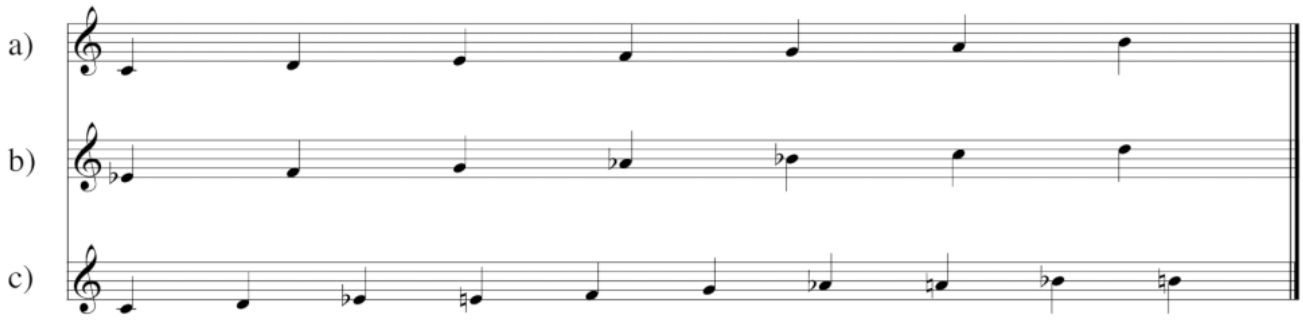
A JOURNAL OF THE SOCIETY FOR MUSIC THEORY

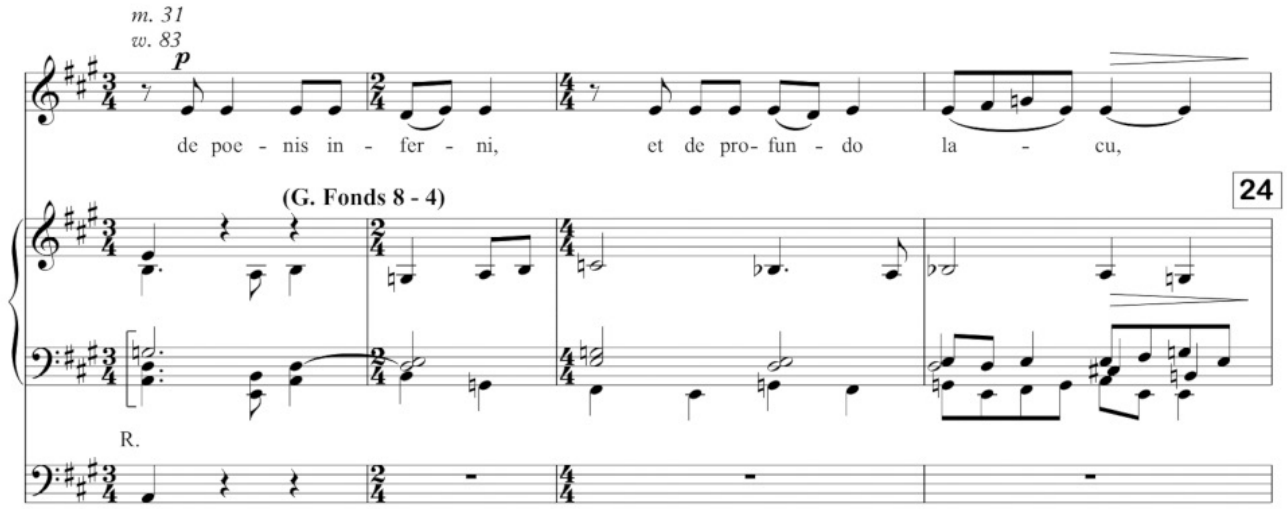
MTO 27.3 Examples: Chiu, Macroharmonic Progressions through the Discrete Fourier Transform: An Analysis from Maurice Duruflé's Requiem

(Note: audio, video, and other interactive examples are only available online)
https://mtosmt.org/issues/mto.21.27.3/mto.21.27.3.chiu.html

Example 1. Different scales combining to form a macroharmony



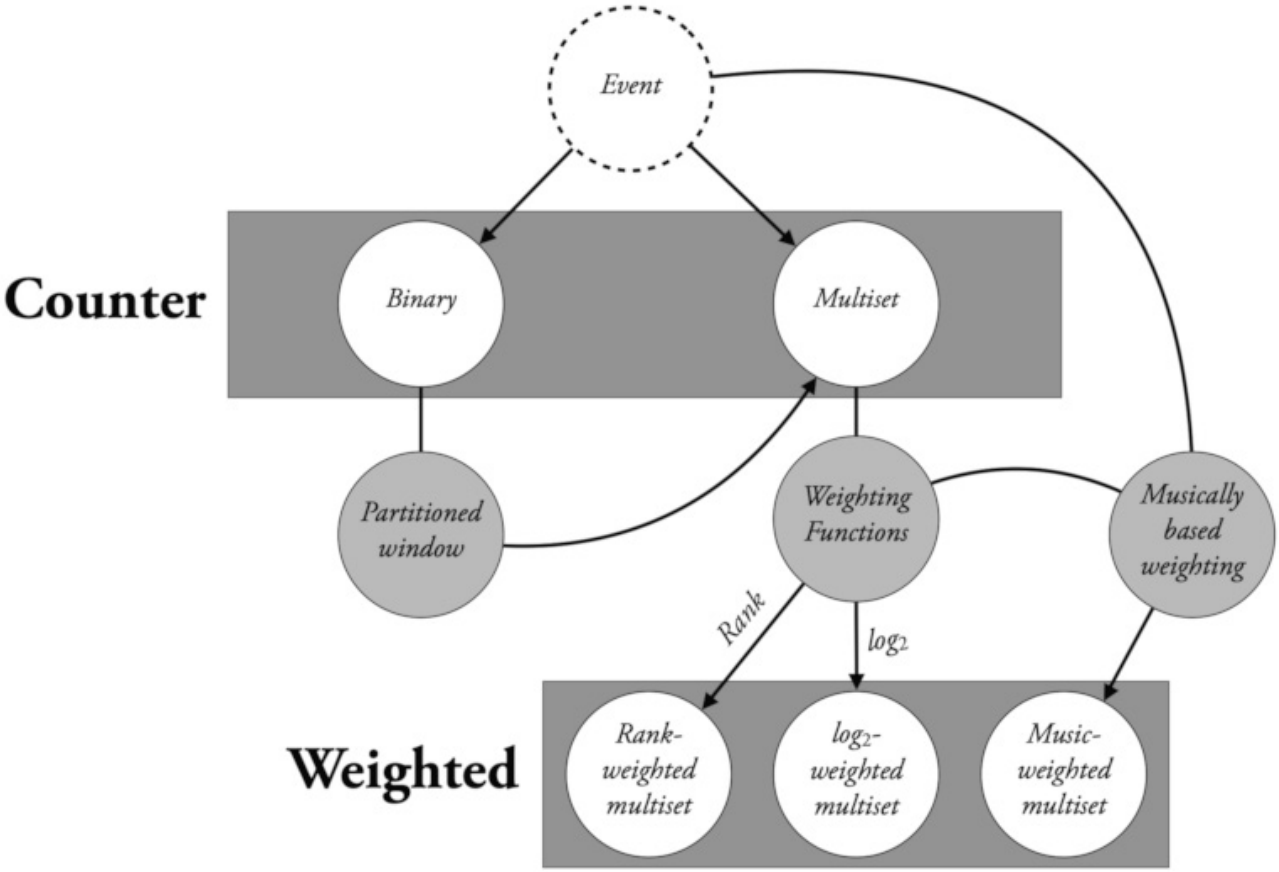
Example 2. Requiem: *Domine Jesu,* mm. 31–34



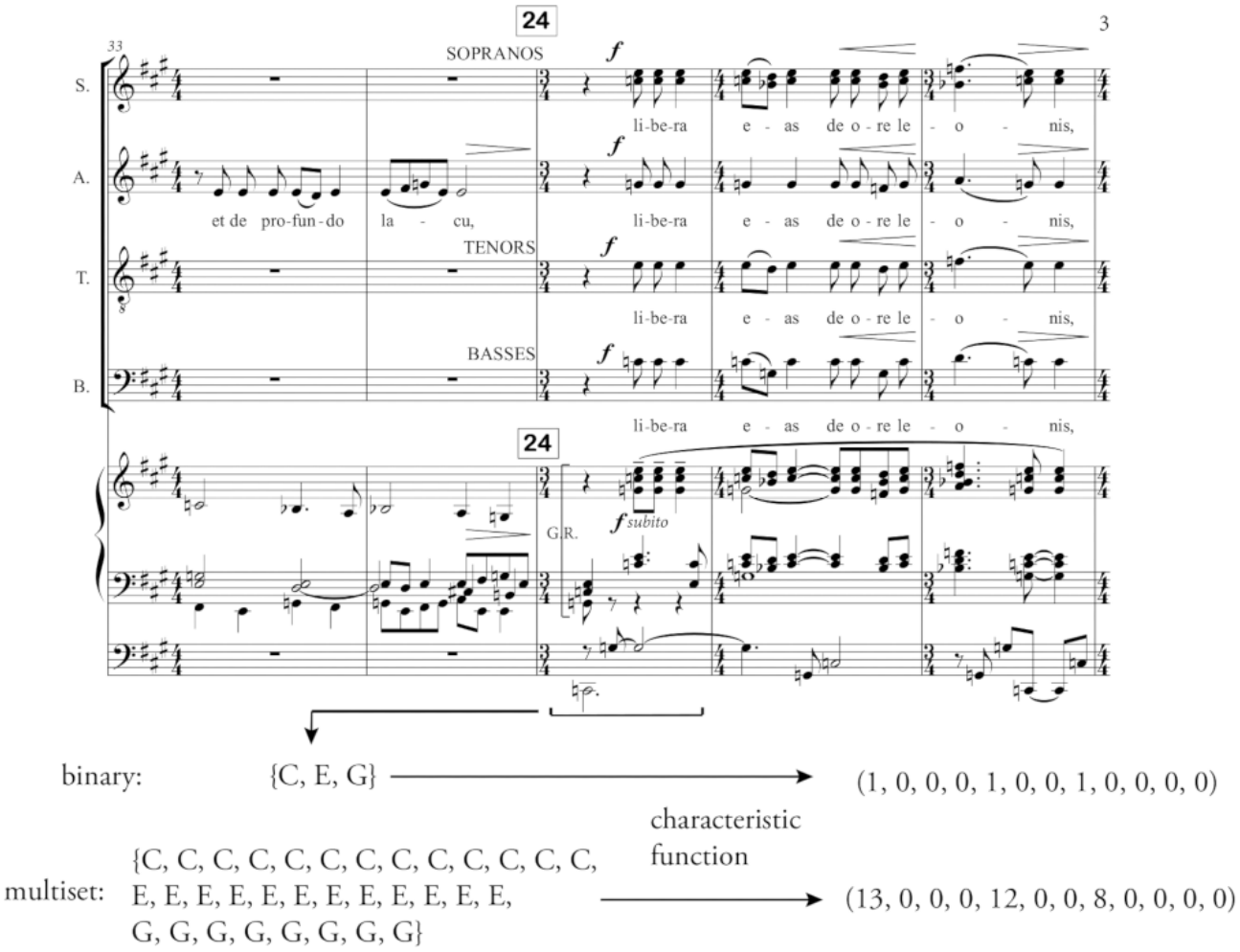
Example 3. DFT macroharmonic qualities

Component	Quality	Description
f_1	*Clustered Quality*	contains chromatically adjacent PCs
f_2	*Dyadicity*	contains tritones or fifths
f_3	*Hexatonicity*	contains triads (augmented or major/minor) or the hexatonic scale (two adjacent augmented triads)
f_4	*Octatonicity*	contains diminished sevenths or octatonic scales
f_5	*Diatonicity*	contains a partial fifth cycle
f_6	*Whole-tone Quality*	contains a whole-tone cycle (partial or complete)

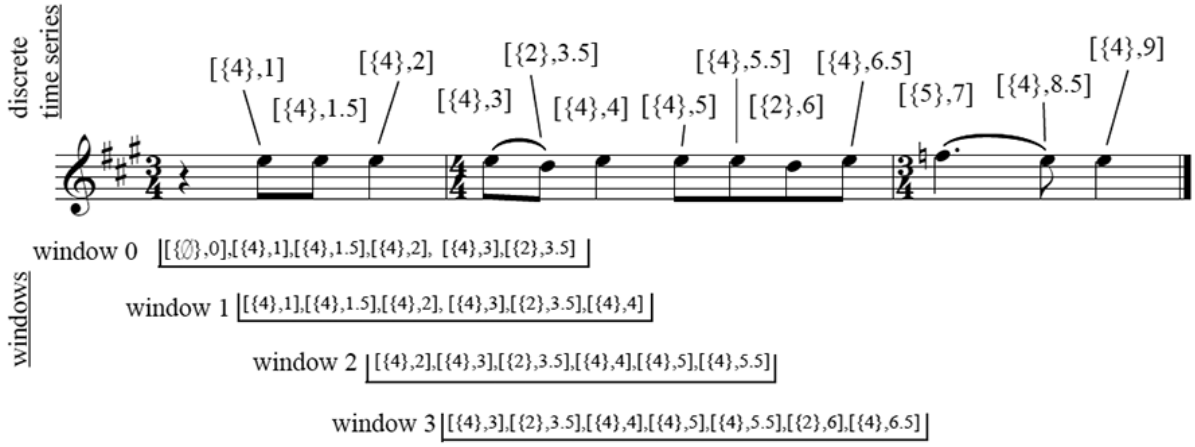
Example 4. Approaches to encoding music



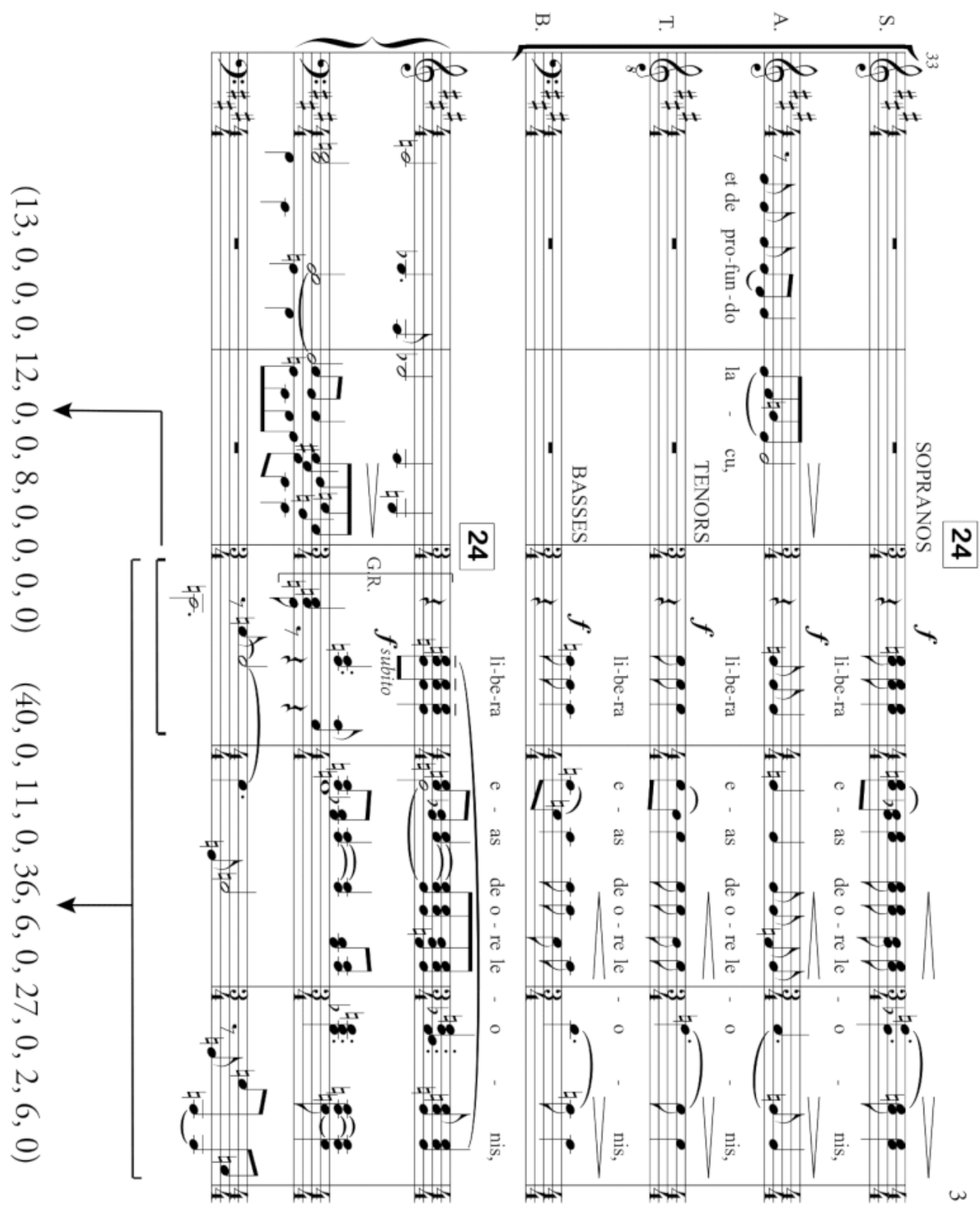
Example 5. *Domine Jesu*, rehearsal 24, binary vs. multiset



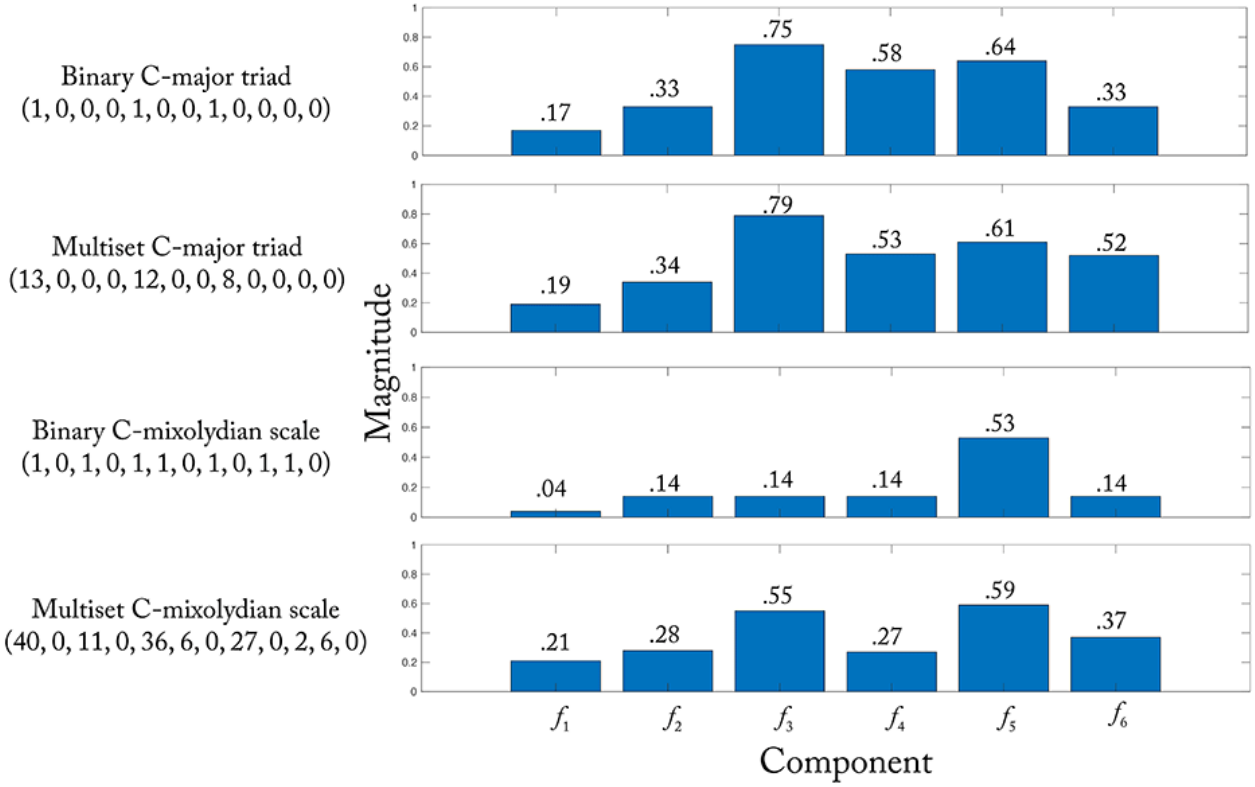
Example 6. *Domine Jesu*, melody at rehearsal 24, overlapping sliding windows



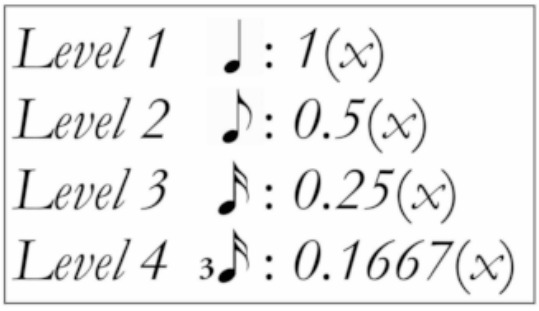
Example 7. *Domine Jesu*, rehearsal 24, different window sizes



Example 8. DFT calculations on different retrieval processes and window sizes for *Domine Jesu*, rehearsal 24



Example 9. Weight by metric hierarchy

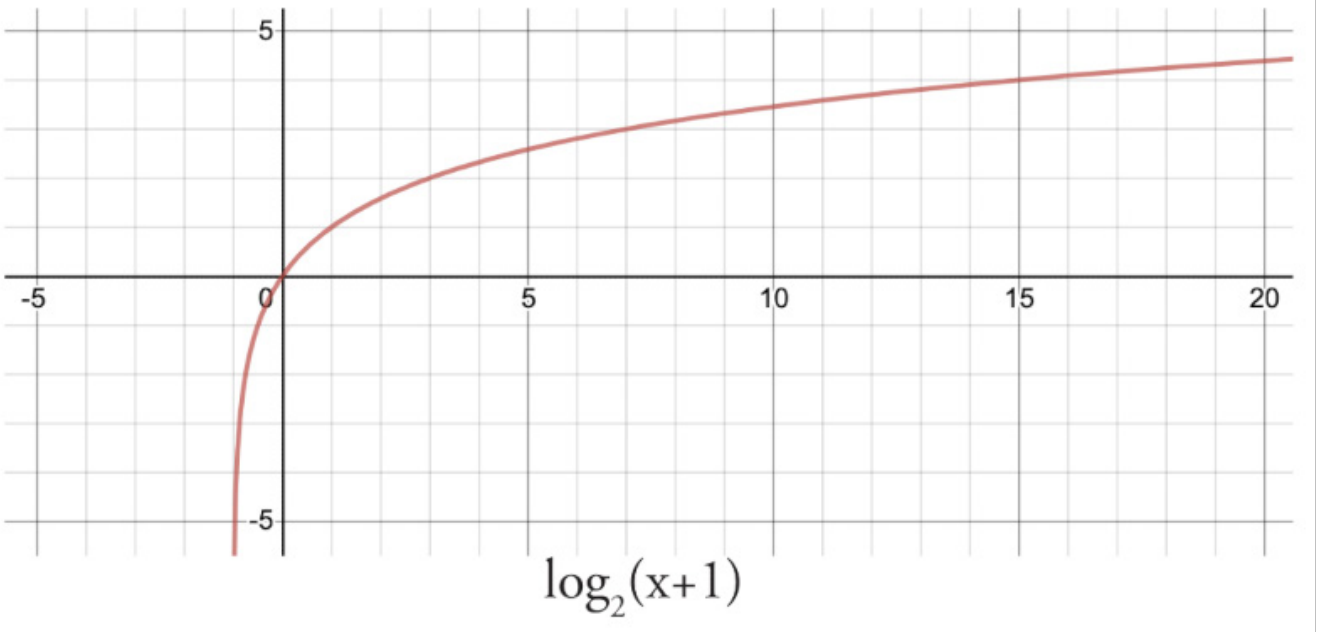


Example 10. Monotonic weightings of PC-frequency distributions, *Domine Jesu*, rehearsal 24

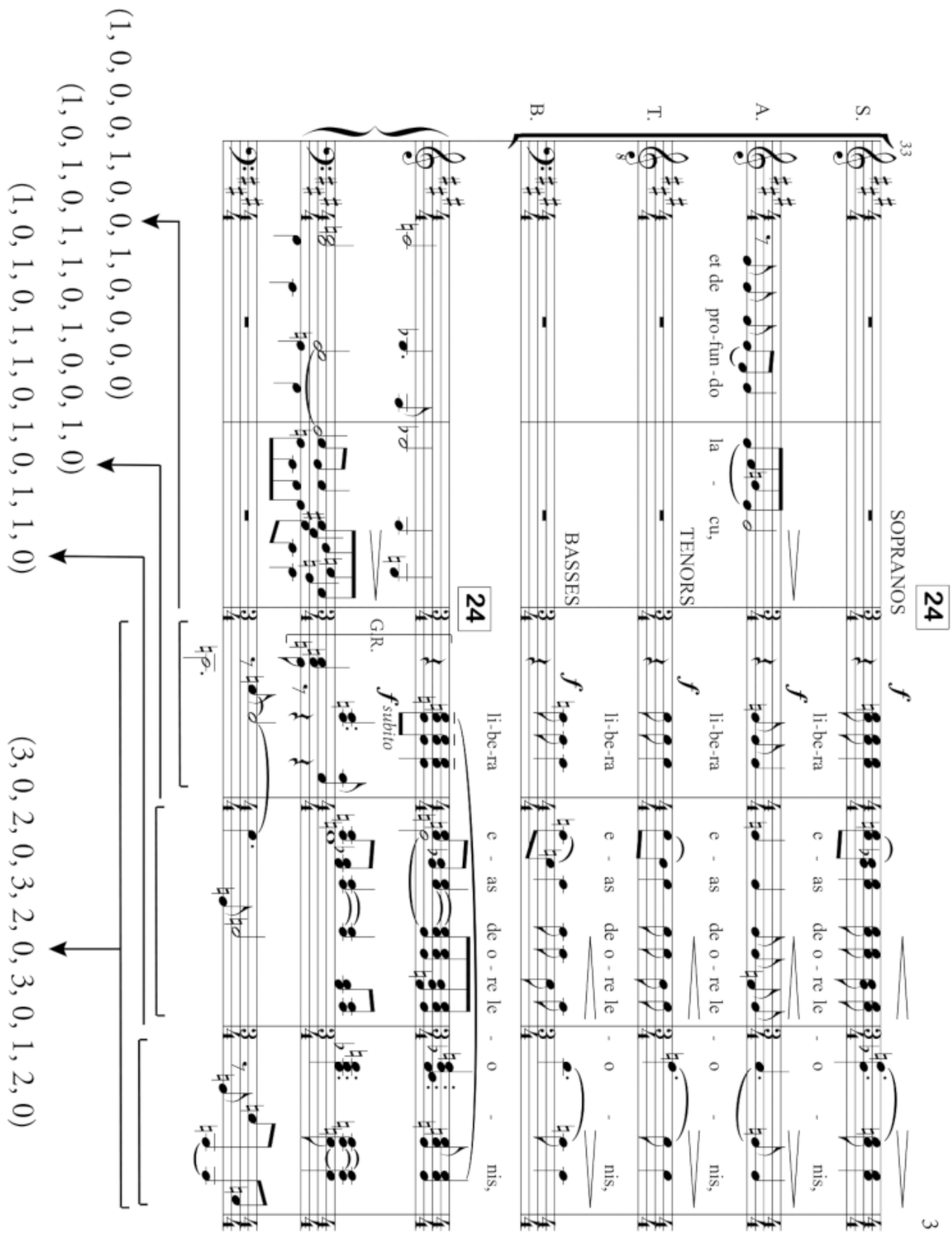
Retrieval Procedure	PC-Frequency Distribution
multiset	(40, 0, 11, 0, 36, 6, 0, 27, 0, 2, 6, 0)

Retrieval Procedure	Weighted Multiset
metric-weighted multiset	(31, 0, 9, 0, 28.5, 6, 0, 18, 0, 2, 4.5, 0)
rank-weighted multiset	(7, 0, 4, 0, 6, 2, 0, 5, 0, 1, 2, 0)
$\log_2$-weighted multiset	(5.4, 0.0, 3.6, 0.0, 5.2, 2.8, 0.0, 4.8, 0.0, 1.6, 2.8, 0.0)

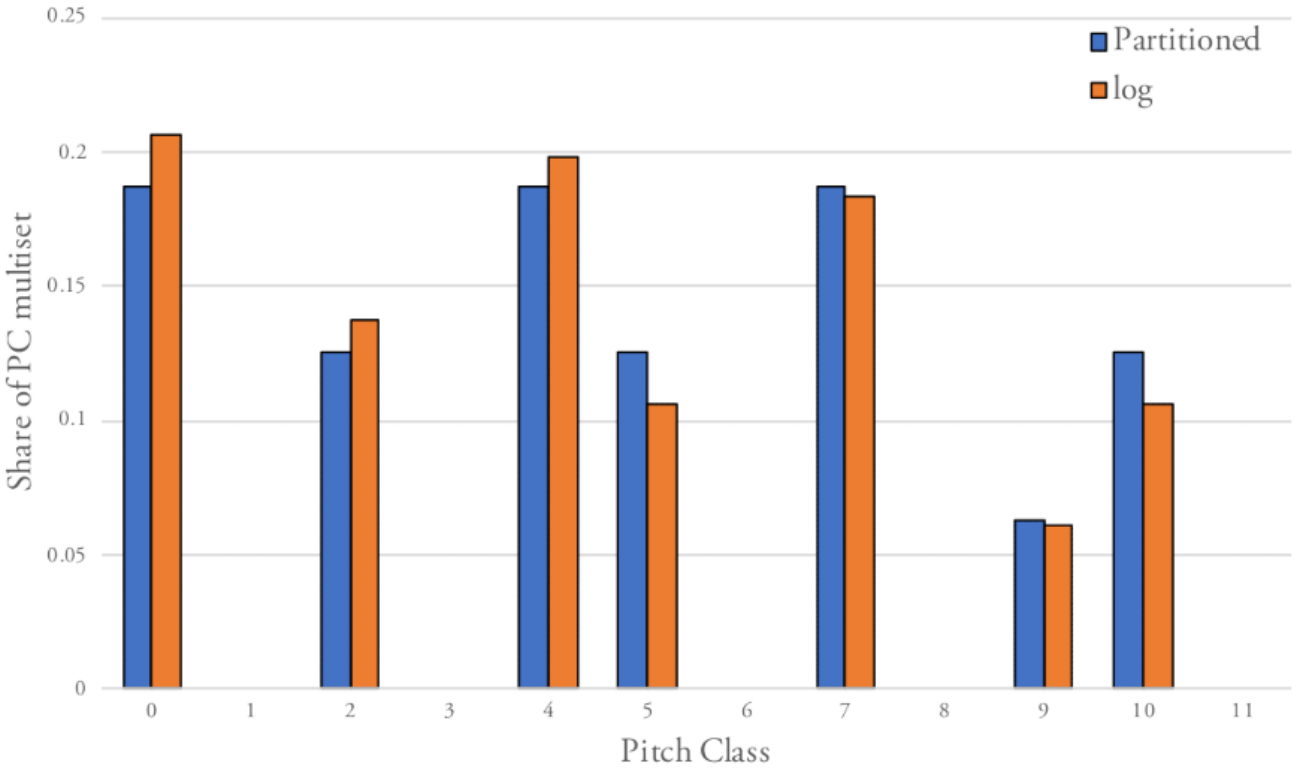
Example 11. $\log_2(x+1)$ function



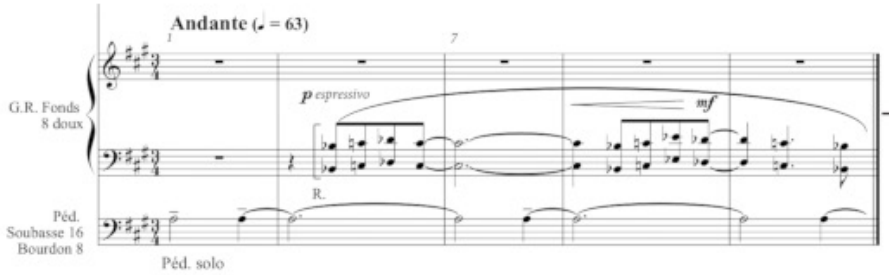
Example 12. *Domine Jesu*, rehearsal 24, partitioned window



Example 13. *Domine Jesu*, rehearsal 24, partitioned window vs. $\log_2$

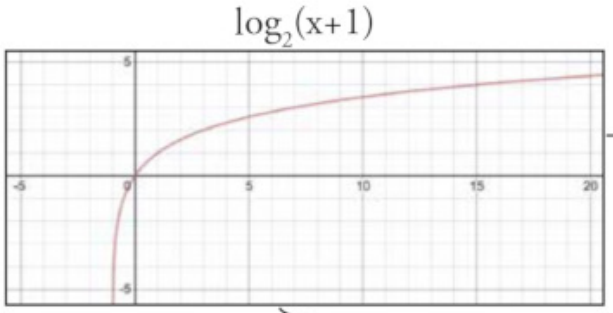


Example 14. Coding procedure flow chart



Full Piece Array
PC and Offset
[[{9}, 0], [{9}, 2], [{t, t}, 4], ... , [{*pcs*}, *t*]]

Window size 12:
PC and Offset
[[{9}, 0], [{9}, 2], [{t, t}, 4], ... , [{e, e}, 11], [{1, 1}, 11.5]]



Weight

Characteristic Function:
(6, 4, 0, 2, 0, 0, 0, 0, 0, 3, 4, 0)

Log-Weighted:
(2.8, 2.3, 0, 1.6, 0, 0, 0, 0, 0, 0, 2, 2.3, 0)

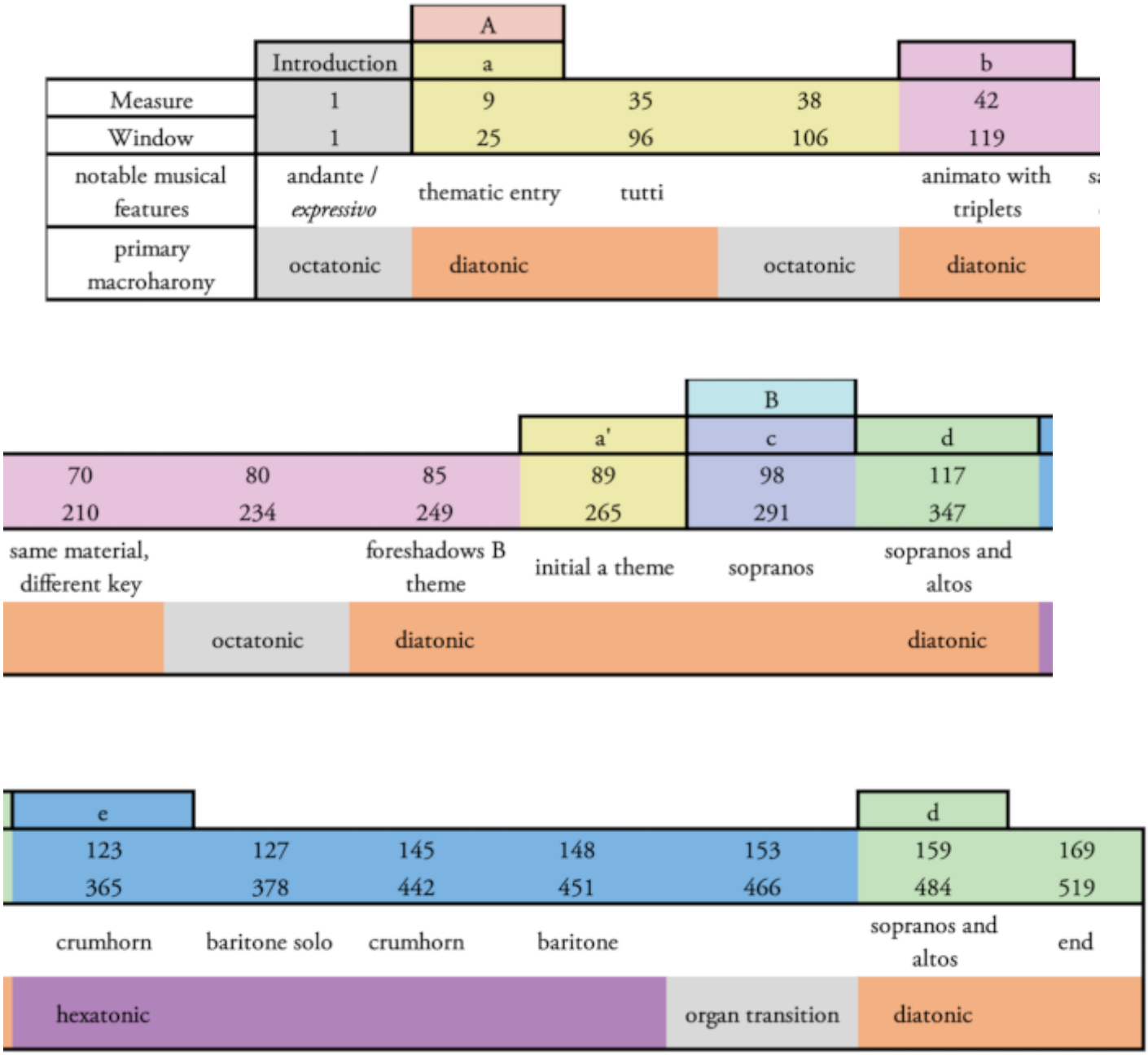
DFT

$$F_n = \sum_{j=0}^{J-1} p_j \, e^{\frac{-2\pi n j}{J}}$$

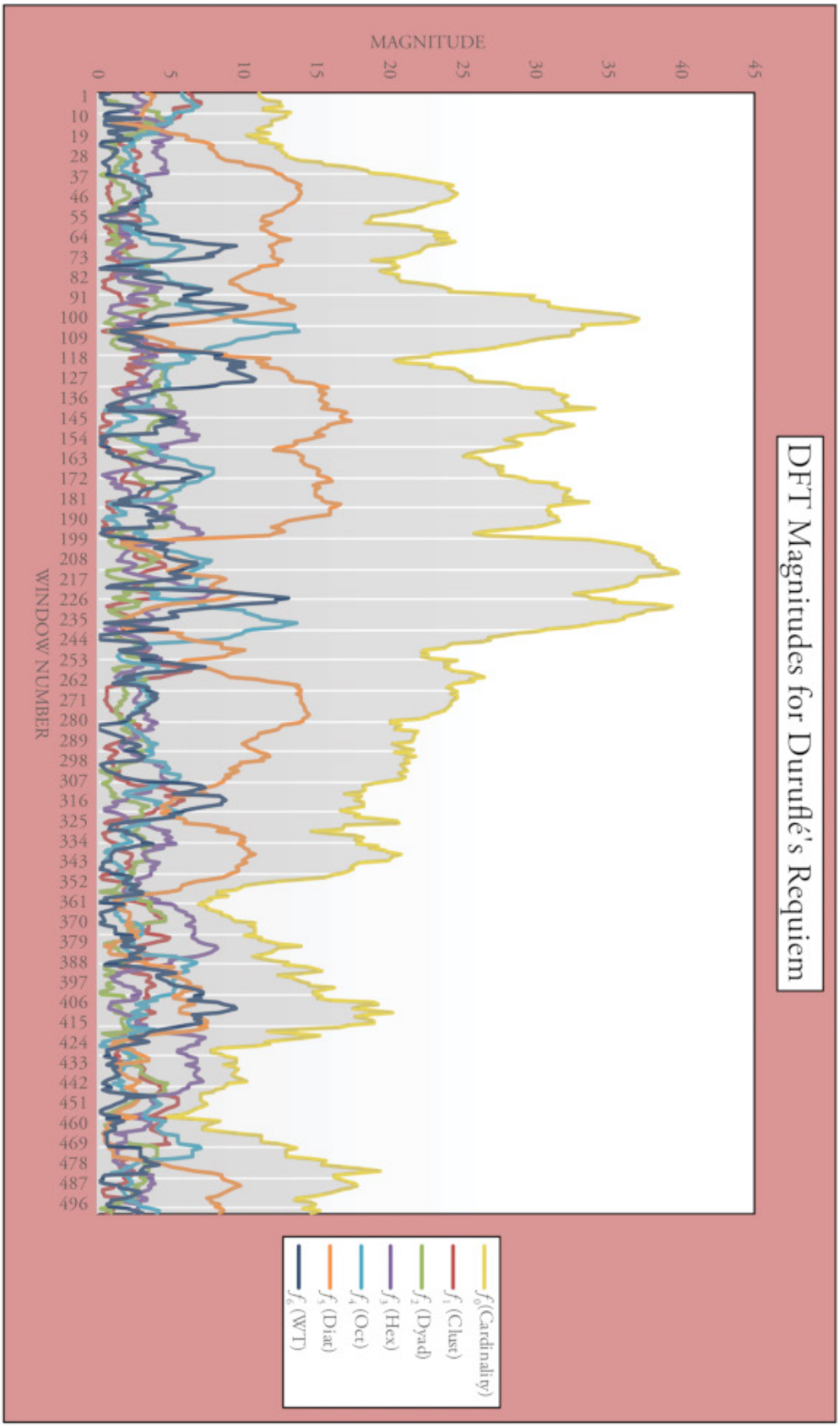
polar form

	$\lvert f_n \rvert$	φ_n
f_0	11.0362	0
f_1	6.112	0.208
f_2	0.778	3.142
f_3	2.780	−1.395
f_4	5.722	−0.779
f_5	3.381	−0.953
f_6	0.778	3.142

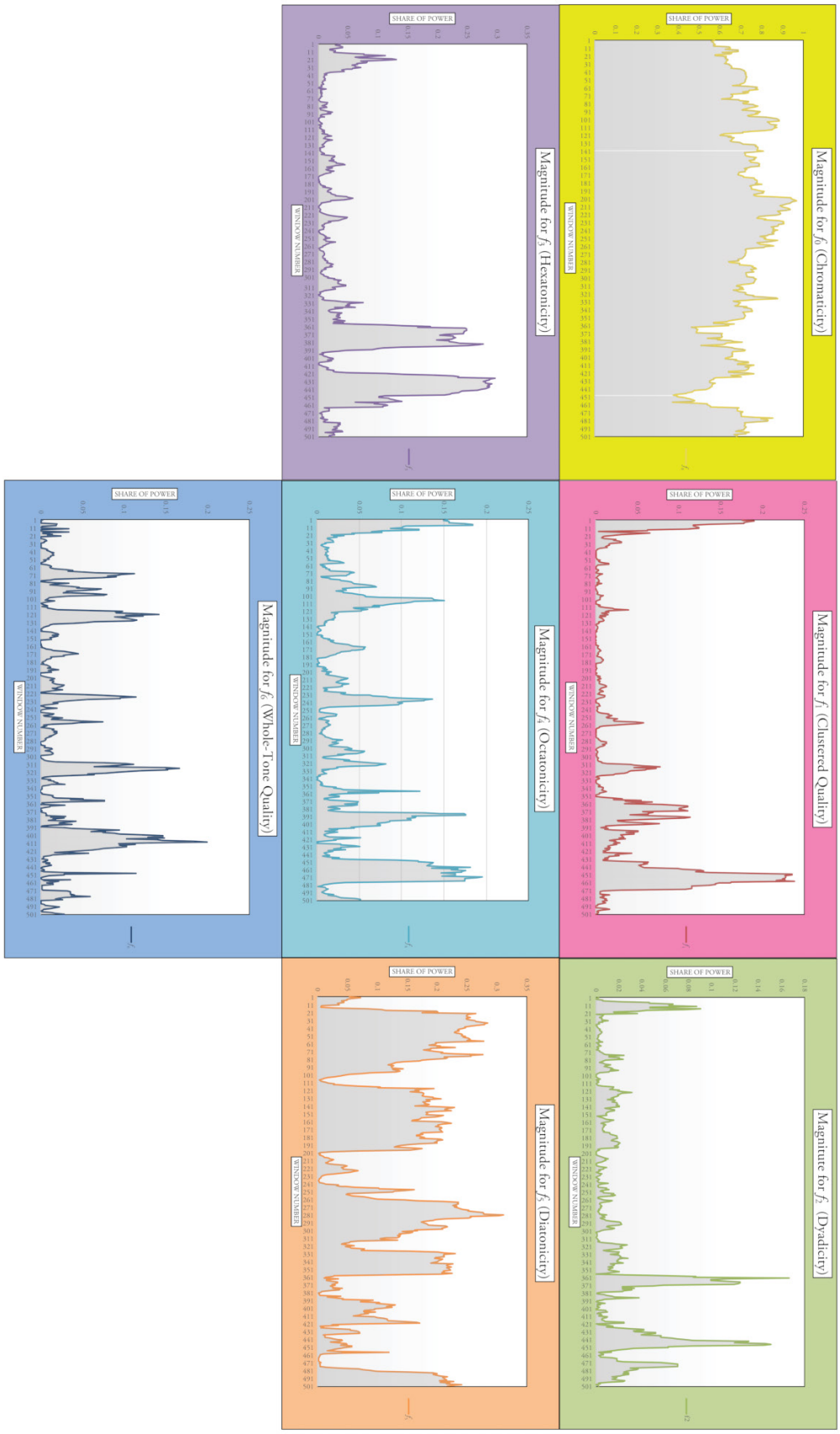
Example 15. *Domine Jesu*, form chart



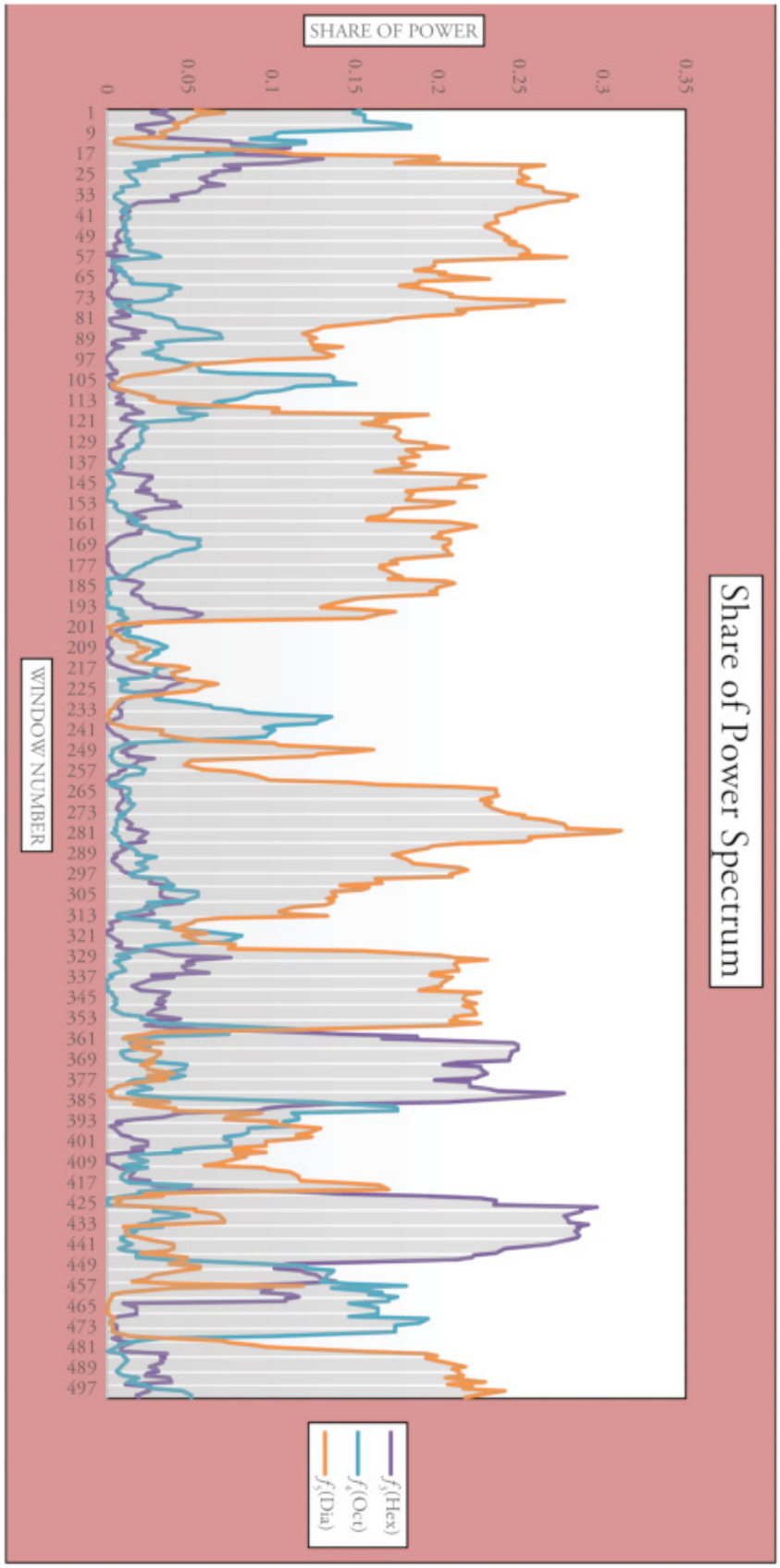
Example 16. *Domine Jesu,* magnitude values



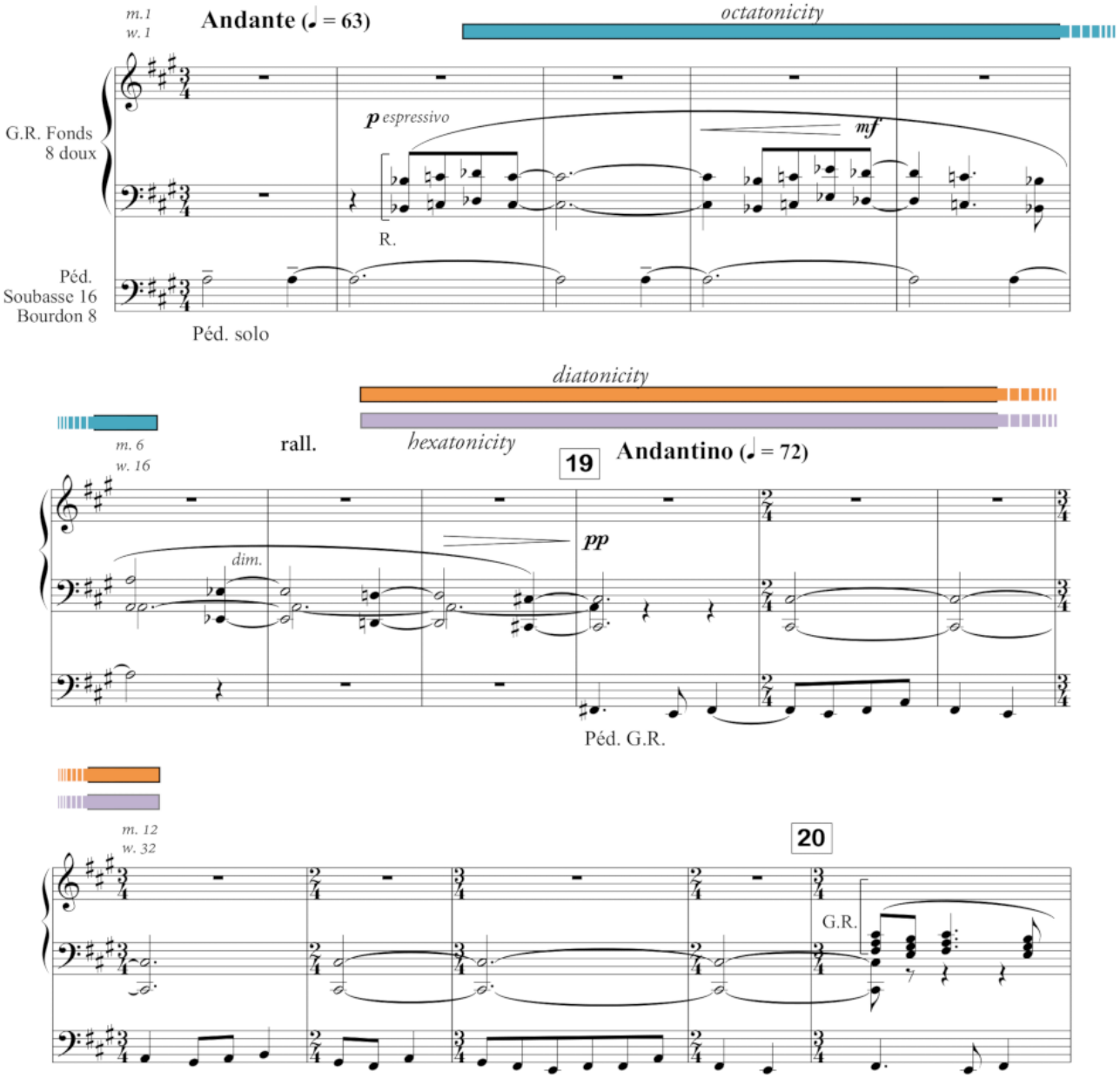
Example 17. *Domine Jesu,* share of power for f_0–f_6 (separated)



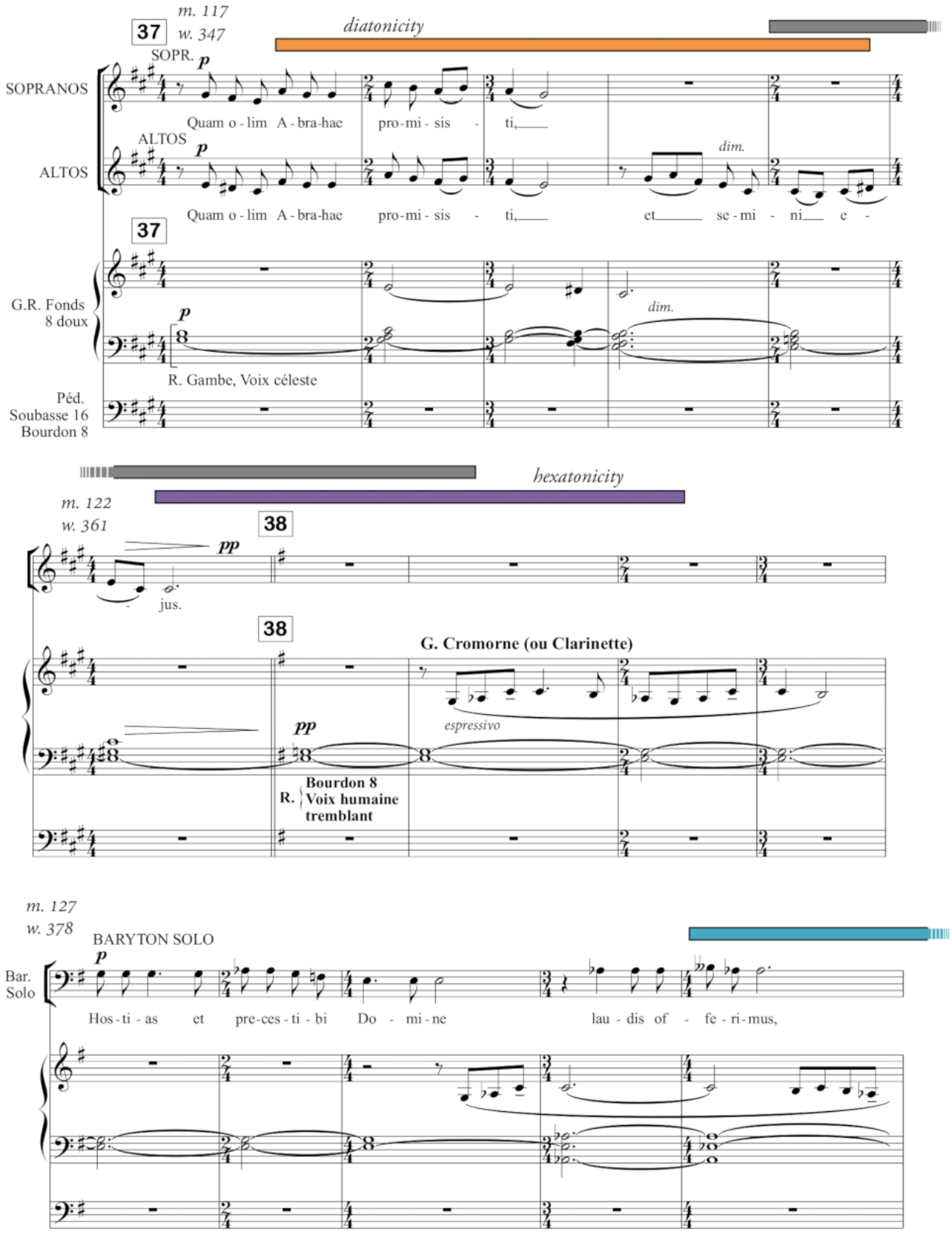
Example 18. *Domine Jesu*, share of power for f_3, f_4, and f_5 (compounded)



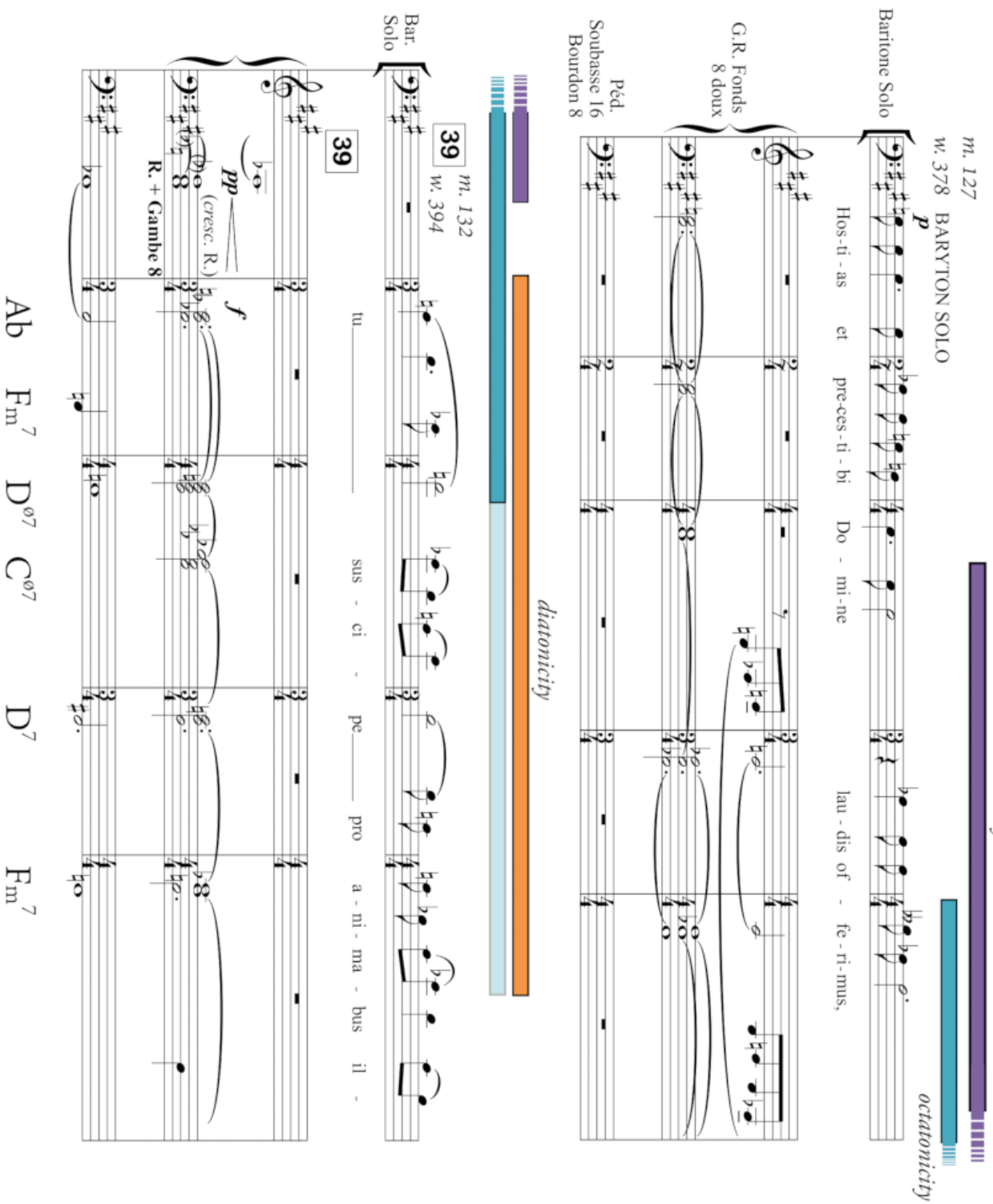
Example 19. *Domine Jesu*, mm. 1–16 (ww. 1–33)



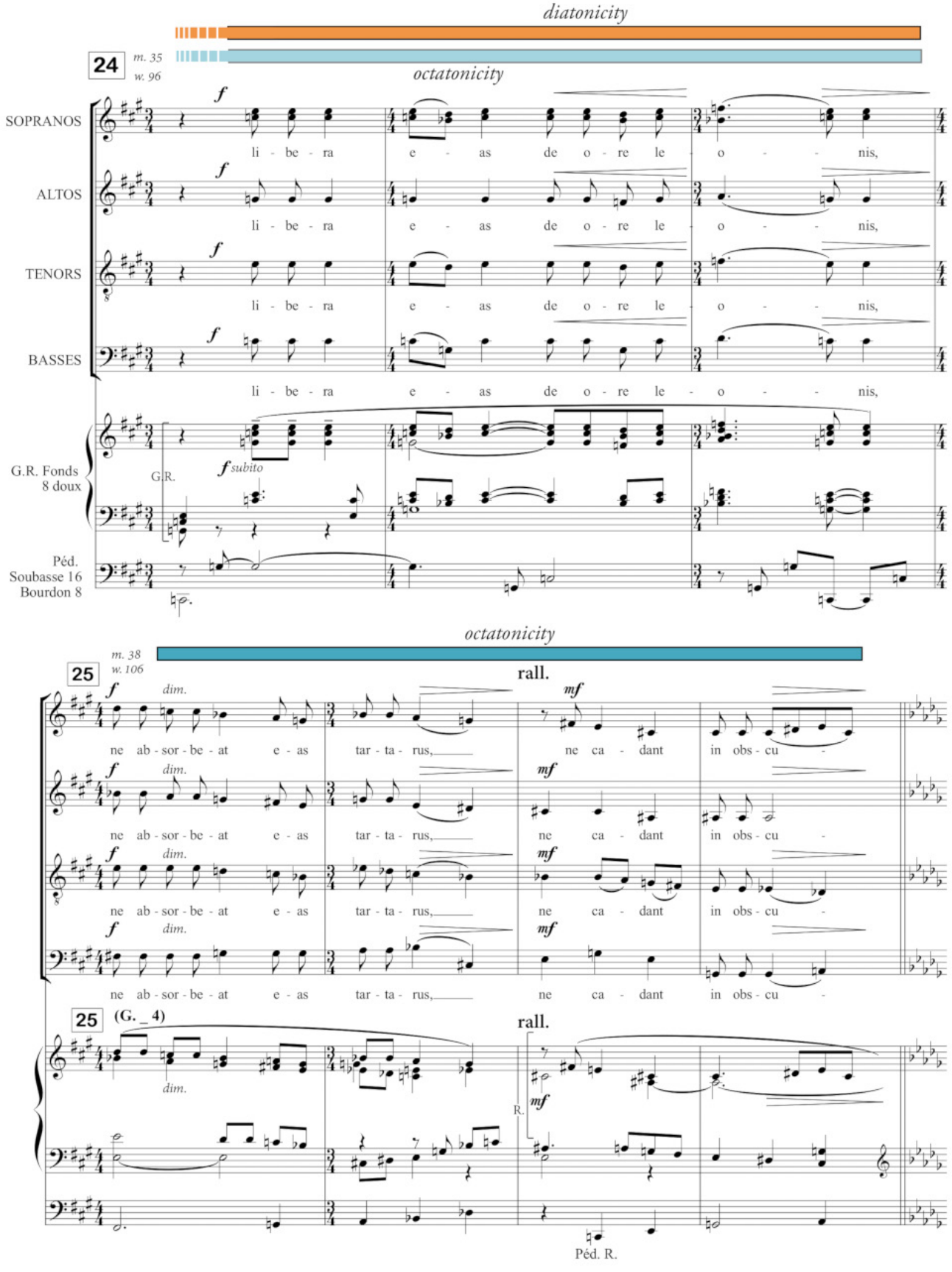
Example 20. *Domine Jesu,* mm. 117–131 (ww. 347–382)



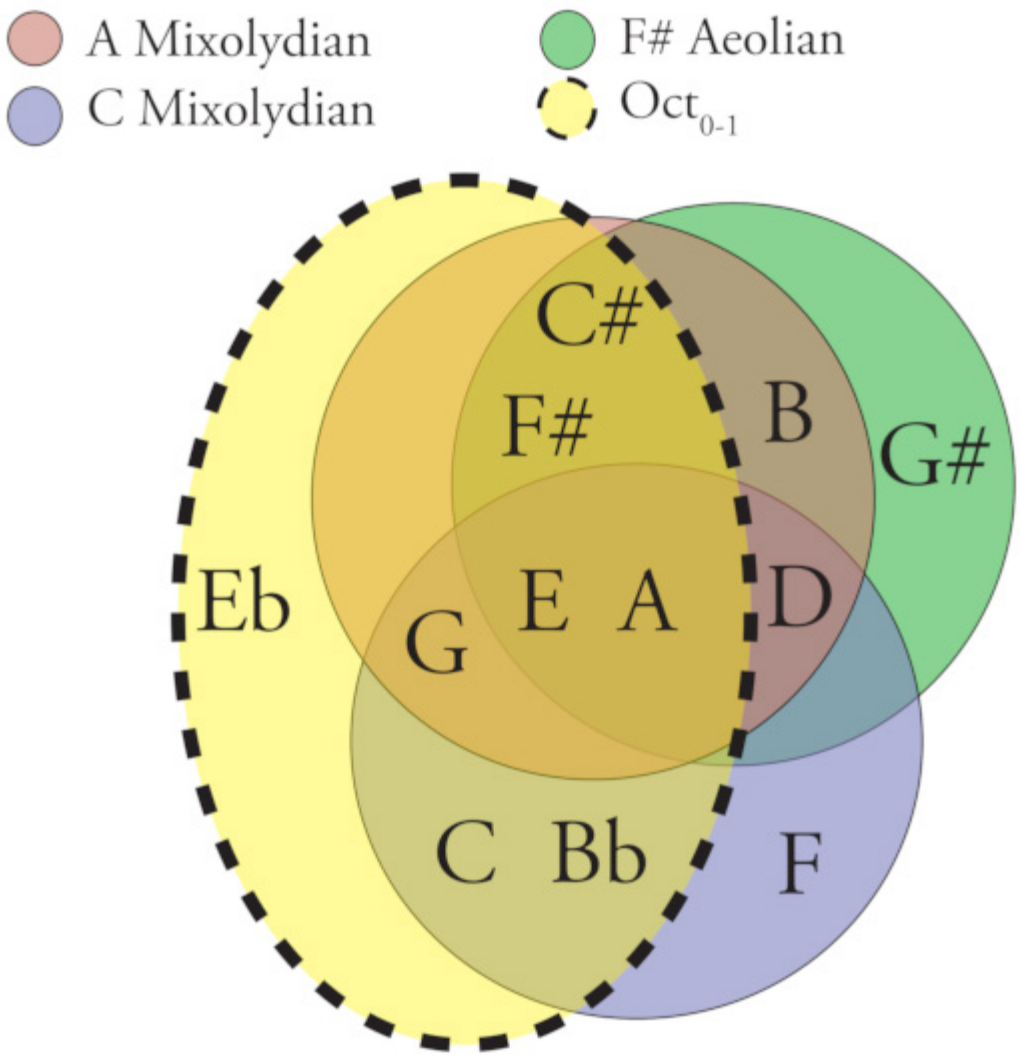
Example 21. *Domine Jesu,* mm. 127–136 (ww. 378–400)



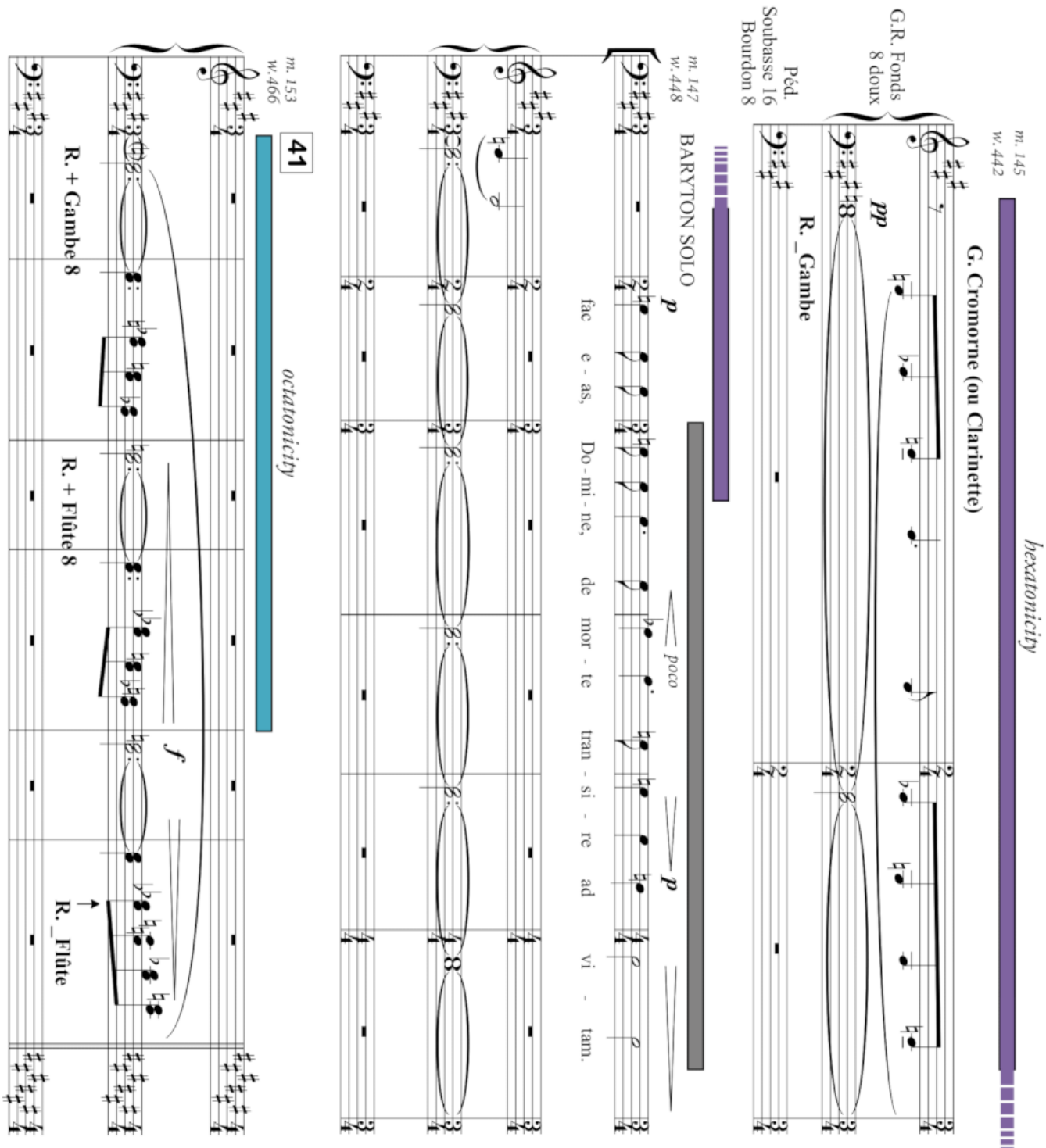
Example 22. *Domine Jesu*, mm. 35–41 (ww. 96–107)



Example 23. Macroharmonic subset relationships



Example 24. *Domine Jesu,* mm. 145–158 (ww. 442–472)



Example 25. *Domine Jesu,* mm. 159–169 (ww. 484–508)