

Melodic Rules Specification v1.0

Plácido R. Illescas, David Rizo, José M. Iñesta

Before detailing the rules some terms must be defined.

Definition 2.1 $rd(n_a) = duration(n_a)/duration(beat)$

The relative duration function determines the ratio between the duration of a note, n_a , and the duration of a beat.

Definition 2.2 $ratio(n_i) = \frac{rd(n_i)}{rd(n_{i-1})} \times \frac{rd(n_i)}{rd(n_{i+1})}$

The ratio function is used to compare the relative duration of a note with its next and previous notes.

Definition 2.3 $pitchName(n_a)$

It defines the position of the name of the note n_a in the ordered set $\{C, D, E, F, G, A, B\}$. It does not include any accidentals.

Definition 2.4 $pitchClass(n_a)$

Order of the note name including its accidental in within the octave. (e.g. $pitch(Eb4) = 3$).

Definition 2.5 $pitchInterval(n_a, n_b) = d.s$

It computes the pitch interval between two notes n_a and n_b , where $d = pitchName(n_b) - pitchName(n_a) + 1$ and $s = pitchClass(n_b) - pitchClass(n_a)$ specified with a resolution of two decimals. A positive value indicates an ascending interval. For example, the unison interval $pitchInterval(n_a, n_a) = 1.00$ and the tritone or augmented fourth is 4.06.

Definition 2.6 $prevI(n_i)$

The previous interval is the interval between a note n_i and its predecessor. $prevI(n_i) = pitchInterval(n_{i-1}, n_i)$

Definition 2.7 $nextI(n_i)$

The next interval is the interval between a note n_i and its successor. $nextI(n_i) = pitchInterval(n_i, n_{i+1})$

Definition 2.8 $beat(n_i)$

Its value is the beat the note onsets.

Definition 2.9 *subbeat*(n_i)

It is a boolean function that is true when the note onset does not match the exact position of the beat, otherwise is false.

Definition 2.10 *strong*(n_i)

For quaternary meters a note is strong when its onset is located in the first or third beat of the measure. In ternary meters, it is strong if and only if it onsets in the first beat. For the compound meters, this function can be computed from these two situations.

Definition 2.11 *tied*(n_i)

It is a boolean function that is true whenever the note n_i is tied from the previous note using a prolongation tie and false otherwise.

Definition 2.12 *tied*(n_i)

It is a boolean function that is true whenever the note n_i is tied from the previous note using a prolongation tie and false otherwise.

Definition 2.13 *part*(n_i)

Subdivision of a beat in two parts for non compound meters, in three for compound meters

Rule name	Condition	Tag	Confidence	NHT Type
RL1.1	$beat = 1 \wedge \neg subbeat \wedge rd > 1$	HT	h	
RL1.2	$beat = 1 \wedge \neg subbeat \wedge rd > 1 \wedge nextI \in \{-2.01, -2.02\} \wedge prevI = 1.00 \wedge rd_n \geq 1$	NHT	m	appoggiatura
RL1.3	$beat = 1 \wedge \neg subbeat \wedge rd > 1 \wedge nextI \in \{-2.01, -2.02\} \wedge prevI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge rd_n \geq 1$	NHT	m	appoggiatura
RL1.2.1	$beat = 1 \wedge \neg subbeat \wedge rd > 1 \wedge nextI \in \{+2.01, +2.02\} \wedge prevI = 1.00 \wedge rd_n \geq 1$	NHT	l	appoggiatura
RL1.5	$beat = 1 \wedge \neg subbeat \wedge rd > 4$	HT	s	
RL2.2	$beat = 2 \wedge \neg subbeat \wedge rd > 1 \wedge prevI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\}$	NHT	l	Passing tone or neighbor tone
RL2.4	$beat = 2 \wedge \neg subbeat \wedge rd > 1 \wedge prevI > 2.s \wedge nextI > 2.s$	HT	s	
RL3.1	$beat = 3 \wedge \neg subbeat \wedge rd > 1$	HT	h	
RL3.2	$beat = 3 \wedge \neg subbeat \wedge rd = 2 \wedge rd > rd_n$	HT	h	
RL3.3	$beat = 3 \wedge \neg subbeat \wedge rd > 1 \wedge rd > rd_n \wedge prevI > 2.s$	HT	h	
RL4.1	$beat = 4 \wedge \neg subbeat \wedge rd > 1$	HT	h	
RQ1.1	$beat = 1 \wedge \neg subbeat \wedge rd = 1$	HT	h	
RQ1.2	$beat = 1 \wedge \neg subbeat \wedge rd = 1 \wedge prevI = 1.00 \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\}$	NHT	m	appoggiatura
RQ1.3	$beat = 1 \wedge \neg subbeat \wedge rd = 1 \wedge prevI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\}$	NHT	l	Passing tone in strong time or not prepared appoggiatura
RQ2.1.1	$beat = 2 \wedge \neg subbeat \wedge rd = 1 \wedge prevI > 2.s$	HT	h	
RQ2.1.1	$beat = 2 \wedge \neg subbeat \wedge rd = 1 \wedge nextI > 2.s$	HT	h	
RQ3.1.p	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI > 2.s$	HT	h	
RQ3.1.n	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge nextI > 2.s$	HT	h	
RQ3.1.1.p1	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge rd_p < 1$	HT	h	
RQ3.1.1.p2	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge rd_p \geq 1$	HT	m	
RQ3.1.1.n1	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge rd_n < 1$	HT	h	

RQ3.1.1.n2	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge rd_n \geq 1$	HT	m	
RQ3.1.2.p1	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI \in \{-1.01, +1.01\} \wedge rd_p < 1$	HT	h	
RQ3.1.2.p2	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI \in \{-1.01, +1.01\} \wedge rd_p \geq 1$	HT	m	
RQ3.1.2.n1	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge nextI \in \{-1.01, +1.01\} \wedge rd_n < 1$	HT	h	
RQ3.1.2.n2	$beat \geq 3 \wedge \neg subbeat \wedge rd = 1 \wedge nextI \in \{-1.01, +1.01\} \wedge rd_n \geq 1$	HT	m	
RQ3.4	$beat = 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI = 1.00 \wedge nextI \in \{-2.01, -2.02\} \wedge rd_n = 1$	NHT	m	appogiatura
RQ3.5	$beat = 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI = 1.00 \wedge nextI \in \{-2.01, -2.02\} \wedge rd_n \neq 1$	NHT	l	appogiatura
RQ3.6	$beat = 3 \wedge \neg subbeat \wedge rd = 1 \wedge prevI \in \{-2.01, -2.02, +2.01, +2.02\} \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\}$	NHT	l	passing tone
RQ4.1.p	$beat = 4 \wedge \neg subbeat \wedge rd = 1 \wedge prevI > 2.s$	HT	h	
RS.T	$\neg subbeat \wedge rd < 1$	HT	m	
RS_NT	$subbeat \wedge rd < 1$	NHT	m	
RS_P1.1	$rd < 1 \wedge part = 2rd \geq rd_n$	HT	m	
RS_P1.2	$rd < 1 \wedge part = 2 \wedge nexI > 2.s$	HT	h	
RS_P1.3s	$(beat = 1 \vee beat = 3) \wedge rd < 1 \wedge part = 2 \wedge prevI = 1.00 \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\}$	NHT	h	appogiatura
RS_P1.3w	$(beat = 2 \vee beat = 4) \wedge rd < 1 \wedge part = 2 \wedge prevI = 1.00 \wedge nextI \in \{-2.01, -2.02, +2.01, +2.02\}$	NHT	m	appogiatura
RS_P2.1	$rd < 1 \wedge part = 3 \wedge (1.0 \leq prevI \leq 2.0) \wedge (1.0 \leq nextI \leq 2.0) \wedge (rd_p \leq rd \leq rd_p)$	NHT	h	
RS_P2.2	$rd < 1 \wedge part = 3 \wedge prevI > 2.s$	HT	h	
RS_P3.1p	$rd < 1 \wedge part = 4 \wedge prevI > 2.s$	HT	h	
RS_P3.1n	$rd < 1 \wedge part = 4 \wedge nextI > 2.s$	HT	h	

Table 1: Melodic rules for a note n_i . The parameter n_i of the functions has been omitted to reduce space. rd_n stands for $rd(n_{i+1})$, rd_p stands for $rd(n_{i-1})$

From (f_a)	To (f_b)	Weight
T	D	26
T	S	75
T	T	1
S	D	100
S	T	145
S	S	1
D	S	-101
D	D	1
D	T	
Perfect V triad + minor 7th	{I,i}	2500
Perfect V triad + minor 7th	{VI,vi}	2100
Perfect V triad	{I,i}	1900
Dim. vii triad + minor 7th	I	2300
Dim. vii triad + dim. 7th	i	
Dim. vii triad	I	1600
Perfect iii triad + minor 7th	I	1550
Aug. triad + with major 7th	i	
Perfect iii triad	I	1500
Aug. III triad	i	

Table 2: Relations between tonal functions within the same tonality and their corresponding weights. The weights for the relation $D \rightarrow T$ depend on the chords forming these tonal functions.