rhythmic approximations

	pulse-events (subbeat groups)							
sub-beats	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
3	21							
4	22	211						
5	32	221	2111					
6	33	222	2121	21111				
	42	321	3111					
7	43	322	2221	21211	211111			
		331	3121	31111				
8	44	332	2222	22121	211211	2111111		
	53	422	3212	31211	311111			
			3131					
9	54	333	3222	22221	212121	2112111	21111111	
		432	3231	32121	311211	3111111		
				31311				
10	55	433	3232	22222	221221	2121211	21112111	211111111
	64	442	3331	32221	312121	3112111	31111111	
			4222	32131	311311			
12	66	444	3333	32322	222222	2221221	21212121	211211211
	75	543	4323	32331	322122	3212121	31121211	212112111
			4242	42222	321321	3113121	31113111	311112111

14	77	554	4343	33332	322322	2222222	22212221	221212121
	86	644	5333	43232	332321	3221222	31221221	312121211
				42422	331331	3213212	31213121	311311211
					422222	3131312	31311311	
15	87	555	4443	33333	323232	3222222	22222221	222212121
		654	5343	43332	332331	3223221	32212221	321212121
				43242	422322	3321321	32131131	311311311
						3313131		
16	88	655	4444	43333	333232	3223222	22222222	222212221
	97	664	5434	43432	333331	3232321	32221222	321221221
				44242	423232	3231331	32132122	312131221
					424222	4222222	32132131	313131211
							31313131	
18		666	5454	44343	333333	3323232	32223222	222222222
		765	5553	44442	433233	3323331	32313222	321221221
			6444	53433	432432	4232322	32313231	322123212
					424242	4224222	33313131	321321321
							42222222	321313131
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**
20		776	5555	44444	433433	3333332	32323232	322232222
		866	6545	54344	434342	4332332	33323231	322322321
			6464	54353	442442	4324232	33313331	323232131
					533333	4242422	42323222	332313131
							42224222	422222222
24		888	6666	55554	444444	4343433	33333333	332332332
		987	7656	65454	544344	4434342	43332333	333233331
			7575	64644	543543	4442442	43234323	432323232
					535353	5334333	43243242	423242322
							42424242	422422422

approximation: given a cell containing a fixed number n of subbeats as a basis,
group these subbeats into $k < n$ pulse-events of approximately even duration
(in the above table, no more than 2-subbeat variation)
model: stack n pennies into k nearly equal stacks $p[i]$ such that

$$p[1]+...+p[k] = n \qquad\qquad |p[i]-p[j]| \leq 2$$

each distribution represents a cell which may repeat or cycle

312121 312121 312121 ...

table attempts to balance durations around cycle
model: consider a roulette wheel with n slots;
distribute k balls around the wheel such that
the spacing between adjacent balls varies by no more than 2

look at **permutations** of each cell

cyclic	212131	
reverse	121213	(happens to be cyclic)
other	321121	

look for
- syncopation
- balance around cycle
- alternating long/short duration (swing)
- rhythmic weight or stress (longer duration)

first pulse event need not be longest;
consider various claves

bossa	16 subbeats	33433
clave	16 subbeats	33424
cuban clave	16 subbeats	34324
12/8 clave	12 subbeats	23223

finer basis (e.g., 16 rather than 8) may give closer
or more interesting approximation
multiply basis and distribution, reevaluate, redivide
interpret basis in different meters. e.g., 12 = 3•4 = 4•3, 24 = 3•8 = 8•3 = 4•6 = 6•4
change basis and find similar approximation, e.g., from cuban clave to 12/8 clave