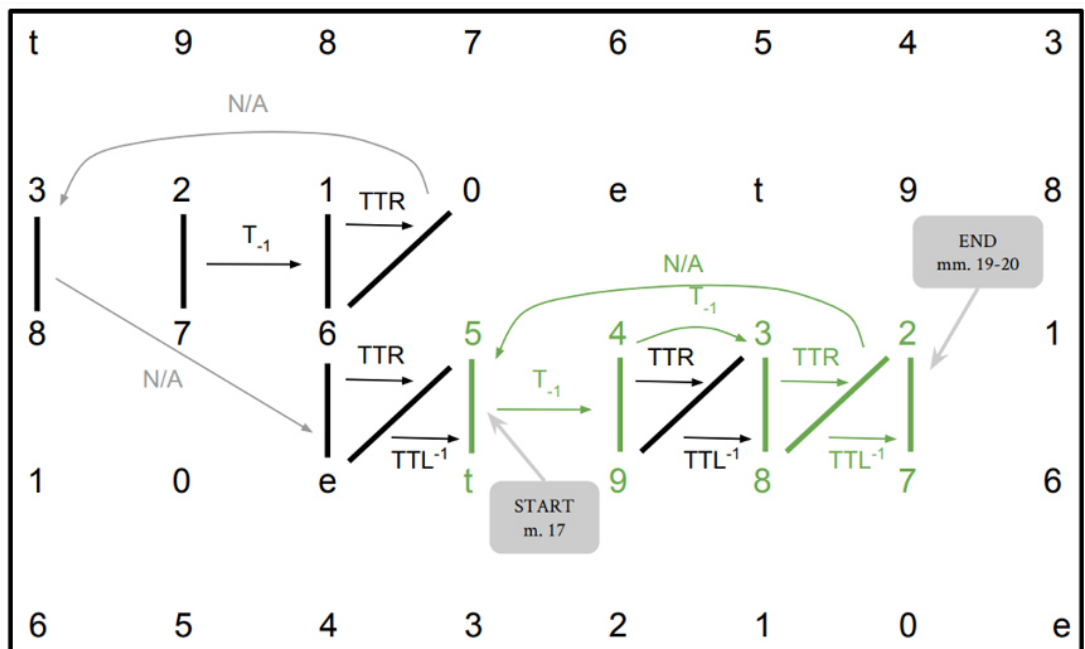
(t, 5) $\xrightarrow{T_{-1}}$ (9, 4) $\xrightarrow{T_{-1}}$ (8, 3) \xrightarrow{TTR} (2, 8) $\xrightarrow{TTL^{-1}}$ (7, 2) \rightarrow (7, 2) \rightarrow

Example 19. Guide-tone voice leading for “Four” (Miles Davis), plotted on the gt *Tonnetz*. Corresponding gt dyads and chord changes are highlighted in the same color.



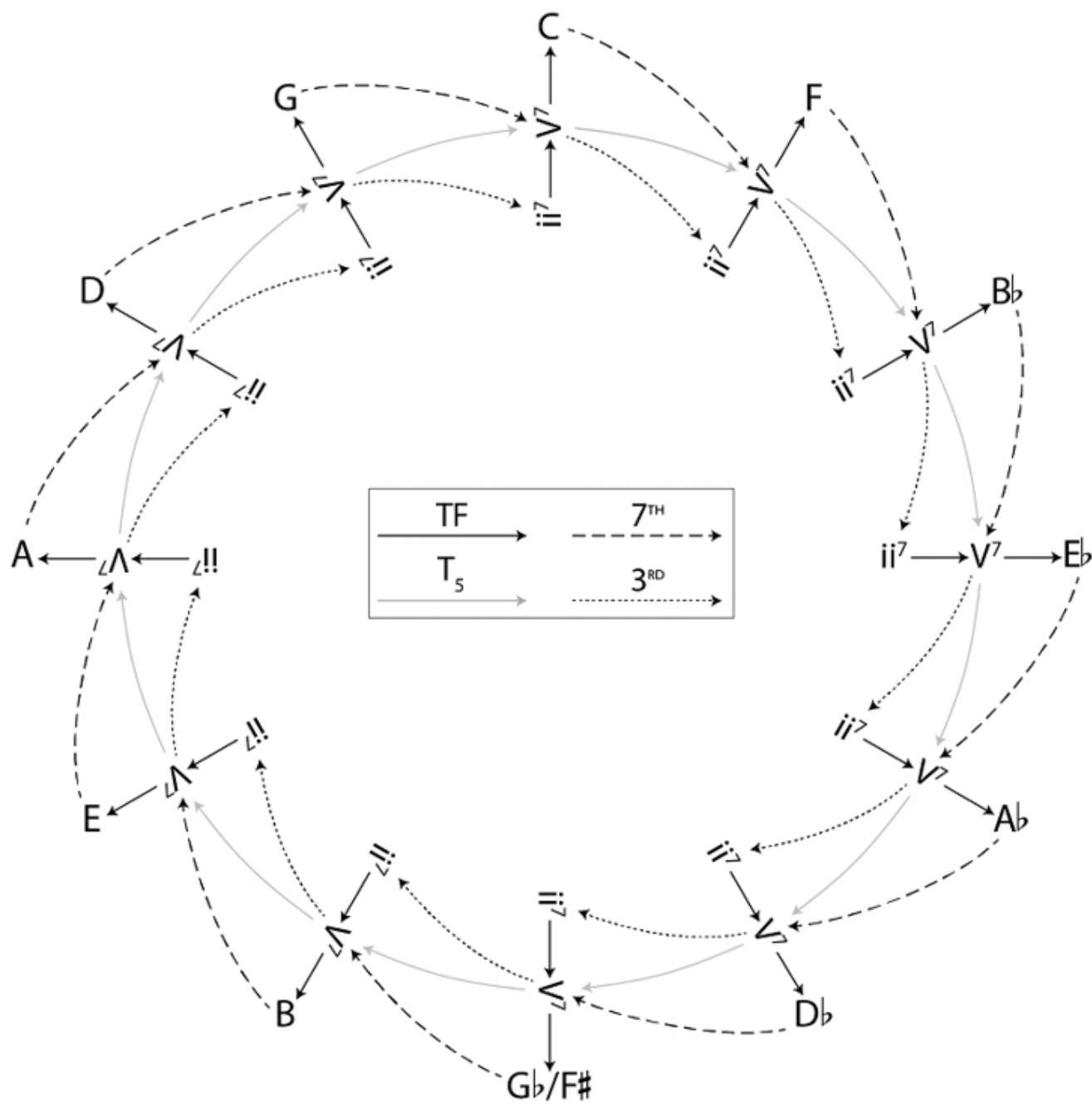


	EbΔ7				Eb-7		Ab7	
	F-7				Ab-7		Db7	
	G-7		F#-7 B7		F-7		Bb7	
1st ending:	G-7		F#-7 B7		F-7		Bb7	:
2nd ending:	G-7 F#-7		F-7 Bb7		EbΔ7			

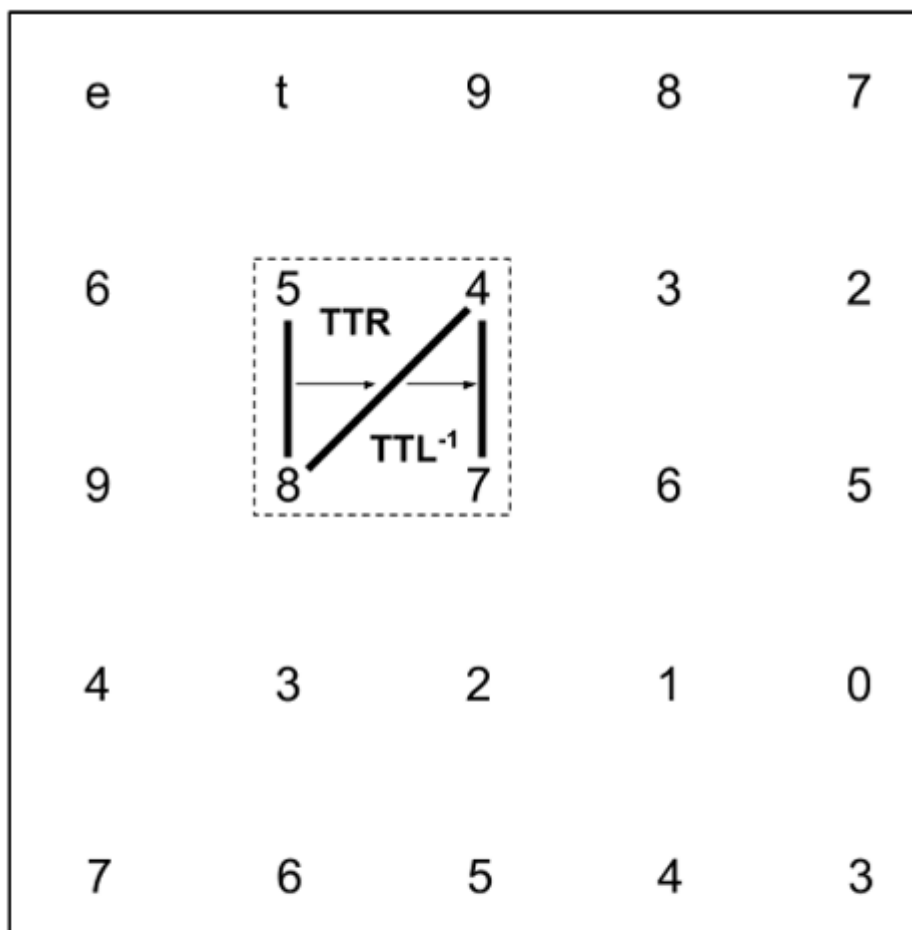


	EbΔ7				Eb-7		Ab7	
	F-7				Ab-7		Db7	
	G-7		F#-7 B7		F-7		Bb7	
1st ending:	G-7		F#-7 B7		F-7		Bb7	:
2nd ending:	G-7 F#-7		F-7 Bb7		EbΔ7			

Example 20. McClimon's ii-V space. Reprinted by permission from McClimon 2017



Example 21. An example of a *ii-V-I* region: The gt voice leading of a ii-V-I progression modeled on the gt *Tonnetz*



Sample harmonizations:

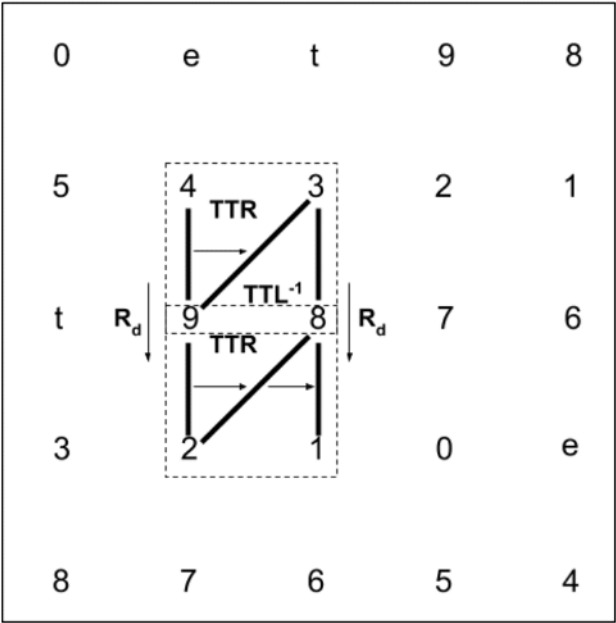
$F-7 \rightarrow Bb7 \rightarrow Eb\Delta7$

$F-7 \rightarrow E7 \rightarrow Eb\Delta7$

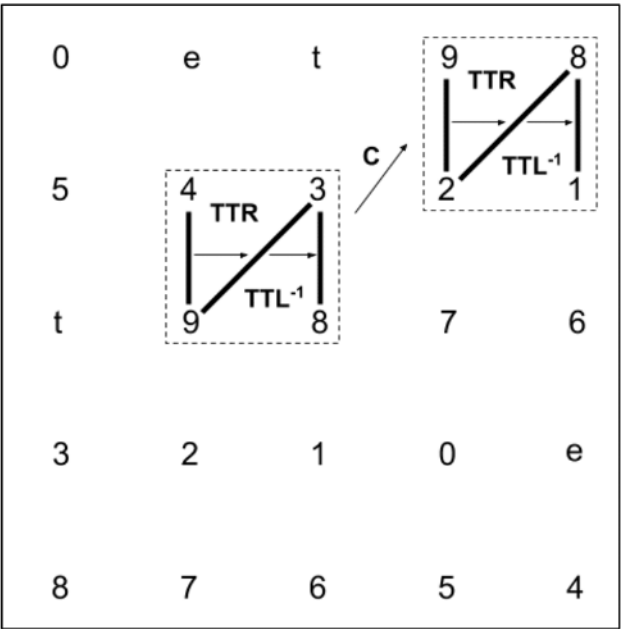
$F-7^{b5} \rightarrow Bb7 \rightarrow Eb\Delta7$

Example 22. Transformational relationships between *ii-V-I* regions

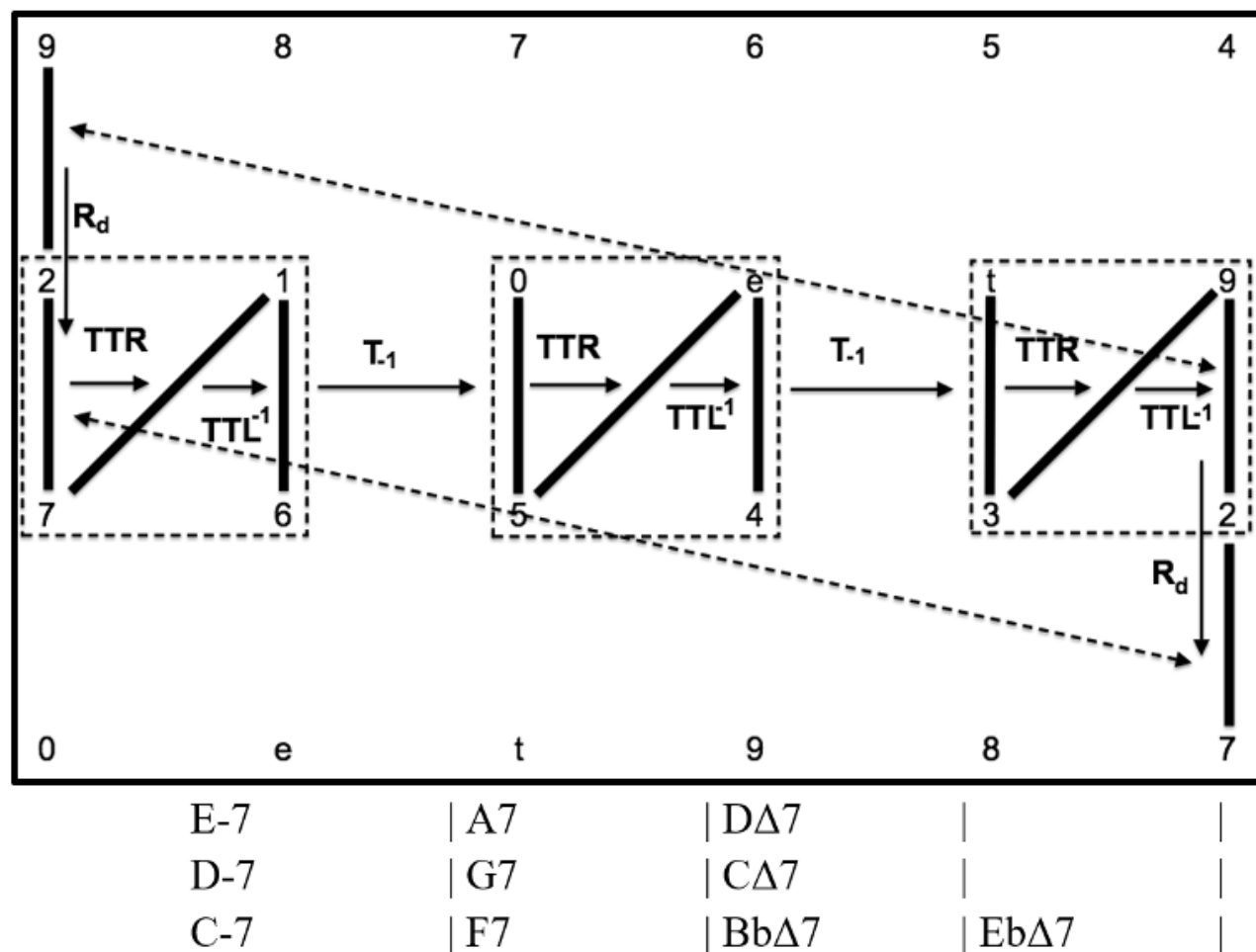
Conceptualizing fifth-related *ii-V-I* regions as R_d -related.



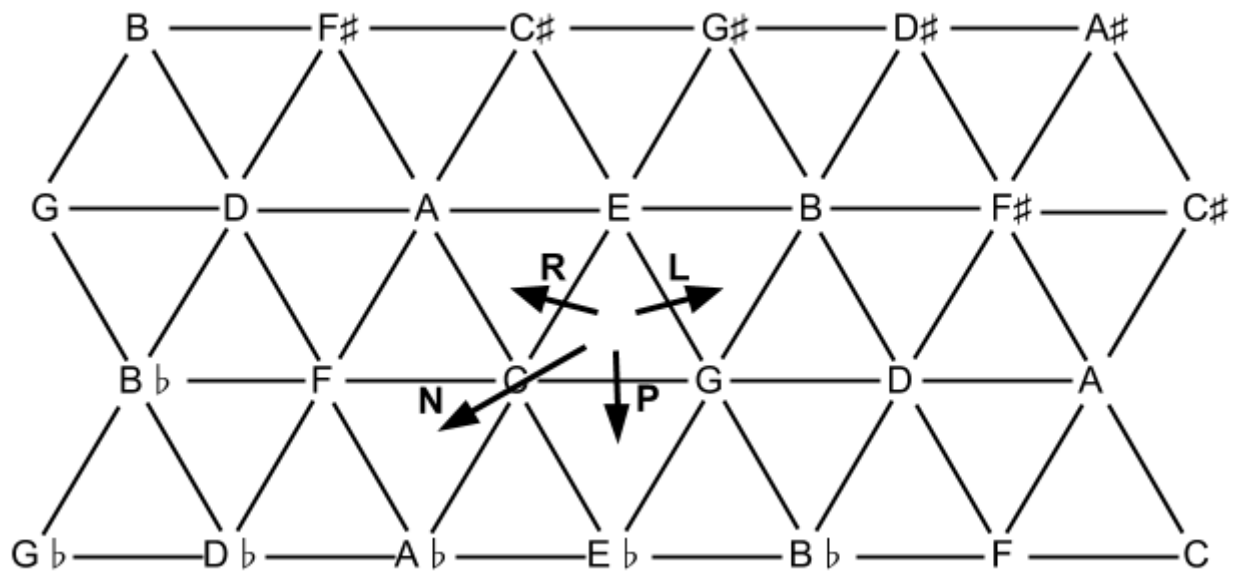
Conceptualizing fifth-related *ii-V-I* regions as C -related.



Example 23. Transformations of gt dyads in mm. 1–12 of “Tune Up” on a gt *Tonnetz*

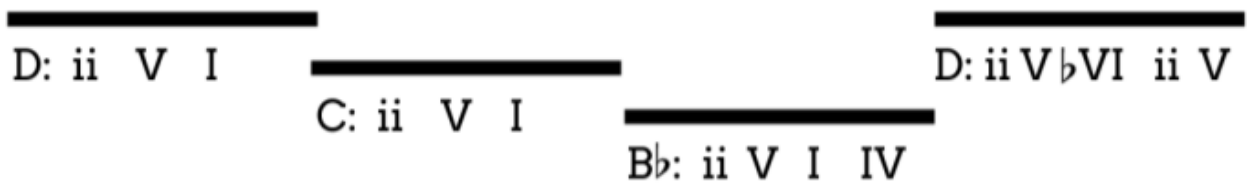


Example 24. The neo-Riemannian *Tonnetz*



Example 25. Visualization of the dialectic between key regions and gt voice leading in “Tune Up.”

Key regions in “Tune Up.”



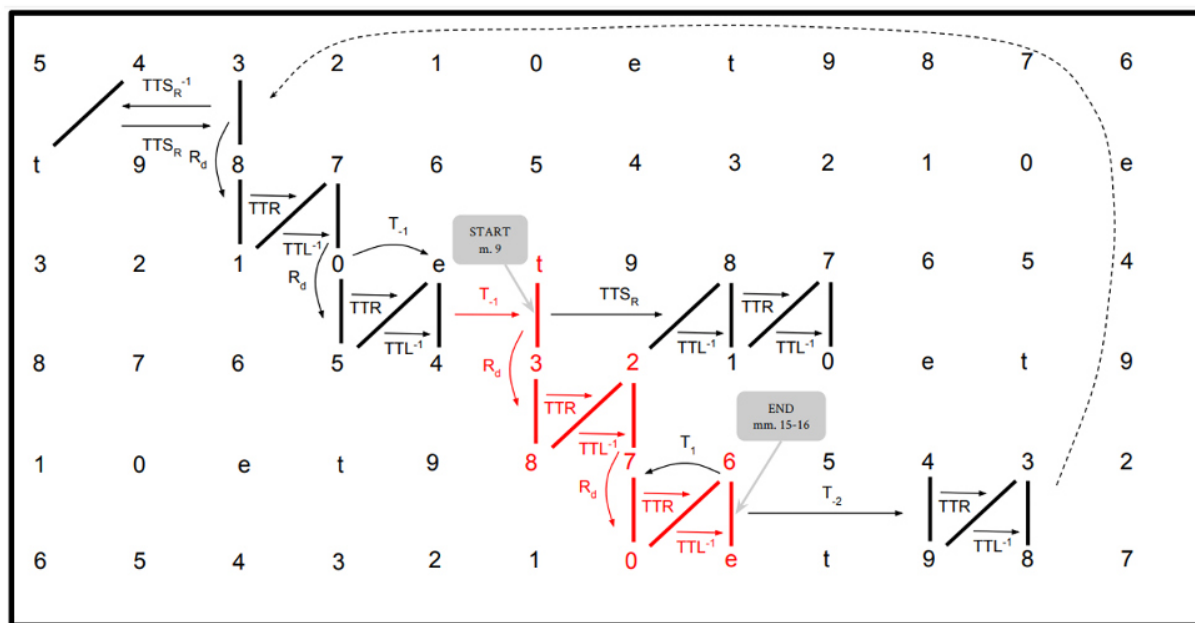
Key regions in “Tune Up,” smoothed out by gt voice leading.



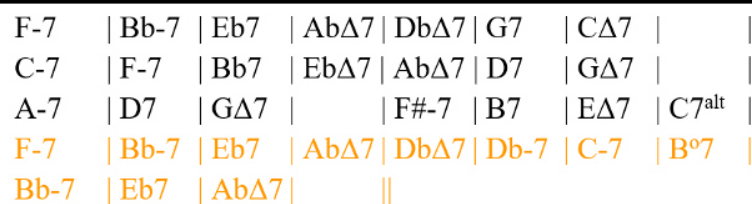
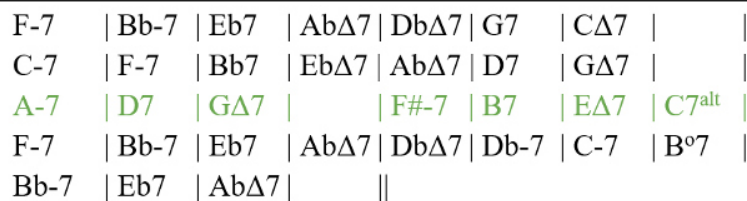
Example 26. Chord changes, gt dyads, and voice-leading transformations in “All the Things You Are” (Jerome Kern)

1	2	3	4	5	6	7	8
F ⁻⁷	B ^{b-7}	E ^{b7}	A ^{bΔ7}	D ^{bΔ7}	G ⁷	C ^{Δ7}	⌘
(8, 3)	→ _{R_D}	(1, 8)	→ _{TTR}	(7, 1)	→ _{TTL⁻¹}	(0, 7)	→ _{R_D}
(5, 0)	→ _{TTR}	(e, 5)	→ _{TTL⁻¹}	(4, e)	→ _{T⁻¹}	(4, e)	
9	10	11	12	13	14	15	16
C ⁻⁷	F ⁻⁷	B ^{b7}	E ^{bΔ7}	A ^{bΔ7}	D ⁷	G ^{Δ7}	⌘
(3, t)	→ _{R_D}	(8, 3)	→ _{TTR}	(2, 8)	→ _{TTL⁻¹}	(7, 2)	→ _{R_D}
(0, 7)	→ _{TTR}	(6, 0)	→ _{TTL⁻¹}	(e, 6)	→ _{T¹}	(e, 6)	
17	18	19	20	21	22	23	24
A ⁻⁷	D ⁷	G ^{Δ7}	⌘	F ^{#-7}	B ⁷	E ^{Δ7}	C ^{7alt}
(0, 7)	→ _{TTR}	(0, 6)	→ _{TTL⁻¹}	(e, 6)	→ _{T⁻²}	(9, 4)	→ _{TTR}
(3, 9)	→ _{TTL⁻¹}	(8, 3)	→ _{TTS_R⁻¹}	(4, t)	→ _{TTS_R}		
25	26	27	28	29	30	31	32
F ⁻⁷	B ^{b-7}	E ^{b7}	A ^{bΔ7}	D ^{bΔ7}	D ^{b-7}	C ⁻⁷	B ^{o7}
(8, 3)	→ _{R_D}	(1, 8)	→ _{TTR}	(7, 1)	→ _{TTL⁻¹}	(0, 7)	→ _{R_D}
(5, 0)	→ _{T⁻¹}	(4, e)	→ _{T⁻¹}	(3, t)	→ _{TTS_R}	(2, 8)	→ _{TTL⁻¹}
33	34	35	36				
B ^{b-7}	E ^{b7}	A ^{bΔ7}	⌘				
(1, 8)	→ _{TTR}	(7, 1)	→ _{TTL⁻¹}	(0, 7)	→ _{TTL⁻¹}	(0, 7)	

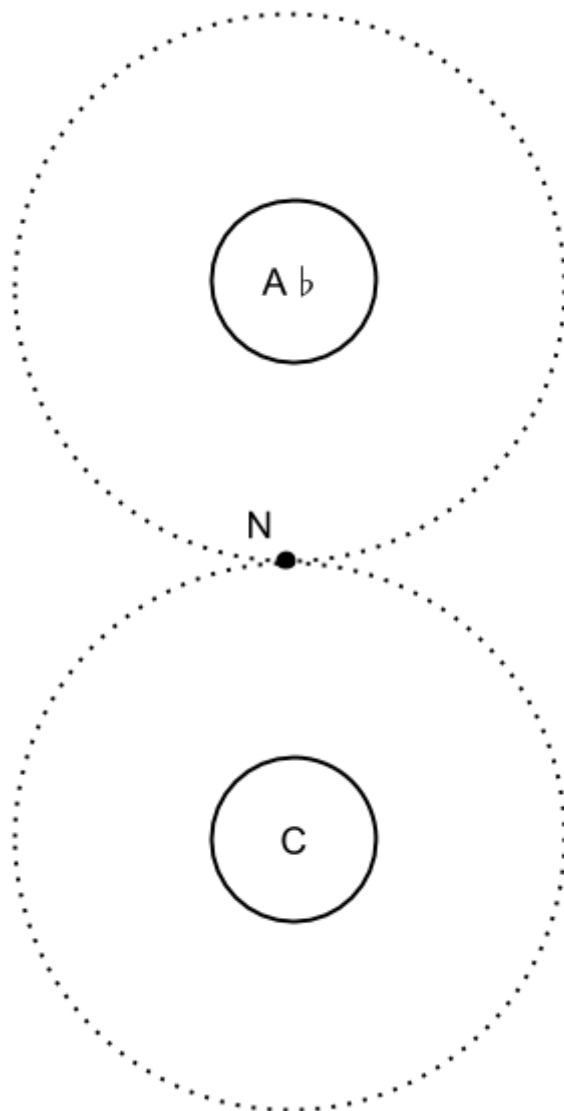
F-7	Bb-7	Eb7	AbΔ7	DbΔ7	G7	CΔ7	
C-7	F-7	Bb7	EbΔ7	AbΔ7	D7	GΔ7	
A-7	D7	GΔ7		F#-7	B7	EΔ7	C7 ^{alt}
F-7	Bb-7	Eb7	AbΔ7	DbΔ7	Db-7	C-7	B°7
Bb-7	Eb7	AbΔ7					



F-7	Bb-7	Eb7	AbΔ7	DbΔ7	G7	CΔ7	
C-7	F-7	Bb7	EbΔ7	AbΔ7	D7	GΔ7	
A-7	D7	GΔ7		F#-7	B7	EΔ7	C7 ^{alt}
F-7	Bb-7	Eb7	AbΔ7	DbΔ7	Db-7	C-7	B°7
Bb-7	Eb7	AbΔ7					



Example 28. Visualization of key regions connected by gt transformation



Example 29. Chord changes, gt dyads, and voice-leading transformations in “Solar” (Miles Davis)

The diagram illustrates the voice-leading transformations for the first 12 measures of the jazz standard "Solar" by Miles Davis. The transformations are categorized into three rows, each showing a sequence of chords and the voice-leading transformations between them.

Row 1 (Measures 1-4):

- Measure 1: C^{-7} (gt dyad: (3, t))
- Measure 2: C^{-7} (gt dyad: (3, t))
- Measure 3: G^{-7} (gt dyad: (t, 5))
- Measure 4: C^7 (gt dyad: (4, t))

Transformations: R_U (1 to 2), TTR (2 to 3), TTL^{-1} (3 to 4).

Row 2 (Measures 5-8):

- Measure 5: $F\Delta^7$ (gt dyad: (9, 4))
- Measure 6: $F\Delta^7$ (gt dyad: (9, 4))
- Measure 7: F^{-7} (gt dyad: (8, 3))
- Measure 8: Bb^7 (gt dyad: (2, 8))

Transformations: T_{-1} (5 to 6), TTR (6 to 7), TTL^{-1} (7 to 8).

Row 3 (Measures 9-12):

- Measure 9: $Eb\Delta^7$ (gt dyad: (7, 2))
- Measure 10: Eb^{-7} (gt dyad: (6, 1))
- Measure 11: Ab^7 (gt dyad: (0, 7))
- Measure 12: $Db\Delta^7$ (gt dyad: (5, 0))

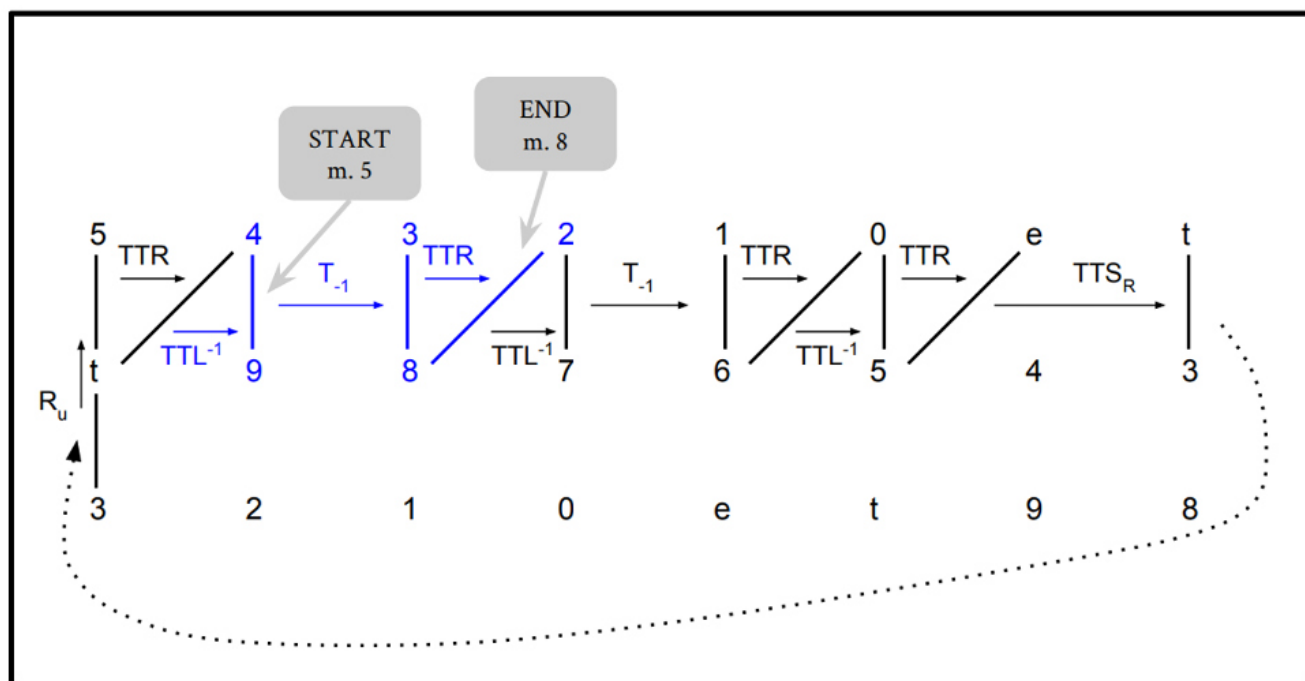
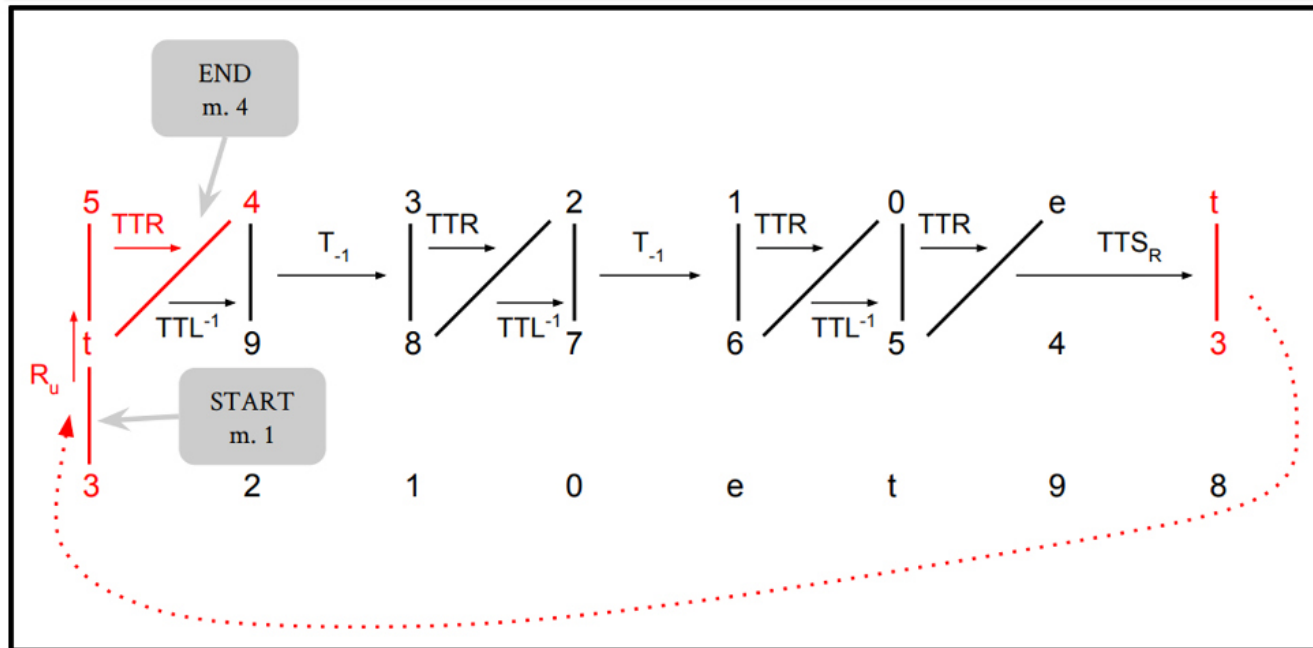
Transformations: T_{-1} (9 to 10), TTR (10 to 11), TTL^{-1} (11 to 12).

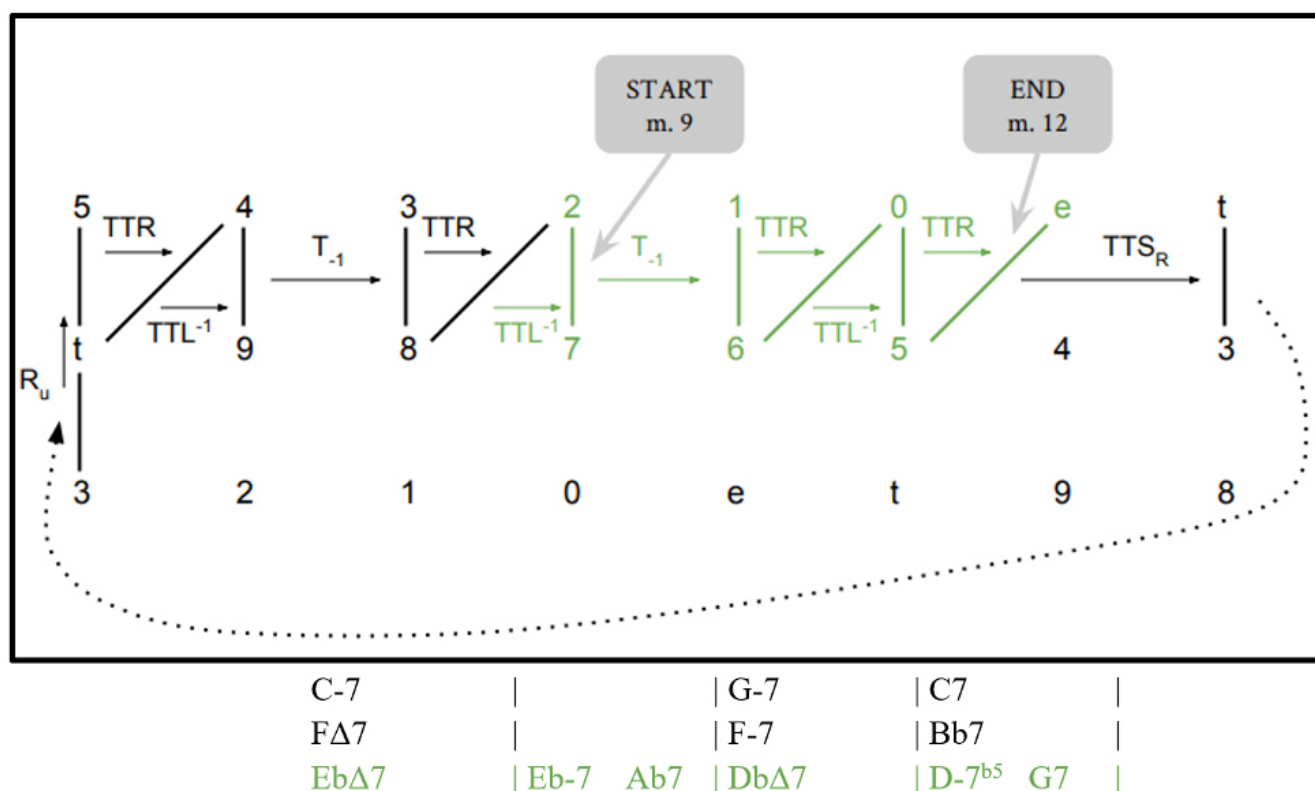
Row 4 (Measures 13-16):

- Measure 13: D^{-7b5} (gt dyad: (5, 0))
- Measure 14: D^{-7b5} (gt dyad: (5, 0))
- Measure 15: G^{7alt} (gt dyad: (5, e))
- Measure 16: G^{7alt} (gt dyad: (5, e))

Transformations: TTR (13 to 14), TTS_R (14 to 15), TTS_R (15 to 16).

Example 30. Guide-tone voice leading for “Solar” (Miles Davis), plotted on the gt *Tonnetz*. Corresponding gt dyads and chord changes are highlighted in the same color.





Example 31. Comparison between chord changes of “Solar” and minor twelve-bar blues

Minor blues

i			
iv		i	
ii-7 ^{b5} (or VI7) V7		i	

Solar

C-7		G-7	C7
FΔ7		F-7	Bb7
EbΔ7	Eb-7 Ab7	DbΔ7	D-7 ^{b5} G7alt