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MTO 28.1 Examples: Rahn, Was Mesopotamian Tuning Diatonic?

(Note: audio, video, and other interactive examples are only available online) https://mtosmt.org/issues/mto.22.28.1/mto.22.28.1.rahn.html

Example 1. Numbers and names of strings

Number	Translation	Sumerian	Akkadian
1	Front	sa-di	qudmû
2	Following	sa-ús	samuššu
3	Third thin	sa-3-sa-sig	šalšu qatnu
4	Fourth small/Ea creator	sa-4-tur	Ea-bānû
5	Fifth	sa-di-5	<i>hamšu</i>
6	Fourth from behind	sa-4-a-ga-gul	ribi uhrî
7	Third from behind	sa-3-a-ga-gul	šalši uhrî
8	Second from behind	sa-2-a-ga-gul	šini uhrî
9	Back	[sa-1]-a-ga-gul	uḫrû

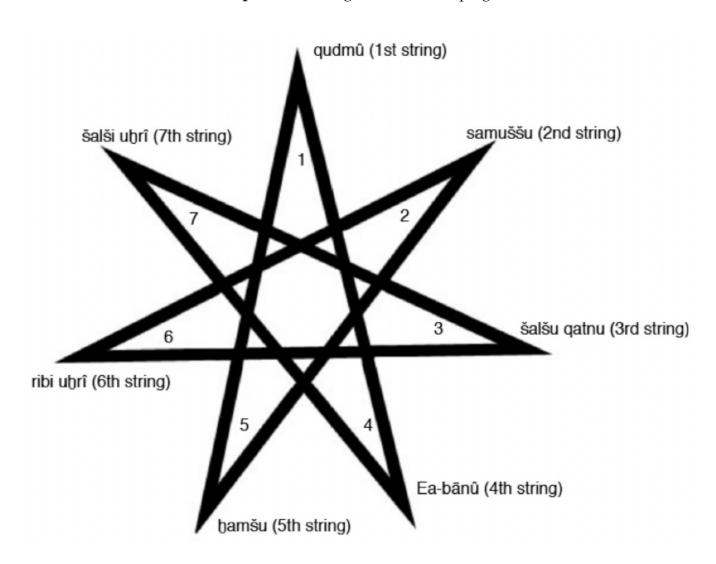
Example 2. Numbers and names of three- and four-string-step dichords

Name
nīš tuhrim
išartum
$embar{u}bum$
$n\bar{\iota}d(i)$ qablim
qablītum
kitmum
pītum

Example 3. La- $zak\hat{u}$ dichords in seven named tunings. For each tuning, C identifies the string that is to be changed to produce the next tuning, reading from top to bottom.

Tunings	String	s:								
	1	2	3	4	5	6	7			
išartum					C					
qablītum	C									
nīš tuḫrim				C						
nīd(i) qablim							C			
pītum			C							
embūbum						C				
kitmum		C								
embūbum						C				
pītum			C							
nīd(i) qablim							C			
nīš tuḫrim				C						
qablītum	C									
išartum					C					

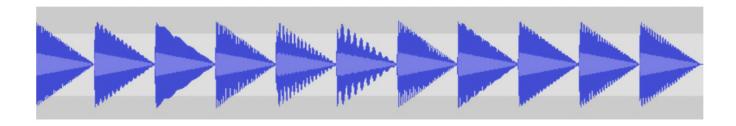
Example 4. Acute, "great," "star" heptagram



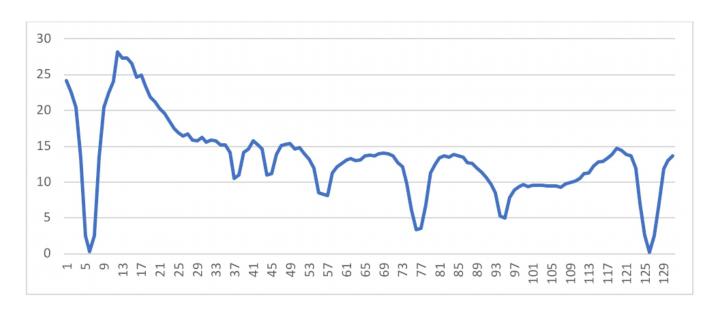
Example 5. Realizing seven tunings "from scratch"

		"Initial" <i>Zakû</i> Dichord if Tuning "From Scratch"							_	ichord eface	•		Bold [.]			
		1	1 2 3 4 5 6 7													
Chapters:	Tuning Names:															
Tightening	išartum	X				x			2&5	5&1	1&4	4&7	7&3	3&6	6&2	2&5
	qablītum	X			x				5&1	1&4	4&7	7&3	3&6	6&2	2&5	5&1
	nīš tuḫrim				x			x	1&4	4&7	7&3	3&6	6&2	2&5	5&1	1&4
	nīd(i) qablim			x				X	4&7	7&3	3&6	6&2	2&5	5&1	1&4	4&7
	pītum			X			x		7&3	3&6	6&2	2&5	5&1	1&4	4&7	7&3
	embūbum		x				x		3&6	6&2	2&5	5&1	1&4	4&7	7&3	3&6
	kitmum		x			x			6&2	2&5	5&1	1&4	4&7	7&3	3&6	6&2
Loosening	išartum	x				x			2&5	5&1	1&4	4&7	7&3	3&6	6&2	2&5
	kitmum		x			x			6&2	2&5	5&1	1&4	4&7	7&3	3&6	6&2
	embūbum		x				x		3&6	6&2	2&5	5&1	1&4	4&7	7&3	3&6
	pītum			x			x		7&3	3&6	6&2	2&5	5&1	1&4	4&7	7&3
	nīd(i) qablim			X				x	4&7	7&3	3&6	6&2	2&5	5&1	1&4	4&7
	nīš tuḫrim				x			x	1&4	4&7	7&3	3&6	6&2	2&5	5&1	1&4
	qablītum	x			x				5&1	1&4	4&7	7&3	3&6	6&2	2&5	5&1
	išartum	x				x			2&5	5&1	1&4	4&7	7&3	3&6	6&2	2&5

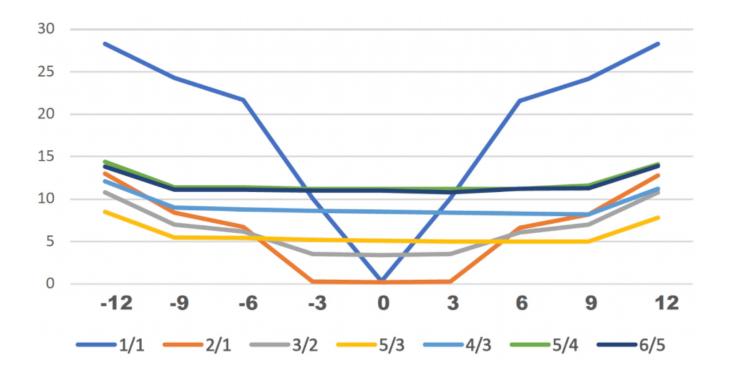
Example 6. Waveforms of 11 pairs of simultaneous tones



Example 7. Changes in roughness among 131 tone-pairs



Example 8. Roughness and undulation near privileged ratios: 1/1, 2/1, 3/2, 5/3, 4/3, 5/4, and 6/5



Example 9. Direction of fundamental frequencies from string 1 to string 7

		strings:						
		1	2	3	4	5	6	7
Α	fundamental frequencies	x	x	0	0	0	0	-X
	directed string steps	<0>	<x></x>	0	0	0	<x></x>	
В	fundamental frequencies	-3x	-5x	0	-2x	-4x	-6x	-x
	directed string steps	<2x>	<-5x>	<2x>	<2x>	<2x>	<-5x>	
	altered fundamental frequencies			-5x			- X	
С	fundamental frequencies	-g+2s	-2g+3s	0	-g+s	-2g+2s	-3g+3s	-g
	directed string steps	<g-s></g-s>	<-2g+3s>	<g-s></g-s>	<g-s></g-s>	<g-s></g-s>	<-2g+3s>	
	altered fundamental frequencies			-3g+4s			-S	
D	fundamental frequencies	-g-2s	-2g-3s	0	-g-s	-2g-2s	-3g-3s	-g
	directed string steps	<g+s></g+s>	<-2g-3s>	<g+s></g+s>	<g+s></g+s>	<g+s></g+s>	<-2g-3s>	
	altered fundamental frequencies			-3g-2s			-S	
E	fundamental frequencies	-s+2g	-2s+3g	0	-s+g	-2s+2g	-3s+3g	-s
	directed string steps	<s-g></s-g>	<-2s+3g>	<s-g></s-g>	<s-g></s-g>	<s-g></s-g>	<-2s+3g>	
F	fundamental frequencies	-s-2g	-2s-3g	0	-s-g	-2s-2g	-3s-3g	-s
	directed string steps	<s+g></s+g>	<-2s-3g>	<s+g></s+g>	<s+g></s+g>	<s+g></s+g>	<-2s-3g>	
	altered fundamental frequencies			-2s-3g			-S	

Example 10. Ratios of 55 pairs of ratios' logarithms

		larger	magni	tudes:									
		ratios	6/1	5/1	4/1	3/1	5/2	2/1	5/3	3/2	4/3	5/4	6/5
		cents	3102	2786	2400	1902	1586	1200	884	702	498	386	316
smalle	r magı	nitudes	:										
ratios	cents												
6/5	316		0.10	0.11	0.13	0.17	0.20	0.26	0.36	0.45	0.63	0.82	[1.00]
5/4	386		0.12	0.14	0.16	0.20	0.24	0.32	0.44	0.55	0.78	[1.00]	
4/3	498		0.16	0.18	0.21	0.26	0.31	0.42	0.56	<u>0.71</u>	[1.00]		
3/2	702		0.23	0.25	0.29	0.37	0.44	0.58	0.79	[1.00]			
5/3	884		0.29	0.32	0.37	0.46	0.56	0.74	[1.00]				
2/1	1200		0.39	0.43	0.50	0.63	0.76	[1.00]					
5/2	1586		0.51	0.57	0.66	0.83	[1.00]						
3/1	1902		0.61	0.68	0.79	[1.00]							
4/1	2400		0.77	0.86	[1.00]								
5/1	2786		0.90	[1.00]									
6/1	3102		[1.00]										

Example 11. Tuning "from scratch" with 4/3 and 3/2 and re-tuning by tightening



Example 12. Re-tuning by loosening

