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THE "INTONATIONAL MUSICAL PHRASE" IN BACH´S SUITE n°1:

an Autosegmental – Metrical Approach in Optimality Theory.

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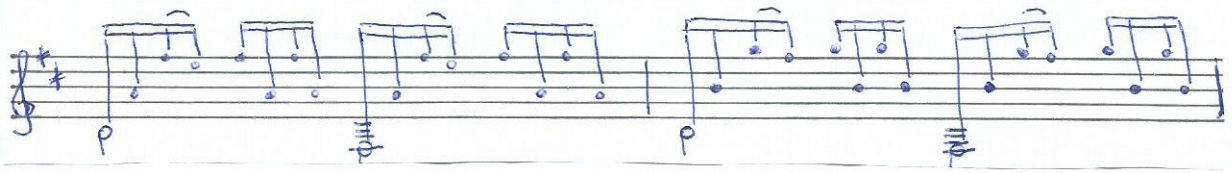
ABSTRACT

Based on the Intonational Model of Autosegmental – Metrical Theory (Ladd, 1996) in the framework of Optimality Theory (Lerdhal&Jackendoff, 1983), we describe the grammar of an "Intonational Musical Phrase (IMP)" in Bach´s Suite n°1.

THE MELODY

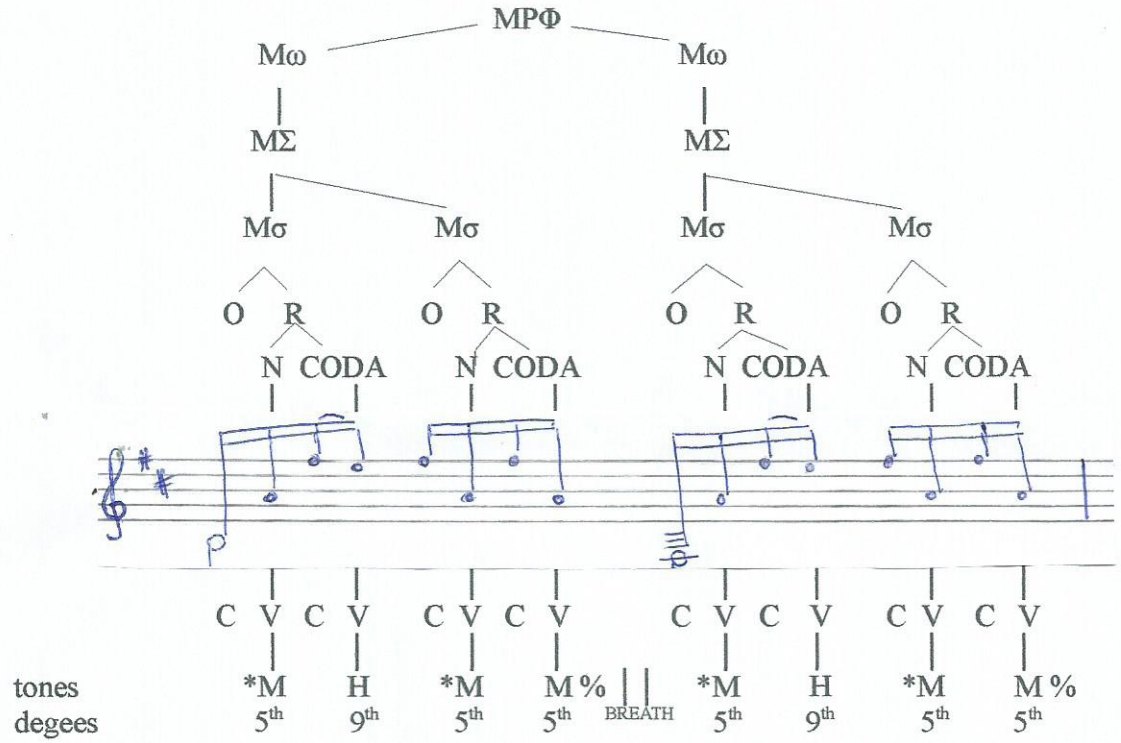
An *intonational musical phrase* (IMP) (Martins, 2014a) consists of two *musical phrases* (MPΦ) and it can last for two bars as the example below shows:



The example above is from a classical guitar transcription (Thorlaksson, 2000).

This *intonational musical phrase* (IMP) is then represented as two *musical phrases* as follows: [MPΦ | MPΦ]IMP.

The first *musical phrase* can be hierarchically represented as:



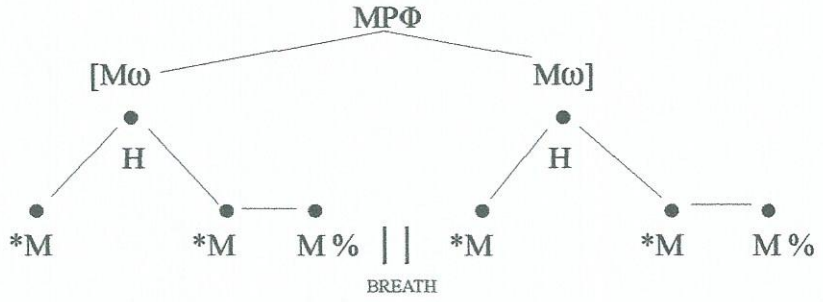
The *tones* above stand for: H(igh) tone and M(id) tone.

According to the Intonational Autosegmental - Metrical Theory (Ladd, 1996) the *tone* types: H(igh) - M(id) and L(ow) are sufficient to describe the variations of fundamental frequencies (F0).

Notice that the *musical notes*, that function as vowels, are the *tone bearing units* (TBU) (Yip, 2006) or the *units* that carry the *musical tones*. The reason to this is that they are the most sonorous part of a syllable (Zec, 2006).

The *intonational contours* for the two *musical words* (*M*ω) above are simetrically represented by their musical degrees [*M*ω (5^{th} 9^{th} 5^{th} 5^{th}) *M*ω(5^{th} 9^{th} 5^{th} 5^{th})]MPΦ.

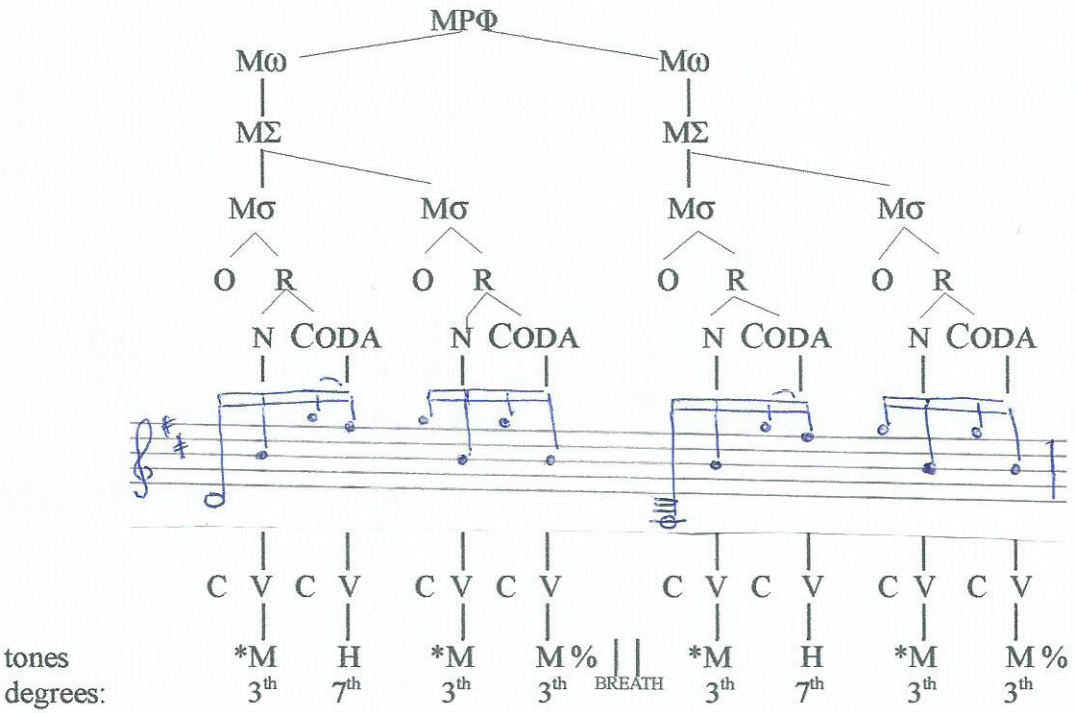
The *intonational musical contours* for the first *musical phrase*: [Mω || Mω]MPΦ:



We can observe on this *musical phrase contours* that there is a pause (constraint: BreathGroup) in between the two *musical words* and also *downsteps* on the *right edge* of *musical words*: *M M% forming a *plateau*.

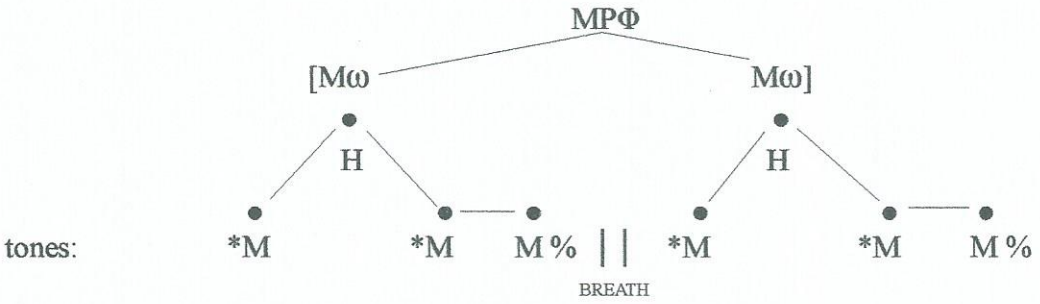
Further research on *musical intonation* together with *acoustic analysis* should reveal if the *nuclear accent* is actually only established on the *nucleus* of a syllable or it has also to do with vowels on *Coda* positions.

The second *musical phrase* can be hierarchically represented as:



The *intonational contours* for the two *musical words* (*M*ω) above are also simetrically represented by their musical degrees: [*M*ω (3^{th} 7^{th} 3^{th} 3^{th}) *M*ω (3^{th} 7^{th} 3^{th} 3^{th})]MPΦ.

The *intonational musical contours* on the second *musical phrase* (MPΦ) presents the same as the first one :

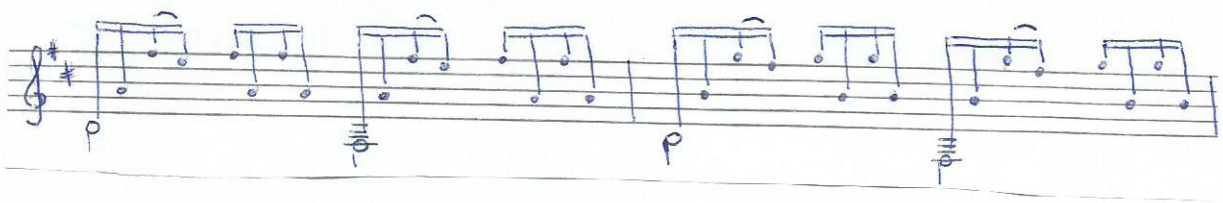


THE HARMONY

For the first *intonational musical phrase* (IMP) Bach makes use of two *modes*: the "D *ionian mode"* for the first *musical phrase* and the "G *lydian mode"* for the second one:

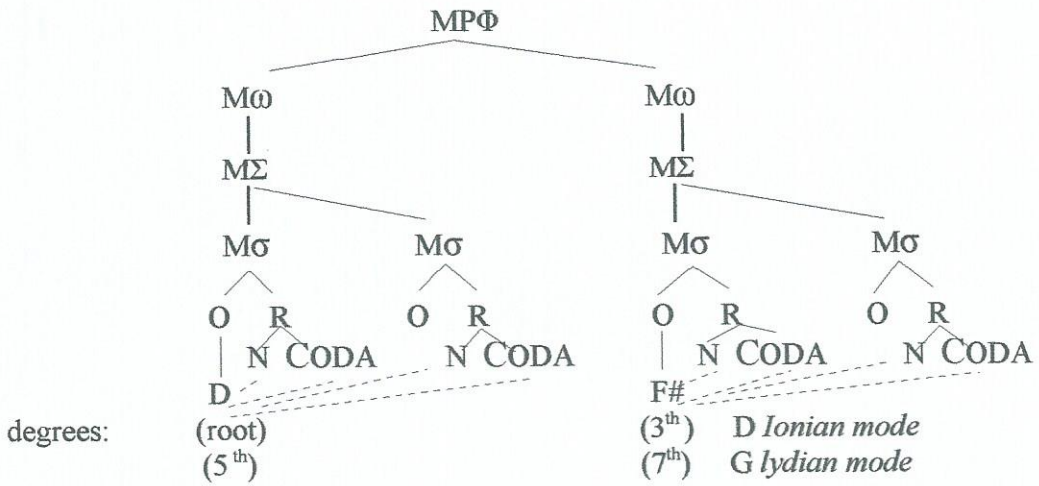
degrees: [[I^9]MPΦ [IVmaj7]MPΦ]IMP
chords: [[D^9]MPΦ [Gmaj7]MPΦ]]IMP
modes: [[*Ionian*]MPΦ [*Lydian*]MPΦ]IMP

"THE PEDAL BASS EFFECT"



Notice above that at the *onset* of *head-syllables* there is a *half note rythm* that keeps sounding together with the other *sixteenth notes* for the entire *musical word* (*M*ω) represented as:

[[Mω Mω]MPΦ [Mω Mω]MPΦ]IMP



The *pedal bass effect* above sustains or "floats" due to not finding any *tone bearing units* (TBU) to get slotted in a musical note.

For the first *musical phrase* (MPΦ) the *pedal bass effect* is formed by the "D *ionian mode*":

1st *musical word* (*M*ω): *root* of the chord: D.

2nd *musical word* (*M*ω): first inversion: D^9/F#.

For the second *musical phrase* (MPΦ) the *pedal bass effect* is formed by the "G *lydian mode*":

1st *musical word* (*M*ω): second inversion: Gmaj7/D.

2nd *musical word* (*M*ω): seventh of the chord: Gmaj7/F#.

To account for the first "*Intonational Musical Phrase*" (IMP) in Bach`s Suite n°1 in the framework of Optimality Theory (Lerdhal&Jackendoff, 1983) we propose the following *constraints*:

(MPΦ) *MODES*: 1st(MPΦ) *THE IONIAN MODE.*

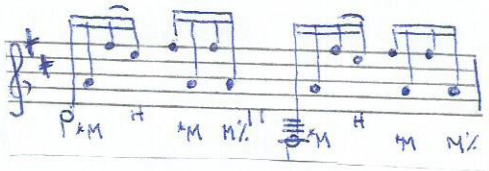
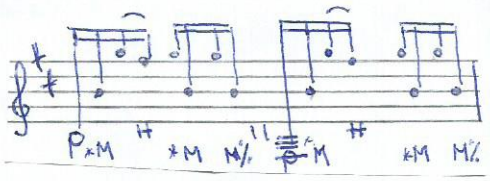
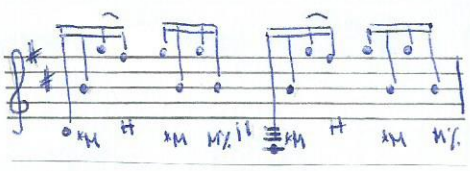
(MPΦ) *MODES*: 2nd(MPΦ) *THE LYDIAN MODE.*

(Mω) TONES: ALLIGN(Left)edge: *M H.

(Mω) TONES: ALLIGN(Right)edge: *M M%.

(IMP) BREATHGROUP: there is a pause in between musical words |: Mω | | Mω :|.

(IMP)PEDAL BASS EFFECT: alternate and sustain the bass pedals |: D(*M*ω) F# (*M*ω) :| for the first (IMP).

Input: **The 1st (IMP) of Bach´s Suite n°1.** The 1st (MPΦ)  The 2snd (MPΦ) 	**(MPΦ) *MODES***		**(Mω) TONES**		**(IMP) BREATH GROUP**	**(IMP) PEDAL BASS EFFECT**
	1st(MPΦ) *IONIAN*	2nd(MPΦ) *LYDIAN*	ALLIGN (L)edge: *M H	ALLIGN (R)edge: *M M%	:Mω | | Mω:|	:|D(*M*ω)F#(*M*ω:|
→ The 1st (MPΦ)  The 2snd (MPΦ) 						
The 1st (MPΦ)  The 2snd (MPΦ). 						*!

The first candidate is the optimal candidate while the second one violates the *constraint*: "(IMP) PEDAL BASS EFFECT" by not using the *"pedal bass effect"*.

The grammar for the first *"Intonational Musical Phrase"* (IMP) of Bach´s Suite n°1 can then be repesented as:

(MPΦ) ***MODES***:1st(MPΦ)*IONIAN*>>2nd(MPΦ) *LYDIAN*>>**(Mω) TONES**: ALLIGN(L)edge:*M H>>ALLIGN(R)edge:*M M%>>**(IMP) BREATHGROUP** |:Mω | | Mω:|>>**(IMP)PEDAL BASS EFFECT**|:D(*M*ω) F#(*M*ω):|.

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