



# **Observations on the diastematic principles in Byzantine musical notations, with emphasis on Gregorios Mpounes Alyates' method of metrophonia, and some links to analogous phenomena in Western Chant<sup>1</sup>**

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## **I. Introduction: Forms of diastematy in Byzantine Chant**

An early form of diastematy in the written tradition of Byzantine Chant has been discovered during the first decade of this century by Ioannis Papatthasiou and Nikolaos Boukas. Five Greek sources of Coptic origin, dated between the VII<sup>th</sup>-beginning of IX<sup>th</sup> century (P. Ryland Copt. 25r-29r from the John Rylands Library in Manchester), use a peculiar neumatation labeled Hermoupolis notation by the two aforementioned scholars. It is made up mainly by the oxeia-sign and its multiplications, indicating different numbers of rising seconds, always calculated from the finalis of the mode<sup>2</sup> (Ex. 1).

However, the main musical notations found in Greek manuscripts from the end of the first Christian millennium, namely the Ekphonic and the Palaeobyzantine ones, are well-known as adiastrmatic and mnemotechnic. As Constantin Floros showed with many examples, the striving towards intervallic precision can be observed mainly in the last evolutionary stages of the Coislin notation<sup>3</sup> (Ex. 2).

Alberto Doda described Middlebyzantine notation as a symbolic system, made up by "conventional signs for melodic intervals placed on a single horizontal line"<sup>4</sup>. Nevertheless, the vertical component is not

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<sup>2</sup> Cf. Papatthasiou and Boukas, "Early Diastematic Notation".

<sup>3</sup> See Floros, *Neumenkunde*, I, pp. 16-17, 311-328, and also Doda, "Coislin Notation".

<sup>4</sup> Doda, "Coislin Notation", p. 65.

missing completely from Byzantine notations: “A little bit of iconicity can, for example, be seen in the disposition of the musical signs in the notation of certain themata”<sup>5</sup> and other formulas, both in Palaeo- and Middlebyzantine notations (Ex. 3-4).

The use of a ‘verticalised pitch spectrum’ also occurs in didactic diagrams, mainly in the so-called tree of parallage (solmisation) and similar schemes (Ex. 5-6)<sup>6</sup>. Though, it is not the vertical position, but the specific sign or combination of signs which define the diastematic value of the neumes in Middle-Byzantine notation. Ex. 7 displays a comparison between the horizontally written intonation formula in the Protopapadike Petrop. gr. 495 with early Middlebyzantine neumes, and the corresponding *nonenoeane* of the *autentus protus* from the Tonaire d’Auch, with Aquitanian neumes which achieve diastemata through point-neumes displayed vertically.

Oliver Strunk described the introduction of the staff in Western notation (XI<sup>th</sup> cent.) and the crystallization of the Middlebyzantine neumes (XII<sup>th</sup> cent.) with its specific symbols for each interval, as two comparable crucial steps, with immense consequences for the later development of each musical tradition (Ex. 8).

## II. Aspects of the concept of metrophonia

Diastemata is linked in Byzantine musical theoretical tradition to the concept of *metrophonia* (see below, 1. neume-lists, 2. didactic poems and 3. treatises). *Μετρῶ φωνάς* means *to count or measure voices*, i.e. to calculate the number of intervals of a second shown by a sign, contained in a *thesis* (formula) or a phrase, or even within a whole piece.

1. In Ex. 9 one can see the famous neume-list from the Protopapadike in Petrop. gr. 495, where each interval sign is encircled together with its metrophonical value: *ison* is ‘voiceless’, *oligon* has one voice (ascending second), *oligon* with *kentema* in front of it has two voices (ascending third) etc. Similar lists (although not with circles) can be found in the Protopapadike contained in Paris. gr. 261 (A.D. 1289), f. 140r, in early Papadikai of the XIV<sup>th</sup> century, like Athens EBE 2600<sup>7</sup>, f. 3r-v, or from the Holy Monastery Lavra I 79, f. 6r-8r, which presents a very large number of combinations of signs. In the ms of the H.M. Iviron 970, an autograph of Kosmas Makedon from A.D. 1686, which contains a fine specimen of the brief redaction of the post-Byzantine Papadike, one can observe the verbalization of the metrophonic content of the

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<sup>5</sup> *ibidem*, p. 64.

<sup>6</sup> For the process of ‘verticalisation of the pitch spectrum’ in Western notation, cf. Witkowska-Zaremba, “Visual Representations”.

<sup>7</sup> For the dating of the manuscript, cf. Troelsgård, *Inventory*. For a recent description, cf. Touliatos-Miles, *Catalogue*, p. 449.

basic interval-signs: «ἔχουσι δὲ καὶ φωνάς τὸ ὀλίγον, μίαν ἢ ὀξεῖα, μίαν-ἢ πετασθῆ, μίαν [...] τὸ κέντημα, δύο» etc. (Ex. 10).

2. Passing now over to *metrophonia* in didactic poems, one can observe two categories of methods:

a) The first one contains exercises consisting of a troparion, usually from the Sticherarion, rendered only by stepwise movements, supplied with the signatures corresponding to each melodic degree, i.e. combined with the so-called *parallage* (solmisation with the polysyllabic names-formulas *ananes*, *neanes* etc.: Ex. 11).<sup>8</sup>

b) A second category of methods, lesser investigated, contains paradigmatic ascending and descending movements within diastematic frames of 1, 2, 3, 4, 7 and even 10 and 11 voices. This kind of methods can pass through the eight modes, or can stay in a single mode throughout the piece: cf. Ex. 12-13.

A step further on this way goes Gregorios Mpounes Alyates, with his method of *metrophonia*, which will be discussed below. Finally, it is Ioannes Plousiadenos who at the beginning of the post-Byzantine era makes a synthesis of previous theoretical approaches in his *Methodical parallage* or *Technology of the musical art* (Laura K 172, p. 8, XVIIIth cent. [Spyridon/Eustratiades]), which in ms Brussels IV 515, f. 11r-18r, 17-18 Jh. (Troelsgård) bears the rubric «Μεθοδική παραλλαγή, [...] πονηθεῖσα παρὰ κύρ Ἰωάννου του Πλουσιαδηνοῦ [...] καὶ τῶν φωνῶν αἰ συνθέσεις κατὰ ἀριθμὸν ἀρίστως συντεθεμένων διαφόρως τε καὶ ποικιλοτρόπως καταλεπτῶς. πῶς δεῖ ἀνέρχεσθαι μίαν, ἑτέρας κατέρχεσθαι [...]». It begins with the troparion *Ἀγίῳ Πνεύματι*, goes on with a *prooimion* whose text mentions the ‘Art and Science of Papadike’ (*Παπαδικὴ τέχνη καὶ ἐπιστήμη*), and ends with an extended method of *metrophonia*, which draws, among others, on Alyates’ similar didactic poem<sup>9</sup>.

3. a) If we turn to theoretical treatises, we can see that Gabriel Hieromonachos considers the *metrophonia* as the ‘beginning’ or ‘principle and base’ and thus a *sine qua non* of the Chanting Art: «Ἐστὶ γὰρ οἶον ἀρχὴ καὶ θεμέλιος ἢ λεγόμενη μετροφωνία. Ταύτην γὰρ καλῶς μετελθὼν ραδίως ἂν καὶ τᾶλλα τῆς ψαλτικῆς κτήσαιο· χωρὶς δὲ ταύτης οὐδὲν κατορθωκῶς εἶη ἂν ὁ ψάλτης»<sup>10</sup>.

<sup>8</sup> See also the example of the metrophonic exercise *Χορὸς τετραδεκαπύρσειτος*, in Alexandru and Troelsgård, “Σημασία”, vol. III, 1227 (plate III.2).

<sup>9</sup> Cf. Χαλδαιάκης, “Ακριβολογία Ἰωάννου Πλουσιαδηνοῦ”. Alexandrescu, “Tipuri de Gramatici”.

<sup>10</sup> Gabriel Hieromonachos, *Abhandlung*, edd. Hanick/Wolfram, pp. 90-91, verses 587-590.

b) At the beginning of the XVI<sup>th</sup> century, Akakios Chalkeopoulos gives in his *Akribologemata* different examples of metrophonical calculation. The first one is applied to the beginning of the Fourth Heothinon, Ὅρθρος ἦν βαθύς, in the fourth authentic mode<sup>11</sup>. He explains that this fragment counts 19 ascending and 19 descending voices and has to finish, according to the parallage (solmisation), in the plagal of the fourth mode (see Ex. 14). According to the same author, an incongruence between the number of ascending and descending voices can indicate a mistake in the orthography of a piece («σφαλτὸ μάθημα»), while another, correctly written fragment, has the same number of ascending and descending voices («σωστὲς ταῖς ἀνιοῦσαις φωναῖς, ὥσπερ καὶ ταῖς κατιοῦσαις»)<sup>12</sup>.

c) A new aspect of metrophonia emerges from the anonymous treatise contained in the ms Athens EBE 968 (XVII<sup>th</sup>-XVIII<sup>th</sup> cent., Zannos). On f. 177r the beginning of St. John Damascene's *sticheron* Τὰς ἐσπερινὰς ἡμῶν εὐχὰς in a setting of the new embellished style (*neos kalloprismos*) is taken as an example of explaining the 'measures' («μέτρα») of the piece, with the aid of an octachordal diagram (see Ex. 15).

It can be presumed, that the anonymous teacher had a polychord instrument (e.g. the *psalterion-kanonion*) in mind by drawing his diagrams.<sup>13</sup> In his treatise, the metrophonia is elucidated as the grasping of the basic intervallic structure of the piece. In contrast with older methods of metrophonia like *Κύριε ἐμοὶ τῷ ἁμαρτωλῷ ἔθου* (Ex. 11), no explicit reference to a stepwise rendition is made; instead, the diagram fits exactly to the intervallic signs (*emphona*) of the original piece.

d) At the beginning of the XIX<sup>th</sup> century, Chrysanthos conveys this latter aspect of *metrophonia* by using the very same example of Τὰς ἐσπερινὰς ἡμῶν εὐχὰς. He defines *metrophonia* as a kind of rendition at face value of the old neumatic text, i.e. as a melodic line made up only by the intervals indicated with the *emphona* of the Middlebyzantine notation, in a rhythmical rendition, but without extra melodic developments used in the melismatic forms of *exegesis* (see Ex. 16)<sup>14</sup>.

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<sup>11</sup> Cf. Ambrosianus A 139 sup., f. 299r (slightly different variant). *Παρακλητική*, 466.

<sup>12</sup> Cf. Athens EBE 917, f. 3r-v and the edition of Chalkeopoulos' text by Αλυγιζάκης, "Θεωρητικό", pp. 355-356, lines 55-76. For the chronology of the treatise, cf. Χατζηγιακουμής, *Χειρόγραφα ἐκκλησιαστικῆς μουσικῆς*, pp. 113-114.

<sup>13</sup> See also the triangular diagrams of the different modes contained in the ms EBE 968, f. 179v-184v.

<sup>14</sup> See also Αρβανίτης, "Ενδειξεις", 236, n. 9. Αλεξάνδρου, *Εξηγήσεις*, pp. 36-43.

### III. Gregorios Mpounes Alyates' Method of metrophonia: Steps for a critical edition in the Papadike-Project

After this brief historical survey, we will turn back to the second quarter of the XV<sup>th</sup> century and focus on Gregorios Mpounes Alyates' *Method of metrophonia*. This piece has been published after the Codex Chrysander ('not earlier than the last quarter of the XVII<sup>th</sup> cent.'<sup>15</sup>) by Oskar Fleischer, in 1904<sup>16</sup>. Below, the method will be approached in two steps: palaeographical-analytical and synchronic.

#### 1. Palaeographical-analytical approaches:

In Ex. 17 some preparing work concerning Alyates' didactic poem is presented, as part of the project of the critical edition of the Papadike, in collaboration with Christian Troelsgård<sup>17</sup>. The μέθοδος τῆς μετροφωνίας (more seldom also called μέθοδος παραλλαγῆς [ex. 17, nr. 3b and 5], presumably because of the close connection between metrophonia as stepwise counting of voices, and the solmisation system), has been appreciated in its transmission history as being 'very useful' (ὠφελιμώτατος), and 'extremely beautiful' (πάννυ ὠραία). Due to the many small differences in the choice and positioning of the big signs (megala semadia – MgS), the decision has been taken to work with a positive collation. Transnotation has been supplied to the version from one of the 'codices meliores', the Papadike ms Jerusalem Anastaseos 45, written by Antonios Megas Oikonomos in A.D. 1719 (Ex. 18)<sup>18</sup>.

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<sup>15</sup> Makris, *Tradition des Anastasimatarion*, p. 33.

<sup>16</sup> Fleischer, *Tonschrift*, Teil B, pp. 33-36.

<sup>17</sup> Cf. Alexandru and Troelsgård, "Σημασία". Id., "Development".

<sup>18</sup> We are still looking for Alyates' autograph of the piece – if possible – and for early good copies of it. In the meantime, the method has been found in the following sources (below follows a list taken from Alexandru, "Gregorios Mpounes Alyates", 44-46, enriched with some more sources): Athos, H.M. Lavra E 6, f. 9r, XVI<sup>th</sup> cent. (Spyridon/Eustratiades, *Catalogue*, p. 76, 448. Demetriou, *Sticherarion*, p. 224, note 434) // Athos, H.M. Iviron 1009 (665), f. 12r-v, XVI<sup>th</sup> cent. (Λάμπρος, *Κατάλογος*, II, p. 245) // Σιάτιστα, Δημόσια Βιβλιοθήκη: Siatistas 27, after f. 1r, 1<sup>st</sup> half-middle of XVII<sup>th</sup> cent. (Γιαννόπουλος, *Ταμειον χειρογράφων*, p. 32) // Athens, EBE 941, f. 16v-28r, XVII<sup>th</sup> cent. (Σακελλίων: Troelsgård, *Inventory*. Touliatos-Miles, *Catalogue*, 142) // Athos, H.M. Lavra K 188 (nr. 1475), pp. 3-4, XVII<sup>th</sup> cent. (Spyridon/Eustratiades, *Catalogue*, p. 254. Troelsgård, *Inventory*) // Athos, H.M. Iviron 1008 (663), f. 4v-5r, XVII<sup>th</sup> cent. (Λάμπρος, *Κατάλογος*, II, p. 245) // Athos, H.M. Iviron 951, f. 3v, 2<sup>nd</sup> half of XVII<sup>th</sup> cent., autograph by Germanos Neon Patron (Στάθης, *Χειρόγραφα Ἁγίων Ὁσίων*, vol. III, p. 642-643) // Athos, H.M. Karakallou 237, f. 18v, 2<sup>nd</sup> half of XVII<sup>th</sup> cent. (Στάθης, *op. cit.*, vol. III, p. 463) // Sinai 1300, f. 10r, A.D. 1670, autograph by Kosmas Alektryopolites (Μπαλαγεώργος/Κρητικού, *Χειρόγραφα Σινᾶ*, vol. I, p. 436, 438) // Athos, H.M. Panteleimonos 1008, f. 15v, last quarter of XVII<sup>th</sup> cent., autograph by Mpalasios hiercus (Στάθης, *op. cit.*, vol. II, p. 418) // Athos, H.M. Iviron 1006 (665),

f. 12r-v, "at least 2<sup>nd</sup> half of XVII<sup>th</sup> cent." (Troelsgård, *Inventory*) // Athos, H.M. Panteleimonos 959, f. 12r, end of XVII<sup>th</sup> cent. (Στάθης, *op. cit.*, vol. II, p. 291) // Idra, Prophitou Iliou 597 (33), f. 10v, end of XVII<sup>th</sup> cent. (Χαλδαϊάκης, *Χειρόγραφα Ὑδρα*, pp. 75-76) // Tübingen Universitätsbibliothek, Codex Chrysander, ❖ facsimile in Fleischer, *Tonschrift*, Part B, pp. 33-36, XV<sup>th</sup> cent. (Floros, *Universale Neumenkunde*, vol. I, p. 112)/end of XVII<sup>th</sup> cent. or later (Makris, *Tradition des Anastasimatarion*, p. 33) // Athos, H.M. Lavra K 188, after f. 1r, XVII<sup>th</sup> cent. (Spyridon/Eustratiades, *Catalogue*, p. 254, 448) // Meteora, Ag. Triados 37, f. 26r, end of XVII<sup>th</sup> cent. (Στάθης, *Χειρόγραφα Μετέωρα*, p. 493, 497 and facsimile of f. 26r on p. 498) // Athos, H.M. Koutloumousiou 449, f. 6v, end of XVII<sup>th</sup> cent.-around A.D. 1700, autograph by Daniel monachos (?) (Στάθης, *Χειρόγραφα Ἅγιον Ὅρος*, vol. III, p. 330) // Jerusalem, Patriarchate, ms without number, f. 8v-9r, late XVII<sup>th</sup>/first half of XVIII<sup>th</sup> cent. (M.A.; Troelsgård, *Inventory*, MMB 17,07) // Lesbos, H.M. Leimonos 459, f. 7r-v, around A.D. 1700, autograph by Παῦλος ἱερέυς (?) (Χατζηγιακουμής, *Χειρόγραφα Τουρκοκρατίας*, pp. 99, 360) // Lesbos, H.M. Leimonos 238, f. 12r-v, around A.D. 1700, written by pupil of Kosmas Makedon and Damianos hieromonachos Vatopedinos, (Χατζηγιακουμής, *op. cit.*, pp. 109-110, 360) // Bruxelles, Bibliothèque royale IV 515, f. 18r-v, XVII<sup>th</sup>-XVIII<sup>th</sup> cent. (Troelsgård, *Inventory*) // Sinai 1298, f. 13r, beginning of XVIII<sup>th</sup> cent., autograph by pupil of Mpalasios hierous (Μπαλαγεώργος/Κρητικού, *Χειρόγραφα Σινᾶ*, vol. I, pp. 395-396) // Sinai 1299, f. 12r, A.D. 1715, autograph by Ἀθανάσιος ἱερομόναχος ἐκ Μουδανιῶν (Μπαλαγεώργος/Κρητικού, *op. cit.*, vol. I, pp. 407-408) // Jerusalem, Patriarchate, Anastaseos, Abraham 45, f. 13v-14r, A.D. 1719, autograph by Ἀντώνιος μέγας οἰκονόμος (Troelsgård, *Inventory* and colophon of the ms, f. 8v) // Athos, H.M. Panteleimonos 1019, f. 11r, about A.D. 1720-1740 (Στάθης, *Χειρόγραφα Ἅγιον Ὅρος*, vol. II, p. 452) // Andros, Korthiou 10, f. 7r, about A.D. 1725-40 (Γιαννόπουλος, *Χειρόγραφα Ἄνδρου*, p. 67, 95) // Athos, H.M. Lavra E 132, f. 7v-8r, A.D. 1733 (Spyridon/Eustratiades, *Catalogue*, p. 88) // Athos, H.M. Lavra E 128, f. 8v-9r, A.D. 1741 (Spyridon/Eustratiades, *Catalogue*, p. 88) // Athos, H.M. Lavra M 93 (nr. 1784), f. 9r-v, A.D. 1728, autograph by Ioannes Lampadarios (the later Protopsaltes, Trapezountios) (Χατζηγιακουμής, *Χειρόγραφα Τουρκοκρατίας*, pp. 157-158 and table 66. Troelsgård, *Inventory*) // Athos, H.M. Iviron 987, f. 6v, after A.D. 1731 (Στάθης, *Χειρόγραφα Ἅγιον Ὅρος*, vol. III, pp. 827-828) // Meteora, Ag. Stephanou 52, f. 8v, A.D. 1743, autograph by Ioannes Protopsaltes Trapezountios (Στάθης, *Χειρόγραφα Μετέωρα*, p. 354, 356) // Meteora, Ag. Stephanou 19, f. 22r, 1st half of XVIII<sup>th</sup> cent. (Στάθης, *op. cit.*, pp. 279, 281) // Athens, EBE 893, f. 13r-v, A.D. 1747, autograph by David Skopelites (Χατζηγιακουμής, *Χειρόγραφα ἐκκλησιαστικῆς μουσικῆς*, pp. 165-166. Troelsgård, *Inventory*). // Athos, H.M. Dionysiou 581, f. 1r, middle of XVIII<sup>th</sup> cent. (Στάθης, *Χειρόγραφα Ἅγιον Ὅρος*, vol. II, p. 736) // Athos, H.M. Iviron 998, f. 6r, middle of XVIII<sup>th</sup> cent. (Στάθης, *op. cit.*, vol. III, p. 899) // Athos, H.M. Koutloumousiou 397, f. 8r, middle of XVIII<sup>th</sup> cent. (Στάθης, *op. cit.*, vol. III, p. 228) // Jerusalem, Patriarchate, Anastaseos, Abraham 85, beginning of the ms, A.D. 1754 (Παπαδόπουλος-Κεραμεύς, *Βιβλιοθήκη*, vol. V, p. 436. Demetriou, *Sticherarion*, p. 224, note 434) // Athos, H.M. Koutloumousiou 446, f. 7r, A.D. 1757, autograph by Theokletos monachos (Στάθης, *op. cit.*, vol. III, p. 313) // Athos, H.M. Iviron 983, f. 2r, A.D. 1762 (Στάθης, *op. cit.*, vol. III, pp. 806-807) // Athos, H.M. Xiropotamou 307, f. 13r, A.D. 1767 & 1770, autograph by Αναστάσιος Βάϊας (Στάθης, *op. cit.*, vol. I, pp. 106-107) // Σουρωτή Θεσσαλονίκης, Ήσυχαστήριο «Ἅγιος Ἰωάννης ὁ Θεολόγος καὶ Ἅγιος

In Ex. 19.a-f a polyprismatic analytical approach is carried out, investigating the form, the metrophonical frames, cadences, formulas, ambitus and contours of the melodic phrases.<sup>19</sup> The piece exposes at its very beginning the heptaphony G-g, then it moves within the frame of the tetraphony G-d, giving many possibilities of filling in this interval (Ex. 19.a). The third period moves within the triphony G-c (Ex. 19.b) and the frame is shrunk to the dipphony G-h and ‘monophony’ G-a in the next two periods (ex. 19.c). The structural frame is enlarged again to a third and a fourth in the periods VI and VII, respectively (Ex. 19.d). Further formulas are given for the tetraphony G-d in the period VIII (Ex. 19.e), and towards the end of the piece, after the lowest point of the piece, D, has been heard, there is a spectacular climax on high a’, in the frame of hendecaphony (Ex. 19.f).

A macroformal and generative analysis of Alyates’ *Method of metrophonia* (see Ex. 20.a) shows the structural background of the piece, made up by the following intervals, used as frames for multiple fillings-in: octave, fifth, fourth, third, second, third, fourth, fifth, octave, fourth, undecime, second+fourth+fifth+fourth=duodecime, fourth, second, fourth (first staff on Ex. 20.a). On the bottom of the same example there is an attempt of modeling a kind of ‘Ursatz’ of this piece on the ground of the *ison* G. One can observe the mirror-symmetries around the center of the piece, where the one voice ‘μῖα’, i.e. the interval of a second is presented (kola 36-44), as well as the climax towards the end of the piece (kola 70-71): Ex. 20.b.

Shifting from the macroformal approach to a microsyntactical one, the next example (Ex. 21.a-g) shows the formulas displayed by Alyates for the frame of dipphony (kola 26-35 and 45-48). Each kolon contains: 1. the neumes after Jerus. Anast. 45, with the identification of the theseis above, 2. a generative analysis (whole tones = structural notes), 3. an attempt of transcription-syllabic rendition mainly in binary feet,

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Ἀρσένιος ὁ Καππαδόκης»: Sourotis 22, f. 11r, about 1770 or slightly later, autograph by Kyrillos hieromonachos (Γιαννόπουλος, *Ταμείον χειρογράφων*, pp. 86-87) // Meteora, Metamorphoseos 329, f. 3v-4r, about A.D. 1775, autograph by Parthenios Meteorites (?) (Στάθης, *Χειρόγραφα Μετέωρα*, p. 155) // Athos, H.M. Lavra I 184, after f. 1r, XVIIIth cent. (Spyridon/Eustratiades, *Catalogue*, p. 210, 448. Demetriou, *Sticherarion*, p. 225 note 427) // Athos, H.M. Vatopaidiou 1440, f. 4r-v, XVIIIth cent. (Catalogue of the Monastery: cf. Troelsgård, *Inventory*) // Athens, Byzantine Museum 56, f. 23-v, XVIIIth cent.? (Troelsgård, *Inventory*. Date estimation according to musical notation of f. 1r-5v, M.A.) // Lesbos, H.M. Leimonos 8, f. 17v-18r, end of XVIIIth cent. (Χατζηγιακουμής, *op. cit.*, pp. 155-156, 360) // Athens, Byzantine Museum 153 (Adrianople 1158), f. 12v, 18th-beginning XIXth cent. (Troelsgård, *Inventory*. Date according to Δ. Πάλλας and M.A.) // Petropolitanus gr. 132, f. 27r, A.D. 1858 (Demetriou, *Sticherarion*, p. 224, note 418).

<sup>19</sup> For further details on this kind of analysis, cf. Alexandru, “Χριστέ ὁ Θεός”.

according to research conducted by Ioannis Arvanitis.<sup>20</sup> Further investigations should be carried on, in order to reconstruct also a slow exegesis for this method.

## **2. Synchronic approach through composition and singing**

A major problem connected not only to Alyates', but also to the other didactic songs contained in the Papadike, concerns their performance practice through history. In order to explore this main aspect of Alyates' *Method of metrophonia*, a synchronic approach through composing and singing has been attempted. The structural melody resulted by the intervallic frames of the *Method* (see Ex. 20.a, the first staff) has been given to a traditional singer-teacher, namely to prof. Ioannis Liakos, Protopsaltis of the Metropolitan Cathedral St. Gregory Palamas in Thessaloniki, in order to freely create a composition for his pupils, showing paradigmatic ways of filling-in these structural frames, according to nowadays practice (see Ex. 22-23). Both the resulted exercise and its performance by the aforementioned protopsaltis can help us to approach somehow the frame of mind in which such exercises might have been composed, performed and taught to the pupils. The same experiment could continue also with other singers-teachers.

## **IV. Conclusions**

Diastemata in Byzantine Chant is a highly interesting phenomenon, connected to different kinds of notation and achieved through different procedures. As shown in the pages above, the earliest form of diastemata seems to have been connected to the Hermoupolis notation and operates mainly with the *oxeia*-sign (number of *oxeiai* indicates number of rising seconds from the finalis of the mode: cf. part I and Ex. 1).

Western notation found its main path toward diastemata with the 'verticalization' in the lay-out of the neumes and the introduction of the staff during the XI<sup>th</sup> cent.

In the East, the XII<sup>th</sup> century witnessed the crystallization of the Middle-Byzantine notation, characterized by a highly refined system of diastemata, which is achieved through concrete combinations of the basic interval signs known as *emphona*. Although symbolic in its way of representation and mainly horizontally displayed, the Byzantine notation makes also a restricted use of 'verticalized' pitch-space, e.g. in *themata* and other formulas of the Palaeobyzantine and

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<sup>20</sup> Cf. Arvanitis, "Way". Id., "Δομή". Id., "Ενδειξεις". Id., *Πυθμός*.



Middlebyzantine notation, the *Tree of parallage* and similar diagrams of the latter notation (cf. part I and Ex. 2-8).

A key-concept connected to diastematy in Middlebyzantine notation is the *metrophonia*.

In its historical evolution, it shows several layers of semantic implications:

❖ In neume-lists, *metrophonia* is connected to the number of ‘voices’ (*phonai*), i.e. intervals of seconds for each neume (cf. part II.1 and Ex. 9-10).

❖ In didactic poems, namely in stichera which have been transformed into methods of *metrophonia*, the whole pieces go only with stepwise movements, and can be sung together with the *parallage* (solmisation: *ananes, neanes...*), or with the hymnographic text written below the neumes (cf. part II.2.a and Ex. 11.a-f). Other *metrophonia* methods, in different degrees of difficulty, display a wealth of *theseis*-melodic formulas within structural frames of the second, third, fourth, fifth, octave, undecime and duodecime, involving both stepwise movements and skips (cf. part II.2.b and III and Ex. 12, 13.a-b, 19.a-f).

❖ In theoretical treatises, *metrophonia* is praised as the base of the psaltic art (Gabriel Hieromonachos: cf. part II.3.a); it can be also connected to the counting of the total number of ascending and descending ‘voices’ within a fragment or a piece, as a means of checking its correctness (Akakios Chalkeopoulos: cf. part II.3.b and Ex. 14). In late post-Byzantine tradition it is associated with the grasping of the structural intervals of a piece, with the aid of a *kanonion* with eight strings-measures (Anonymus in Athens EBE 968: cf. part II.3.c and Ex. 15), and Chrysanthos explains *metrophonia* as a syllabic and rhythmic rendition of the old notation which can serve as a preparation for long melismatic *exegesis* (cf. part II.3.d and Ex. 16).

Gregorios Mpounes Alyates’ *Method of metrophonia*, one of the most complex samples of this type of didactic pieces (cf. part III and Ex. 17-23), can be contextualized within the large corpus of theoretical writings as drawing on the different kinds of neume-lists (especially the *emphona*) of the Papadike, on the older methods of *metrophonia* like the one by Xenophon (Xenos Korones), and also, in its larger conception, on the *Mega Ison* by St. John Koukouzeles. In its turn, Alyates’ *method of metrophonia* inspired Ioannes Plousiadenos in his poly-synthetic *Μεθοδική παραλλαγή* (Ex. 24).

From the evidence listed above, *metrophonia* emerges as a basic tool connected with the understanding of the diastematic structure written down with the *emphona* of Middlebyzantine notation. Intimately connected to the old form of *parallage* (the complex medieval solmisation system), it belonged to the prerequisites of good chanting,

without being its essence, which lied in the adequate rendition of the pieces according to oral tradition<sup>21</sup>.

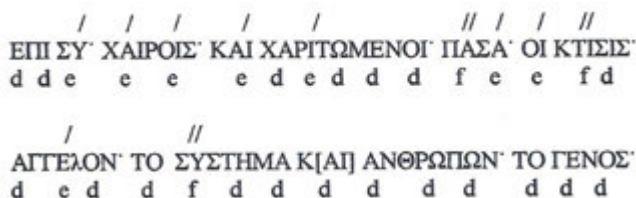
When in 20th of March, A.D. 1719, the Presbyter Antonios, Great Oikonomos of the Great Church finished his Papadike in the ms Jerus. Anast. 45, one of our 'codices meliores', he putted in head of his kolophon the following twelve-syllable verses (f. 8v): «τῷ μουσικῆν ἔνθεον προθυμουμένῳ / ὀρθῶς μαθεῖν, καὶ μουσόληπτος φῆναι, / συντόμως τήνδε μετιέτω τὴν βιβλόν»<sup>22</sup>, touching thus on the main role of the Papadike as a theoretical text: to facilitate the correct and quick learning, as well as the singing with musicality of the divine chants.

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<sup>21</sup> See Ex. 16 and part II.3. in this paper.

<sup>22</sup> "To the one who is eager to learn in the right way the divine music and to sing with musicality, I wish that he should quickly go through this book".

## V. Examples

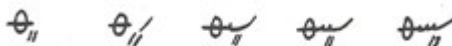


**Example 1. The beginning of the theotokion *Ἐπί σοι χαίρει, Κεχαριτωμένη*, from P. Ryland Copt. 25r, 7<sup>th</sup>-beginning of IX<sup>th</sup> cent., with early diastematic notation.**

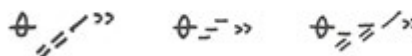
Above the text: neumes of the Hermoupolis notation, below a transnotation into alphabetical notation.

(Source: I. Paphanasiou and N. Boukas, “Early Diastematic Notation in Greek Christian Hymnographic Texts of Coptic Origin. A Reconsideration of the Source Material”, in *Palaeobyzantine Notations III. Acts of the Congress held at Hernen Castle, The Netherlands, in March 2001*, edited by G. Wolfram, *Eastern Christian Studies* 4 [2004], 17).

Thematismos (Coislin I-IV)



Thematismos (Coislin V-VI)

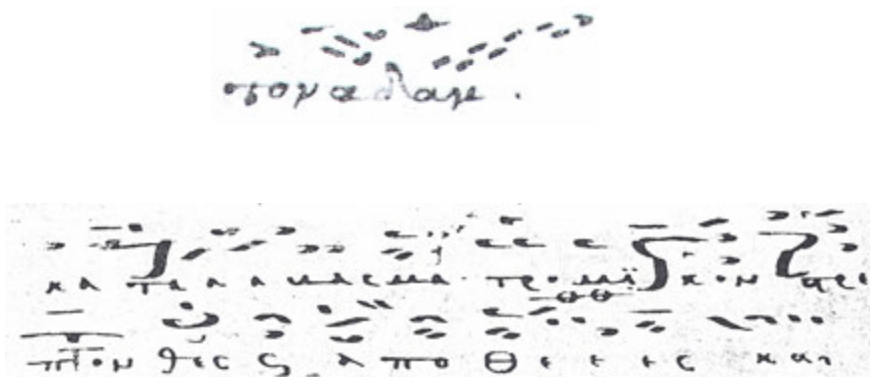


Thematismos (Middlebyzantine notation)



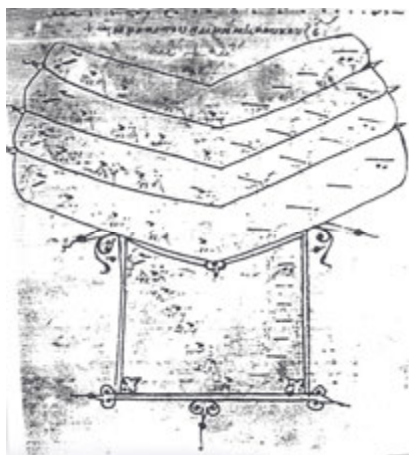
**Example 2. The case of thematismos, from Palaeobyzantine adiastematic to Middlebyzantine diastematic notation.**

(Sources: C. Floros, *Universale Neumenkunde* [Kassel: Bärenreiter-Antiquariat Kassel-Wilhelmshöhe, 1970], vol. 3, p. 48. Ms Athens EBE 2458, f. 3r, A.D. 1336, fragment of the *Mega Ison* by St. John Koukouzeles [from microfilm of the collection of the Monumenta Musicae Byzantinae, Copenhagen]. For a description and some plates of this ms see Γρ. Στάθης, “Ἡ ἀσματική διαφοροποίηση ὅπως καταγράφεται στὸν κώδικα EBE 2458 τοῦ ἔτους 1336”, in *Χριστιανική Θεσσαλονίκη. Παλαιολόγειος ἐποχή*, ΚΒ΄ Δημήτρια, Ἐπιστημονικὸ Συμπόσιο, Πατριαρχικὸν Ἴδρυμα Πατερικῶν Μελετῶν, Ἱερὰ Μονὴ Βλατάδων, 29-31 Ὀκτ. 1987, Κέντρο Ἱστορίας Θεσσαλονίκης τοῦ Δήμου Θεσσαλονίκης, αὐτοτελεῖς ἐκδόσεις 3 [Θεσσαλονίκη, 1989], pp. 169-188, 200-207).



**Examples 3-4. Although the Byzantine neumes are usually placed on a horizontal line, a vertical component is discernible in the disposition of certain neumes in Palaeobyzantine and Middlebyzantine notations.**

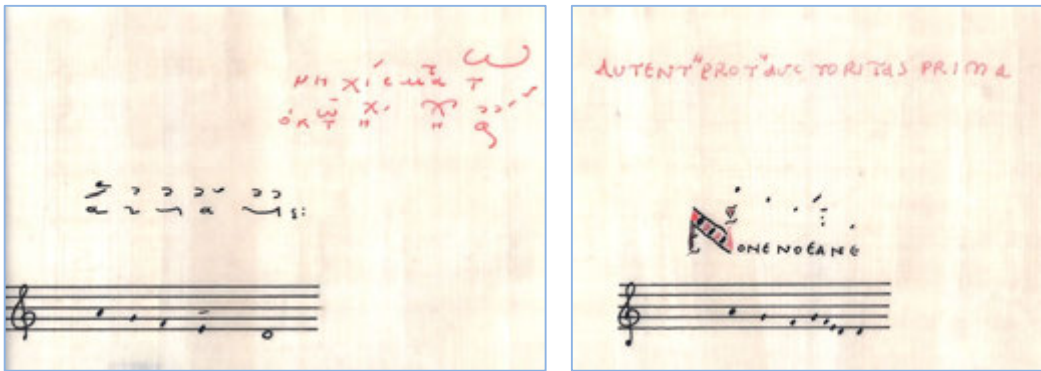
(Sources: Above: Vind. theol. gr. 136, f. 228v, first half of XII<sup>th</sup> cent., Coislin V, from the edition by Gerda Wolfram, *Sticherarium Antiquum Vindobonense*, MMB Série principale 10, Pars Principalis [Vienna: Verlag der Österreichischen Akademie der Wissenschaften]. ❖ Below: Fragment from St. John Koukouzeles' *Mega Ison*, from ms Athens EBE 2458, f. 3r, A.D. 1336, [from microfilm of the collection of the Monumenta Musicae Byzantinae, Copenhagen]).



**Examples 5-6. Examples of ‘verticalised pitch spectrum’ in Byzantine tree-diagrams.**

(Sources and notes: Left: Ms H.M. Dionysiou 570, f. 79v, scribe Ioannes Plousiadenos, end of XV<sup>th</sup> cent., description of the ms by Γρ. Στάθης, *Τὰ χειρόγραφα βυζαντινῆς μουσικῆς. Ἅγιον Ὅρος* [Αθήνα: IBM, 1976], τ. Β', 698, 703. Note the descending and ascending scale in the frame of an octave in the lower part of the diagram. ❖

Right: Ms Gennadius 23, f. 11v, A.D. 1713, facsimile from: Rev. Konstantinos Terzopoulos, “Hidden in Plain Sight: Musical Treasures in the Gennadius Library. Byzantine Repertories and a Snippet of Modern Greek History”, in *Hidden Treasures at the Gennadius Library*, The Gennadius Library, American School of Classical Studies at Athens, *The New Griffon* 12 [2011], fig. 13. For the notion of ‘verticalised pitch spectrum’, cf. footnote 6 in this article).



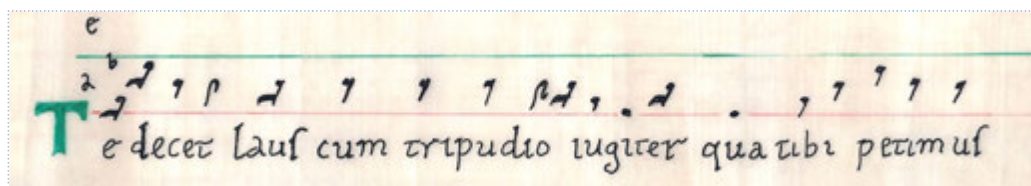
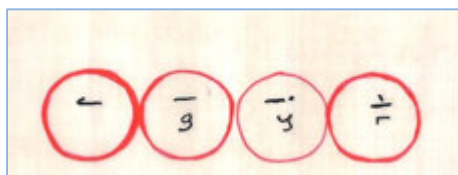
**Example 7. Diastemata in East and West (I):**

**Left: Middle Byzantine notation: diastemata by designing for each interval its own, symbolic sing/combination of signs, displayed horizontally.**

**Right: Aquitanian neumes: diastemata through point-neumes displayed vertically.**

(Sources and notes: Left: upper roads: the intonation formula of the first authentic mode, copied from the Protopapadike Petrop. gr. 495, f. 4r, second half of XIII<sup>th</sup> cent.: cf. facsimile in Evgeny Vladimirovich Gertsman, *Petersburg Theoreticon* [Odessa: Variant Publishers, 1994], p. 230 and plate LVII; on staff: transnotation. ❖

Right: upper roads: the intonation formula of the first authentic mode, copied from the Tonaire d'Auch, Bibliothèque nationale de France, Ms latin 1118, f. 104r, A.D. 990: cf. facsimile in C. Massip, *Le livre de musique*, Conférences Léopold Delisle [Paris: Bibliothèque nationale de France, 2007], p. 42, table 10. See also David Hiley, "Diastematic", *New Grove Dictionary of Music*. Version html [thanks to Miss A. Karanikola for her help]. I. Παπαθανασίου, *Εγχειρίδιο Μουσικής Παλαιογραφίας. Πρώτη ενότητα. Δυτικές νευματικές σημειογραφίες* [Αθήνα: Διογένης, Αθήνα 2002], 89; on staff: transnotation: see J. Raasted, *Intonation formulas and modal signatures in Byzantine musical manuscripts*, MMB, Subsidia VII [Copenhagen: Munksgaard, 1966], 154).



### Example 8. Diastemata in East and West (II):

From the period of the adoption of Middle Byzantine notation (“could have begun during the 1<sup>st</sup> first half of the XII<sup>th</sup> cent.” [Papathanasiou] /about 1150 [Troelsgård], until 1814, “the notation used in the transmission of Byzantine chant underwent no radical change. With the general acceptance of the diastematic principle at the very beginning of this long time-span, Byzantine musicians had taken a crucial step, a step no less crucial than the analogous one taken in the West at a somewhat earlier date” (Guido d’Arezzo’s reform, ca A.D. 1030), “and once this crucial step had been taken, there could be no turning back”

(Sources: quotations from O. Strunk, *Specimina notationum antiquiorum*, MMB VII, Pars Suppletoria [Copenhagen: Munksgaard, 1966], 1. See also I. Papathanasiou, “The musical notation of the Sticherarion MS Vat. Barb. gr. 483”, in *Byzantine Chant. Tradition and Reform*, Acts of a Meeting held at the Danish Institute at Athens, 1993, ed. C. Troelsgård, Monographs of the Danish Institute at Athens [Athens, 1997], vol. 2, 53-67. See further the entry “Notation”, § III,1,v,b, in *New Grove Dictionary of Music*, Version html. ❖

For the picture above: copy from the list of the ascending intervallic signs from the Protopapadike Petrop. gr. 495, f. 2v, second half of the XIII<sup>th</sup> cent.: cf. facsimile in Evgeny Vladimirovich Gertsman, *Petersburg Theoreticon* [Odessa: Variant Publishers, 1994], plate LIV.

❖ For the picture below: fragment copied from the ms BnF latin 10508, f. 6r, XII<sup>th</sup> cent., from the Benedictine Abbey Saint-Évroult d’Ouche, with “french neumes of the second epoch”, and lines [added afterwards]: dry-point lines with letter-clefs a and e [la, mi] and coloured lines in red [F-Fa] and in green [c-do]: see facsimile and description in C. Massip, *Le livre de musique*, Conférences Léopold Delisle [Paris: Bibliothèque nationale de France, 2007], p. 21 and 41, tab. 9. See also “Notation”, § III,1,v,b, *New Grove Dictionary of Music*, Version html).





**Example 9. Metrophonia in neume-lists: the content of ‘voices’ of each interval sign (*emphonon*) according to the Protopapadike in Petrop. gr. 495, f. 2v-3r, a copy by Neophytos Hieromonachos from Damascus, 2nd half of XIIIth cent.**

(Sources: Evgeny Vladimirovich Gertsman, *Petersburg Theoreticon* [Odessa: Variant Publishers, 1994], plates LIV-LV. See also M. Alexandru and Chr. Troelsgård, “Η σημασία της Παπαδικής λεγόμενης προθεωρίας για την έρευνα της βυζαντινής και μεταβυζαντινής μουσικής”, in Πρακτικά του ΣΤ’ Διεθνούς Συμποσίου Ελληνικής Παλαιογραφίας [Δράμα, 21-27 Σεπτεμβρίου 2003], edd. Β. Άτσαλος and Ν. Τσιρώνη, Ελληνική Εταιρεία Βιβλιοδεσίας, Αθήνα 2008, vol. II, pp. 563-564 and III, pp. 1224-1225).

σὺν τὸ μοσ κέρμοις :- ὅμοιοι ἢ κέρμοις.  
 Ἰὸ ὀλιγον, μίαν· ἢ ὀξεία, μί· ἢ πεπτασθῆ, μί· ὀξεία.  
 φρεμα, μίαν· το πεπτασθῆ μίαν· το κέντημα, δύο.  
 ταδὺ κέρμοις, μί· ἢ κέρμοις, ἢ ὀξεία, ὀξεία.  
 ερφορ, μί· ἢ ὀξεία ἀπὸ ερφορ μίαν·  
 το ἔλαφρον, μί· ἢ ἄπορρω, δύο· ἢ χαμηλῆ,  
 ἢ ἄπορρω, το κράτημα ὑπόρροον δύο·  
 ἢ τούτοις τοῖς σημάδιοις ἀνέρχεται καὶ κέρμοις  
 πᾶσα ἢ μελωδία τῶν ψαλμικῶν τέχνης ἐν

**Example 10.** The verbalization of the metrophonic content of the basic interval signs in the brief redaction of the post-Byzantine Papadike, ms Iviron 970, f. 2v, A.D. 1686, scribe Kosmas Makedon: “and they have the following content of voices: the oligon has one, the oxeia one (...), the kentima two...”

(Source and notes: Γρ. Στάθης, *Φάκελος μαθήματος «Αναλυτικὴ βυζαντινὴ σημειογραφία»*. Σημειώσεις πανεπιστημιακῶν παραδόσεων καὶ τέσσερις ἐνότητες – προθεωρία καὶ μελισμένα τροπάρια - ἀπὸ χειρόγραφους καὶ ἔντυπους μουσικοὺς κώδικες μὲ βυζαντινὴ σημειογραφία [Ἀθήνα: Ἐθνικὸ καὶ Καποδιστριακὸ Πανεπιστήμιον Ἀθηνῶν, Τμῆμα Μουσικῶν Σπουδῶν, 1997], 38. In line 6 of the ms, there should be τὸ ἔλαφρον, δύο instead of μίαν).



A 139, f. 188r

ΕΒΕ 2458, f. 5r

1.

ΕΒΕ 2458

**Example 11.a. Metrophonia in didactic poems (a): Selected stichera transformed into exercises of metrophonia and parallage, with exclusive stepwise movements within the intervallic frames of the actual sticheron. Renditions: i. stepwise movement with the apechemata corresponding to each melodic degree, and presumably ii. stepwise movement with the text of the sticheron. The case of *Κύριε ἔμοι τῶ ἁμαρτωλῶ ἔθου*, idiomelon for Thursday morning in the First Week of Lent.**

(Sources and notes: the collation contains for each kolon: the sticheron from the Sticherarium Ambrosianum A 139 sup., f. 188r-v, A.D. 1341, edd. Perria/Raasted, MMB XI [Copenhagen, 1992] and the homonymous exercise for metrophonia and parallage from Athens EBE 2458, f. 5r, A.D. 1336. Both sources are supplied with transnotation of the interval signs on staff. It should be underlined that the interval signs show only the structural notes of the piece; in order to sing the melos, one has to rely on the different forms of traditional *exegesis*: cf. M. Αλεξάνδρου, *Ἐξηγήσεις και μεταγραφές της βυζαντινής μουσικής* [Θεσσαλονίκη: University Press, 2010], pp. 14-17, 36-43, 80-94).

2.

A139

ε σου με τα να αν

ε σου με τα να αν

ε 2458

ε σου με τα να αν

---

3.

A139

ε με τον α να αν

ε με τον α να αν

ε 2458

ε με τον α να αν

**Example 11.b. Continuation of the collation of the sticheron *Κύριε ἔμοι τῶ ἁμαρτωλῶ ἔθου.***

4.

A139       $\overset{\sim}{\text{v}} \text{ } \overset{\sim}{\text{v}} \text{ } \overset{\sim}{\text{v}}$        $\text{v} \text{ } \text{v} \text{ } \text{v} \text{ } \text{v}$   
 σω ω      σα βου λο με νος,

ΕΘΕ 2458       $\overset{\sim}{\text{v}} \text{ } \text{v} \text{ } \text{v} \text{ } \text{v} \text{ } \text{v}$        $\text{v} \text{ } \text{v} \text{ } \text{v} \text{ } \text{v}$   
 ρ η γ η γ η ρ δ      ω η ε ρ η η γ  
 σω ω ω ω σαυ αι βου λο με νος

---

5.

A139       $\text{v} \text{ } \text{v} \text{ } \overset{\sim}{\text{v}}$        $\overset{\sim}{\text{v}} \text{ } \text{v}$        $\overset{\sim}{\text{v}} \text{ } \text{v} \text{ } \text{v}$   
 α με τρη      τω ε      λε ει σου.

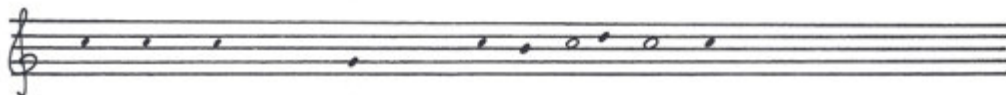
ΕΘΕ 2458       $\text{v} \text{ } \text{v} \text{ } \overset{\sim}{\text{v}} \text{ } \text{v} \text{ } \text{v}$        $\text{v} \text{ } \text{v} \text{ } \text{v} \text{ } \text{v}$        $\text{v} \text{ } \text{v} \text{ } \text{v} \text{ } \text{v}$   
 α ρ η γ η η ρ δ α α ρ η γ η η ρ δ α α ρ η γ η ρ δ α α  
 α με τρη η η η τω ε      λε ει ει σου ου ς

**Example 11.c. Continuation of the collation of the sticheron *Κύριε ἔμοι τῶ ἀμαρτωλῶ ἔθου.***

6.

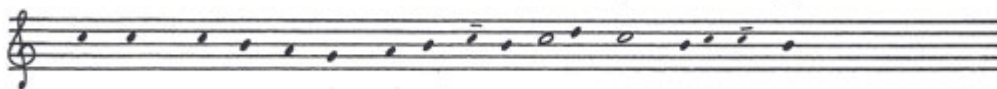
A 139

σοι προς ηλ ηγω δε ο μη νοη.



ΕΘ+ 2458

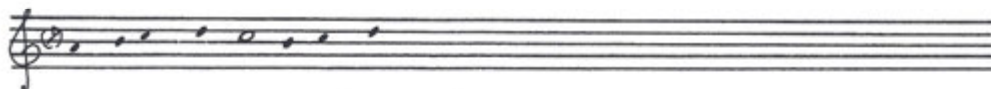
σοι προς ηλ ηγω δε ο ο μη νοη ος



7.

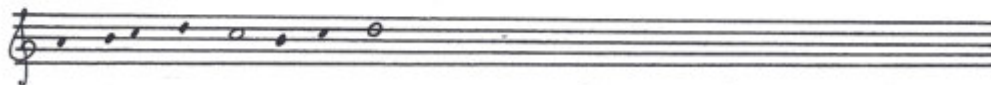
A 139 f.  
188 v

εν ης σπει α α'



ΕΘ+ 2458

εν ης σπει αλ αλ δις



Example 11.d. Continuation of the collation of the sticheron *Κύριε ἐμοὶ τῶ ἀμαρτωλῶ ἔθου.*

8.

A 139

---

9.

A 139

Example 11.e. Continuation of the collation of the sticheron *Κύριε ἔμοι τῶ ἀμαρτωλῶ ἔθου.*

10.

A139

τῶ μοῦ νο ἴου εἰς ἄσπερον

11.

↑ 1

2

↓ 3

4

**Example 11.f. End of the collation of the sticheron *Κύριε ἔμοι τῶ ἁμαρτωλῶ ἔθου.***

(Note: on the last four staves the modal structure of the sticheron is shown. Nr. 1 and 3 display the melodic steps with the signatures occurring in the metrophonia & parallaxe exercise from EBE 2458. Since the same signatures are repeated at the interval of a fifth (*trochos*-system), f-sharp is required in the upper register. Nr. 2 and 4 explain the brief *echemata* which correspond to each melodic step, according to a parallaxe-exercise found in Codex Chrysander, and published in O. Fleischer, *Die spätgriechische Tonschrift*, B [Berlin: Reimer, 1904], 17-18. For the dating of Codex Chrysander not earlier than the last quarter of the XVIIIth cent., cf. E. Makris, *Die musikalische Tradition des Anastasimatarion im 16. und 17. Jahrhundert*, Doctoral Dissertation [Universität Wien: Geisteswissenschaftliche Fakultät, 1996], 33. For a collation of the aforementioned exercise with similar parallaxe methods, cf. Alexandru and Troelsgård, "Σημασία", III, 1229).

1st. Iβίκυρ 973, φ. 15β

ἰσασοὶ τῶν ἡ' ἤχων

First male  
auth.+  
pl.

1. 2. 3. 4. 5.

Second male  
auth.+  
pl.

6. 7. 8.

Third male  
auth.+  
vars.

9. 10. 11. 12. 13. 14.

Fourth male  
auth.+  
pl.

15. 16. 17. 18.

**Example 12. Metrophonia in didactic poems (b): paradigmatic ascending & descending movements within frames of 1, 2, 3, and 4 voices, passing through the modes: the case of the *ἰσασοὶ τῶν ἡ' ἤχων* – ‘Equalizations’ of the 8 modes from the Papadike H.M. Iviron 973, f. 15v, beginning of XV<sup>th</sup> cent.: fully developed Middlebyzantine notation and transnotation on staff.**  
 (Description of the source: Γρ. Στάθης, *Τὰ χειρόγραφα βυζαντινῆς μουσικῆς. Ἅγιον Ὄρος* [Αθήνα: IBM, 1993], τ. Γ', pp. 739-740).



1. Ἰβήρων 973, p. 15β

Ἐτέρη μέθοδος

1. φωνή:

1. διηλιέ 2. κρείσημα 3. κούρημα 4. πελαστή 5. ὀψεία 6. ὀψία 7. πελαστή

2. φωνή:

8. ἀνεκίονη 9. παραλατινέ 10. παραλατινέ 11. ὀψία 12. ἀνεκίονη 13. πετ+δωρα 14. διηλιέ

3. φωνή:

15. κρείσημα 16. κούρημα 17. πελαστή 18. πελαστή 19. παραλατινέ

20. ὀψία 21. ὀψίον, κη. 22. πελαστή 23. διηλιέ 24. κρείσημα 25. κούρημα 26. πελαστή

**Example 13.a. Metrophonia in didactic poems (b): paradigmatic ascending & descending movements within frames of 1-4 and 7 voices, in the plagal of the fourth mode: *Ἐτέρη μέθοδος*, H.M. Iviron 973, f. 15v, beginning of XV<sup>th</sup> cent.: fully developed Middlebyzantine notation and transnotation on staff.**

(Description of the source and note: Στάθης, *Χειρόγραφα Ἁγίων Ὄρων*, τ. Γ', 739-740. The same method, with very small differences, can be found also in ms Lavra Λ 165, f. 32v, where it is ascribed to Xenophon, author which can be identified with Xenos Korones, according to Γρηγόριος Αναστασίου, *Τὰ κρατήματα στην Ψαλτική Τέχνη*, IBM, Μελέται, 12, ed. Γρ. Στάθης [Αθήνα, 2005], 515. This ms was used in order to facilitate the reading of some unclear places of Iviron 973 [kolon and beginning of kolon 37]).



27. 28. 29. (=24.)

Πιλοσόν κρεστηροῦσφῆνον κρέστηρα

4 φωνοί: 30. εἰωθῆ 31. Κούφισμα 32. Πιλοσόν 33. κρέστηρα 34. κρεστηροῦσφῆνον

7 φωνοί: 35. ἀνάβαση κρέστηρα 36. Κατάβαση (μὴ ψηφισά)

Επινοή Κασάλη(η)

37. βαρετω ἀπορροαί ἀπόφρα

Example 13.b. Continuation of the *Ἐτέρα μέθοδος*, H.M. Iviron 973, f. 15v.

1.

A139, f. 29r

EBE 917, f. 3r

φωναί: -4 +4 -4

2.

A139

EBE 917

φωναί: +4 -1 +1 +2 -2 +2 -2 +2 -1 -1 -1 +1 +3 -1 -1

**Example 14. Metrophonia as calculation of the voices of one piece: Akakios Chalkeopoulos' example of the Fourth Heothinon.**

(Sources and notes: The present collation contains: in the first and third line: the beginning of the Heothinon from the *Sticherarium Ambrosianum*, edd. Perria/Raasted, MMB XI [Copenhagen, 1992], and in the second and fourth line: the corresponding example from Chalkeopoulos' *Akribologemata*, Athens EBE 917, f. 3r, A.D. 1500-1520. The theoretician explains that at the beginning of the Heothinon: “Ἐχει δὲ φωναὶ ἀνιοῦσαι ἰθ', ὁμοίως καὶ κατιοῦσαι” [“There are 19 ascending voices and the same number of descending ones”]. In order to understand this kind of metrophonic calculation we wrote below the second and fourth line the number of rising and falling voices [intervals of seconds] shown by each sign. Summing them up, we obtain as total number of ascending voices: 4+4+1+2+2+2+1+3 = 19, and as total number of descending voices: 4+4+1+2+2+1+1+1+1+1 = 19).

1. *διεχὶ τῶν ἑσπερινῶν στιχηρῶν, συνιστῶν ἀπὸ αἰῶν Χρυσάφης ὡς νέου.*

*Μουσ. ν. 170, f. 90*

ὁς ἐσπέρηνας ἡμῶν εὐχάας

2. *ὄρα παράδειγμα.*

*ΕΒΕ 968, f. 177r*

Πά' Νη' Ζω' Κε' Δι' Γα' Βου' Πα'

*Μὲ ὀκτώ μέτρα ψάλλεται αὐτὸ τὸ στιχηρὸν. Τρεῖς χορδαὶς ἔχει ἀνιούσας καὶ τέσσαρας κατιούσας, καὶ μία φυλάττη τὸ κύριον ἴσον*

**Example 15. Diagram for the apprehension of metrophonia in the anonymous treatise from Athens EBE 968. The paradigm *Τὰς ἑσπερινὰς ἡμῶν εὐχάας*. Metrophonia = rendition of the intervallic structure of a piece, with singing of the hymnographic text.**

(Notes and sources: At Nr. 1 the beginning of the first hesperion sticheron in the first authentic mode, with text by St. John of Damascus, and melody by Chrysaphes the New is given, after an Anastasimatarion of the XVIII<sup>th</sup> cent. [thanks Rev. Nektarios Paris for this source]. Below, a transnotation in staff is supplied. Nr. 2 shows a copied fragment of the well-known diagram from EBE 968, f. 177r, XVII<sup>th</sup>-XVIII<sup>th</sup> cent., together with our transnotation on staff and the addition of the Chrysanthine monosyllabic solmisation in the left margin. The Anonymos states below the diagram: “Μὲ ὀκτώ μέτρα ψάλλεται αὐτὸ τὸ στιχηρὸν. Τρεῖς χορδαὶς ἔχει ἀνιούσας καὶ τέσσαρας κατιούσας, καὶ μία φυλάττη τὸ κύριον ἴσον” = “This sticheron is to be chanted with eight measures: It has three ascending and four descending strings, and one holds the ison (basic tone)”. For editions of this diagram cf. K. Ψάχος, *Ἡ παρασημαντικὴ τῆς βυζαντινῆς μουσικῆς*, 2nd ed. Γ. Χατζηθεοδώρου [Αθήνα: Διόνυσος, 1978], plate K, and A. Αλυγιζάκης, *Ἡ οκταχῆα στὴν ἐλληνικὴ λειτουργικὴ ὑμνογραφία* [Θεσσαλονίκη: Πουρναρά, 1985], 272. For the dating of this theoretikon, see I. Zannos, *Ichos and Makam. Vergleichende Untersuchungen zum Tonsystem der griechisch-orthodoxen Kirchenmusik und der türkischen Kunstmusik*, Orpheus-Schriftenreihe 74 [Bonn: Orpheus-Verlag, 1994], 541).

70. Ἦν δὲ Παράλλαγ' ἢ μὲν, τὸ νὰ ἐφαρμόζωσι τοὺς πολυουλλάβους φθόγγους ἐπάνω εἰς τοὺς ἐγκυχαραγμένους χαρακτήρας τοῦ ποσοῦ τῆς μελωδίας, ψάλλοντες ἀντιὸς συνεχῶς ἐπὶ τε τὸ ὀξύ καὶ ἐπὶ τὸ βαρὺ, καὶ οὐδέποτε ἐπὶ τὸ ἴσον, ἢ ὑπερβατιῶς. Μετροφωνία δὲ ἦν, τὸ νὰ ψάλλωσι τὸ μεμειωμένον τροπάριον, καθὼς ζῆτοῦσι μόνον οἱ χαρακτήρες, οἱ τινες γράφουσι τὸ ποσοῦν τῆς μελωδίας, χωρὶς νὰ παρατηρῆται τὸ ζῆτούμενον ἀπὸ τὰς ὑποστάσεις καὶ θίσεις. Μῆλος δὲ ἦν, τὸ νὰ ψάλλωσι τὸ μεμειωμένον τροπάριον, καθὼς ζῆτοῦσιν αἱ θίσεις τῶν χαρακτήρων μετὰ τῶν ὑποστάσεων, δι' ὧν γράφεται ὄχι μόνον τὸ ποσοῦν τῆς μελωδίας, ἀλλὰ καὶ τὸ ποιὸν, χωρὶς νὰ παρατηρῆται καὶ τὸ κείμενον τῶν λέξεων. Πρὸς δὲ σαφήνειαν κίεθω ἐπὶ παραδείγματος αὕτη ἡ περικοπή.

Τὸς ε σπε ρι νας η η η μων Ε εω χα α

71. Ἐψάλλετο λοιπὸν αὕτη ἡ περικοπή Παράλλαγ' ἢ μὲν τοῦτον τὸν τρόπον ἀρῶτες διὰ τὴν μαρτυρίαν, ἱεραγε αἰεὶς ἱεραεὶς αἰεαὶς διὰ τὴν Χρημῆν, ἐπιδη ἢ Ἀπόστροφος ὑπετάσσειτο. Ἐπιτα ἀφῆροντες τὰ ἴσα, ἐψάλλον ἱεαὶς ῥαα αγια ἀρῶτες ἱεαὶς διὰ τὴν Πειαστήν καὶ Ὑψηλὴν ῥαα διὰ τὰ Κινήματα, ἱεαὶς αἰεαὶς διὰ τὸ Ἐλαφρόν, ἐπιδη ἢ Ἀπόστροφος ὑπετάσσειτο. ἱεαὶς ῥαα διὰ τὸ Κίνημα, ἐπιδη τὸ Ὀλίγον ὑπετάσσειτο ἱεαὶς αἰεαὶς ἱεαγιε διὰ τοὺς Ἀποστροφούς, αἰεὶς ἱεαὶς διὰ τὸ Ἐλαφρόν, ῥαα διὰ τὰ Κινήματα, αγια ἀρῶτες διὰ τὰ Ὀλίγα ἱεαὶς ῥαα διὰ τὸ Κίνημα, ἱεαὶς διὰ τὴν Ἀπόστροφον, καὶ αἰεαὶς διὰ τὸν Σύνδεσμον, ἦγον τὰς δύο ἀποστροφούς.

72. Μετροφωνία δὲ ἐψάλλετο μὲν τέτοιον τρόπον, αἰον ἰδού κατὰ τὴν ἡμετέραν Μίθεδον οὕτω γράφομεν.

Τὸς ε σπε ρι να α ας η η η η μω  
ων ε εν χα α α α ας η

73. Κατὰ δὲ μῆλος ἐψάλλετο μὲν τὸν ἀκόλουθον τρόπον.

Τὸς ε σπε ρι να α α α α ας η  
μω ω ω ῥω ω ων ε ε ε ε ε ε

Example 16. Chrysanthos, *Mega Theoretikon*, Trieste 1832, pp. XLVI-XLVIII, §§ 70-73: about the triptych parallage-metrophonia-melos, as the three degrees in the apprehension-process according to the Old Method.

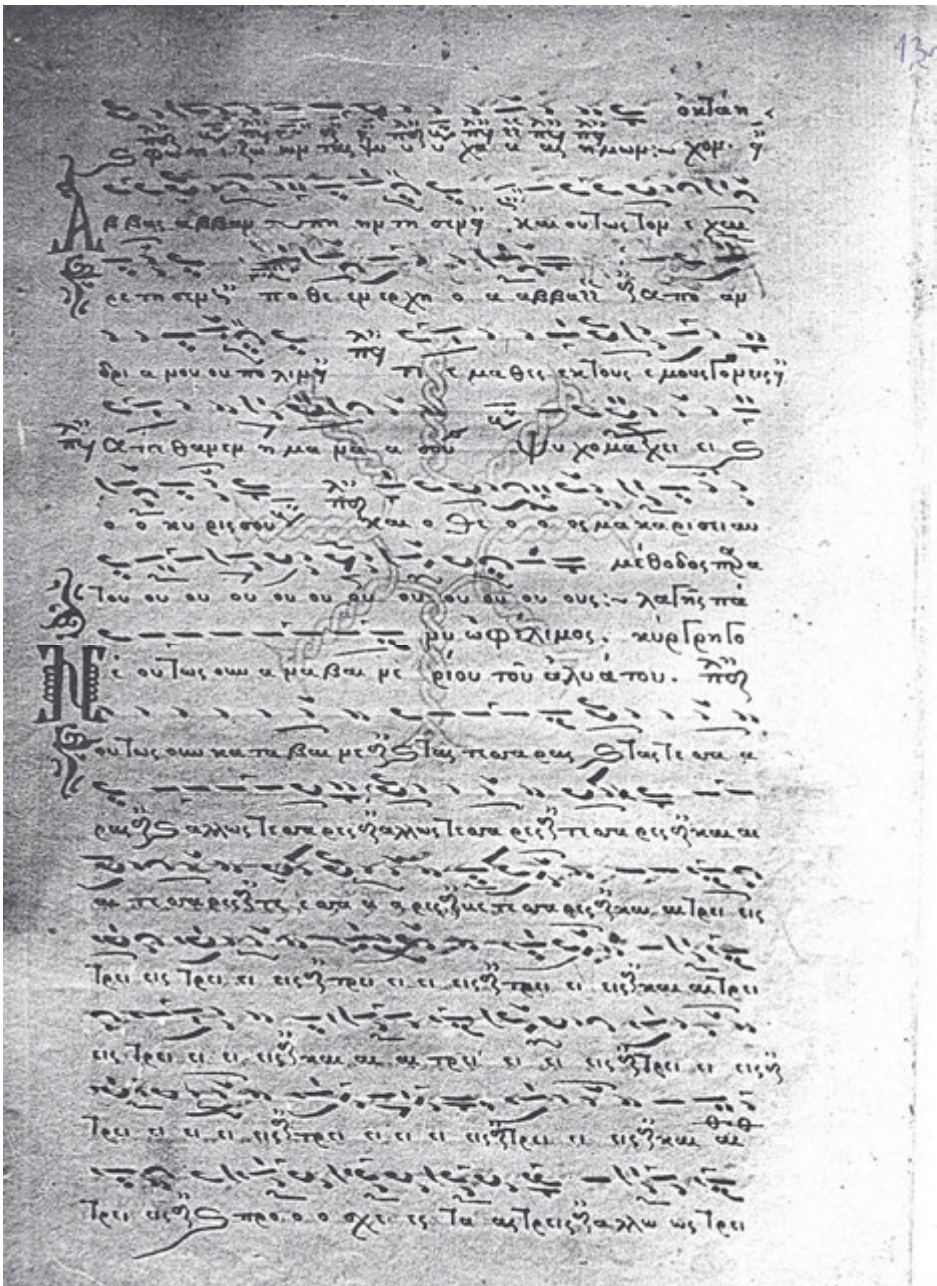
Once more the paradigm *Τὰς ἐσπερινὰς ἡμῶν εὐχὰς*.  
Metrophonia = syllabic rendition of the old neumatation 'at face value', with rhythm, and by singing the hymnographic text.

(Further reading concerning this example: A.K. Khalil, *Echoes of Constantinople: oral and written tradition of the psaltes of the Ecumenical Patriarchate of Constantinople*, PhD Dissertation, UC San Diego, 2009, UC San Diego Electronic Theses and Dissertations, Permalink: <http://escholarship.org/uc/item/6r2794cz>, pp. 45-49).

**Example 17. Gregorios Mpones Alyates, Method of metrophonia, incipit: an open collation of sources.**

Sources: **1. H.M. Iviron 1009**, f. 12r-v, XVI<sup>th</sup> cent. (Lampros): ἕτερα μέθοδος τῆς μετροφωνίας ὀφελημωτάτος ποιήμα κύρ Γρηγορίου Πούνη τοῦ Ἀλιάτου | **2. H.M. Laura K 188**, pp. 3-4, XVII<sup>th</sup> cent. (Spyridon/Eustratiades): μέθοδος τῆς μετροφωνίας Γρηγορίου Μπούνη τοῦ Ἀλιάτου and 37r-38r (man. sec.), XVII<sup>th</sup> cent. (Lampros): ἕτερα μέθοδος κύρ Γρηγορίου Μπούνη τοῦ Ἀλιάτου and ἕτερα μέθοδος τῆς παραλαγῆς κύρ Γρηγορίου τοῦ Ἀλιάτου | **4. Codex Chrysander**, ed. Fleischer, *Tonschrift*, B, pp. 33-36, ‘the earliest in the last quarter of the XVII<sup>th</sup> cent.’ (Makris): ἕτερα μέθοδος τῆς μετροφωνίας ὀφελημωτάτη ποιήμα κύρ Γρηγορίου Μπούνη τοῦ Ἀλιάτου πάνι ὄρεα | **5. H.M. Koutloumoussiou 449**, f. 6v-7r, ‘end of XVII<sup>th</sup> cent.-around 1700’ (Stathis): μέθοδος παραλαγῆς πάνι ὀφέλιμος κύρ Γρηγορίου τοῦ Ἀλιάτου | **6. Brussels IV 515**, f. 18r-v, XVII<sup>th</sup>-XVIII<sup>th</sup> cent. (Troelsgård): ἕτερη μέθοδος τῆς μετροφωνίας πάνι ὀφέλιμος ποιήμα κύρ Γρηγορίου Μπούνη τοῦ Ἀλιάτου ἐκ τῆς Συλμβρίας | **7. Jerusalem, Anastaseos 45**, f. 13v-14r, A.D. 1719, scribe Antonios Megas Oikonomos (cf. kolophon f. 8v and Troelsgård) | **8. H.M. Laura M 93**, f. 9r-v, A.D. 1728, scribe Ioannes Lampadarios (Spyridon/Eustratiades): μέθοδος μετροφωνίας ὀφελημωτάτη ποιήμα Γρηγορίου τοῦ Ἀλιάτη (blurred copy) | **9. H.M. Laura E 132**, f. 7v-8r, A.D. 1733 (Spyridon/Eustratiades): μέθοδος μετροφωνίας ὀφελημωτάτη ποιήμα κύρ Γρηγορίου τοῦ Ἀλιάτη | **10. H.M. Laura E 128**, f. 8v-9r, A.D. 1741, scribe Agaprios (Spyridon/Eustratiades): μέθοδος μετροφωνίας ὀφελημωτάτη ποιήμα κύρ Γρηγορίου τοῦ Ἀλιάτου





Example 18.a. Gregorios Mpounes Alyates, Method of metrophonia, in one of the 'codices meliores': Jerusalem Anastaseos 45, f. 13v, A.D. 1719, scribe Antonios Megas Oikonomos.



**Example 18.b. Gregorios Mpounes Alyates, Method of metrophonia (continued), Jerusalem Anastaseos 45, f. 14r.**



**Μέθοδος παραλλαγής πάνω ᾠφέλιμος, κύρ Γρηγορίου τοῦ Αλυάτου, πλ. δ'**  
**Very useful method of parallage by Gregorios Alyates, plagal of the 4<sup>th</sup> mode**

Elements of formal, modal, generative/structural, syntactical and metrophonical analysis based on MS Jerusalem, Anastaseos 45, f. 13v-14r, A.D. 1719, autograph by Antonios Megas Oikonomos (cf. Troelsgård, *Inventary and kolophon of the ms, f. 8v*. See also Nagy, "Elemente")

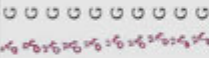


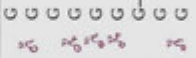

Fe-riods	Kola	Greek text and translation	Systems – Frame intervals	Main ambitus – Structural notes	Martyrial (Main & Medial Signatures) – Cadences and Phorai	Thesis (Formulas)	Total ambitus and metro-phonical elements	Melodic contours
I	1. Pro- Logue	<p>Ne οὐτως οὐν ἀναβαίνατε  οὐτως οὐν κατεβαίνατε  <i>Ne. This way, in fact, go up,  this way, in fact, go down</i></p>	Heptaphony (octachord)	G - g - G 1 - 8 - 1	G → G 	1. Anabasis   2. Katabasis		(1)
II	3. 4. 5. 6. 7. 8. 9. 10.	<p>καὶ τὰς τέσσαρας  καὶ τὰς τέσσαρας  καὶ ἄλλας τέσσαρας  ἄλλας τέσσαρας  τέσσαρας  καὶ τέσσαρας  τέσσαρας  καὶ τέσσαρας  καὶ τέσσαρας  καὶ τέσσαρας</p> <p><i>and the four (voices) (twice,  with different formulas)  and in another way/four  in another way four  four  and four  four  or four</i></p>	Tetraphony (pentachord)	G - d - G 1 - 8 - 1	D → G d G d G G G G G	3. Anabasis, kratema   4. Katabasis, including: antikenomata, kratemata (dyo apostrophi synteseisoi & diple)   5. Anabasis, antikenoma, dyo ap. synd. + apoderna   6. Katabasis, including: antikenomata, dyo ap. synd.   7. Antikenoma, apoderna   8. Anabasis, psophites, antikenoma, dyo ap. synd.   9. Katabasis, including: petastai, heteron paraklesma, dyo ap. synd.   10. Diple + lygisma, psophitokatabasma + antikenoma and dyo ap. synd.	 Ascending voices: + 7 Descending voices: - 7	 (3) (4) (5) (6) (7) (8) (9) (10)

**Example 19.a. Polyprismatic analytical approach to Alyates' Method of metrophonia.**  
**The frame of heptaphony G-g and of tetraphony G-d.**

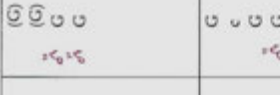







III	11. και τρεῖς τρεῖς 12. τρεῖς 13. τρεῖς 14. τρεῖς 15. τρεῖς 16. και τρεῖς 17. τρεῖς 18. τρεῖς 19. τρεῖς 20. τρεῖς 21. τρεῖς 22. τρεῖς 23. και τρεῖς 24. και ἑποδοχῆς τὰς τρεῖς 25. δὲ τρεῖς	Triphony (tetrachord)	G - c - G			<p>11. Anabasis, kratema, antikenoma   12. Antikenoma   13. Psephistokatabasma + heteron parakalesma &amp; dyo ap. synd.   14. Katabasis, including: kratema (7), psephistoparakalesma, dyo ap. synd.   15. Dipole, antikenoma, dyo ap. synd.   16. Lygisma, kratema   17. Psephiston, dyo ap. synd.   18. Dipole, bareia + lygisma, kratema, bareia + kylisma   19. Psephiston + antikenoma, dyo ap. synd.   20. Diplopeasthon with lygisma, psephistoparakalesma + antikenoma, dyo ap. synd.   21. Psephistokatabasma, homalon, apoderma + dipole   22. Psephiston + antikenoma, dyo ap. synd. (idem k. 19)   23. thes kai apodes, dyo ap. synd.   24. Descending pallilogia (sequences), with the formula bareia + lygisma (3 times). Kolon ends with apoderma   25. Bareia meta oxeias + lygisma, kratema, descending pallilogia with dipole + heteron parakalesma (2 times). Kolon ends with dyo ap. synd.</p>
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**Example 19.b. Polyprismatic analytical approach to Alyates' Method of metrophonia (continued). The frame of the triphony G-c.**

IV	<p>26. δύο καὶ δύο 27. δύο 28. δύο 29. δύο 30. δύο 31. δύο καὶ ἀλλὰς 32. καὶ δύο καὶ ἀλλὰς 34. καὶ δύο 35.</p> <p>two and two two (four times with different formulae) and in another way and two and in another way and two</p>	Diphony (trichord)	G - h - G	 <p>26. Petaste, heteron parakalesma + dipole   27. Psephiston, dyo ap. synd.   28. Psephistokatasma, apoderma + dipole   29. Tromikon, bareia + lygisma, apoderma   30. Lygisma, apoderma   31. Petaste, heteron parakalesma + dipole, dyo ap. synd.   32. Psephiston, bareia, apoderma   33. Petaste, bareia + lygisma, apoderma   34. Descending pallilogia with the formula bareia + lygisma (2 times). Kolon ends with apoderma   35. Tromikon, apoderma + dipole</p>	 <p>Ascending voices: + 28 Descending voices: - 28</p>	 <p>(26) (27) (28) (29) (30) (31) (32) (33) (34) (35)</p>
V	<p>36. καὶ μία μία 37. ἀλλὰς[ε] 38. μία καὶ μία 39. καὶ ἀλλὰς 40. καὶ μία οὐτως 41. μία 42. μία 43. μία 44.</p> <p>and one one in another way and one and in another way and one, this way one (3 times with different formulae)</p>	'Monophony' (dichord)	G - a - G	<p>36. Lygisma, apoderma   37. Diplopetasthon + lygisma   38. Antikenoma, apoderma   39. Isotes, parakletike, apoderma   40. Isotes, parakletike + heteron parakalesma, apoderma   41. Psephiston, bareia + lygisma, apoderma + dipole   42. Bareia, kratema   43. Lygisma, dyo ap. synd.   44. Antikenoma, dyo ap. synd.</p>	 <p>Ascending voices: + 12 Descending voices: - 12</p>	 <p>(36) (37) (38) (39) (40) (41) (42) (43) (44)</p>

Example 19.c. Polyprismatic analytical approach to Alyates' Method of metrophonia (continued).  
The frame of the diphony G-h and the monophony G-a.

VI	45. 46. 47. 48.	δύο δύο οὐδὺς δύο  τὸν τὸν this way τὸν	Diphony (trichord)	G - h - G	 (G) (G) G G	45. Parakletike + heteron paraklesma   46. Daria   47. Pasma + heteron paraklesma + diplo   48. Paraklesma, lygisma, apoderma	 Ascending voices: + 11 Descending voices: - 11	 (45) (46) (47) (48)
VII	49. 50. 51. 52.	καὶ τρεῖς καὶ ἄλλος τρεῖς καὶ οὐτὸν τρεῖς τρεῖς  and three and in another way three and this way three three	Triphony (tetrachord)	G - c - G	 G c G G	49. Anabasis ending with diplo, petaste, bareia + psephiston   50. Parakletiko, bareia + antikenoma, anatrichisma, apoderma   51. Petaste, heteron paraklesma encompassing dyo ap. synd. at the end of the kolon   52. Bareia + lygisma, apoderma, dyo ap. synd.	 Ascending voices: + 13 Descending voices: - 13	 (49) (50) (51) (52)

**Example 19.d. Analysis of Alyates' Method of metrophonia (continued).  
Again the frame of the diphony G-h and triphony G-c, with new formulas.**

VIII	<p>53. τέσσαρες</p> <p>54. τέσσαρες καὶ τέσσαρες</p> <p>55. τέσσαρες καὶ τέσσαρες</p> <p>56. τέσσαρες καὶ τέσσαρες</p> <p>57. τέσσαρες καὶ ἄλλως</p> <p>58. τέσσαρες καὶ ἄλλως τέσσαρες</p> <p>59. ἄγνια</p> <p>60. τέσσαρες</p> <p>61. τέσσαρες</p> <p>62. τέσσαρες</p> <p>63. τέσσαρες</p> <p>64. τέσσαρες</p> <p><i>four (two times, with different formulas)</i></p> <p><i>and four</i></p> <p><i>four</i></p> <p><i>and four</i></p> <p><i>and in another way</i></p> <p><i>four</i></p> <p><i>and in another way four</i></p> <p><i>hegia</i></p> <p><i>four (two times, with different formulas)</i></p>	Tetraphony (pentachord)	G - d - G	<p>G</p> <p>G →</p> <p>G</p> <p>G</p> <p>G</p> <p>G</p> <p>G</p> <p>G</p> <p>G</p> <p>d</p> <p>G</p> <p>G</p>	<p>53. Diple + antikenoma, apoderma   54. Antikenoma, kratema   55. Petaste, psephiston, bareia + antikenoma, dyo ap. synd.  </p> <p>56. Psephiston, plasma + heteron parakalesma   57. Isotes, psephiston + antikenoma, dyo ap. synd.  </p> <p>58. Kratema, syragma, apoderma   59. Parakalesma, lygisma, dyo ap. synd. + apoderma   60. Psephiston, plasma + heteron parakalesma, apoderma   61. Descending paillogia with the formula bareia + lygisma (4 times). Kolon ends with dyo ap. synd.   62. Anabasis on the apechema of the 4<sup>o</sup> authentic mode, with anatrachisma + lygisma and ending with diple   63. Psephiston, bareia + antikenoma, dyo ap. synd.  </p> <p>64. Psephiston and descending paillogia with the formula bareia + lygisma (2 times). Kolon ends with diple</p>	<p>(53)</p> <p>(54)</p> <p>(55)</p> <p>(56)</p> <p>(57)</p> <p>(58)</p> <p>(59)</p> <p>(60)</p> <p>(61)</p> <p>(62)</p> <p>(63)</p> <p>(64)</p>
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**Example 19.e. Polyprismatic analytical approach to Alyates' Method of metrophonia (continued).  
Once more the frame of the tetraphony, with further formulas.**

IX Epi- logue	<p>65. ἑπτὰ φωνὰὶ δεκάφωνος ἑπτὰ καὶ ἀνὰ τριφώνου</p> <p>66. καὶ τριφῶν</p> <p>67. καὶ τριφῶν</p> <p>68. τριφῶν</p> <p>69. δεκά φωνῶν</p> <p>70. καὶ ἑνδεκάφ</p> <p>71. βαλλε</p> <p>72. καὶ ἀλλὰ καὶ παθητὰ :-</p> <p>73. seven voices, duplication and also seven apostrophat and three (twice, with different formulas) three ten voices and eleven see</p>	<p>Heptaphony (octachord)</p> <p>Triphony (tetrachord)</p> <p>Decaphony Hendecaphony 'Monophony'</p> <p>Triphony (undecime, duodecime, dichord, tetrachord)</p>	<p>G - g - G</p> <p>G - D - G</p> <p>D - g</p> <p>a - D</p> <p>G - a - G</p> <p>G - c - G</p>	<p>♯</p> <p>♯</p>	<p>g →</p> <p>D</p> <p>G</p> <p>D</p> <p>D</p> <p>g</p> <p>G</p> <p>G</p> <p>G</p>	<p>65. Isotes, antikenoma, petasto, kratema   66. Katabasis of ten voices, including: red bareia, psephiston, dyo ap. synd., bareia + heteron parakalesma, dyo ap. synd.   67. Anabasis   68. Antikenoma, kratema   69. Antikenoma   70. Isotes, antikenoma, diplo   71. Antikenoma, kratema, antikenoma, anabasis ending with diplo   72. Antikenoma, apoderma   73. Anabasis, kratema + psephiston, plisma + heteron parakalesma, bareia + lygisma, apoderma</p>	 <p>Ascending voices: + 37</p> <p>Descending voices: - 37</p> <p>Total number of ascending voices: + 242</p> <p>Total number of descending voices: - 242</p>	
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**Example 19.f. Polyprismatic analytical approach to Alyates' Method of metrophonia. The epilogue, within the frames of heptaphony G-g, triphony D-G (lowest point), decaphony (D-g) and hendecaphony (climax! D-a), and again monophony (G-a) and triphony (G-c). Metrophonic calculation of voices (intervals of second) in the entire piece: ascending: 242, descending: 242.**

**Periods:**

**Background**  
74x3 40

**-structural intervals:**

**Kaba:**

**Background in another clef and transposed:**

**Melodic steps of the structural melody**

**Macrograph of the structural melody**

**"Ursatz" - Lisan-diagram**  
with structural melody and kaba-indication

**Text: Key words:**  
Anabasis-Katolaine  
Tetrastar  
Trois  
Dyo  
Mia  
Dyo  
Trois  
Tetrastar  
Hoptar  
Diplastar  
Dekastar  
Herastar  
A-lypes  
melastar

**Total number of ascending voices: +54**

**Total number of descending voices: -54**

Example 20.a. A macroformal & generative analysis of Alyates' Method of metrophonia, based on ms Jerusalem, Anastaseos 45, f. 13v-14r.

**Rehearsal**

• Rehearsal: I  
 • Background: 14-23, 24-35, 36-44, 45-52, 53-64, 65-71, 72-83

• Structural intervals: K. 1-2, 3-10, 11-23, 24-35, 36-44, 45-52, 53-64, 65-71, 72-83

• Kala: 1-2, 3-10, 11-23, 24-35, 36-44, 45-52, 53-64, 65-71, 72-83

• Climax

• Background: 1-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-90

• Melodic steps of the structural melody

• Melodizing of the structural melody

• "Ursta" - Isom - diagram

• Total number of descending notes: 54

• Total number of ascending notes: 54

K. 1-2 3-10 11-23 24-35 36-44 45-52 53-64 65-71 72-83

• Analysis: *Andante - Moderato* *Trio* *Andante* *Trio* *Andante* *Trio* *Andante* *Trio* *Andante*

• Text: Key words: *Andante - Moderato* *Trio* *Andante* *Trio* *Andante* *Trio* *Andante* *Trio* *Andante*

Example 20.b. The same analysis, with highlighting of the mirror-symmetries and the climax.



Petase, heterom parak. +  
 dipte  
 du o o

"Voices":  
 +2 -2

Melodic contour

**Example 21.a. Alyates' Method of metrophonia.**

**The formulas in the frame of diphony: neumes after Jerus. Anast. 45, with: identification of formulas, transnotation, generative analysis, transcription-syllabic rendition according to Arvanitis' method, total number of ascending & descending voices, melodic contour. Kolon 26.**

Petase, heterom parak. +  
 dipte  
 du o o

"Voices":  
 +2 -2

Petase, heterom parak. +  
 dipte  
 du o o

"Voices":  
 +3 -3

**Examples 21.b-c. Alyates' Method of metrophonia, the frame of diphony, k. 27-28.**



29.

Trambon, Garsia, apeduna  
 dypina  
 +4 -4

30.

dypina, apeduna  
 +2 -2

31.

Pelaki, herna, dya ap, syad,  
 pa, ralph  
 +2 -2

The image displays three examples of musical notation, each consisting of a rhythmic diagram and three staves of music. Example 29 features a rhythmic diagram with notes and rests, and a +4 -4 interval. Example 30 features a rhythmic diagram with a +2 -2 interval. Example 31 features a rhythmic diagram with a +2 -2 interval. Each example includes a treble clef staff with a key signature of one sharp (F#) and a 2/4 time signature, and two bass clef staves. The notation includes various rhythmic values, stems, and beams, along with some decorative elements like wavy lines and arrows.

**Example 21.d. Alyates' Method of metroponia, the frame of diphony, k. 29-31.**

32. *Propitios, apudam*  
*boreis*  
 c 2 1 5 = 0 0 +3 -3  
 kai a a = 22uy

33. *Pet. Cassini apudam*  
*aggama*  
 c 2 1 5 = 0 0 +3 -2  
 kai du 3 2 0

34. *Propitios PAULLOSIA*  
*boreis* *Idea* *apudam*  
*aggama*  
 1-3 2 1 5 = 0 0 +4 -4  
 kai ai a a u 22uy

Example 21.e. Alyates' Method of metrophonia, the frame of diphony, k. 32-34.

35. *Tramitan ... opulenta +*  
*du o* +3 -3

VI. 45. *Pankelitia + heston*  
*pankaloma* +2 -2

46. *Dasta*  
*du o* +2 -2

**Example 21.f. Alyates' Method of metrophonia, the frame of diphony,  
 k. 35, 45-46.**

47. *Pisomata*  
*metronon par' - diplo*  
 ou ouy

+ 2 - 2

48. *Paraklaxama* *lygisma* *apodroma*  
 ou ou ou ou ou ou ou

+ 5 - 5

Example 21.g. Alyates' Method of metrophonia, the frame of diphony, k. 47-48.

Παρακάτω μπορείτε να βρείτε μια αλληλουχία διαστημάτων στον ήχο πλ. του δ'.

Προσπαθήστε να δημιουργήσετε για τους μαθητές σας ένα διδακτικό ποίημα, που να έχει ως δομικούς φθόγγους ή ως διαστήματα πλαίσιο αυτήν την συγκεκριμένη αλληλουχία. Παρακαλώ δώστε περισσότερες δυνατότητες συμπλήρωσης του κάθε διαστηματικού πλαισίου. Ως κείμενο μπορείτε να επιλέξετε ό,τι σας φαίνεται πιο κατάλληλο για διδακτικούς σκοπούς.

**Example 22. Synchronic approach to Alyates' Method of metrophonia, through composition and singing: The task given to a contemporary chanter.**

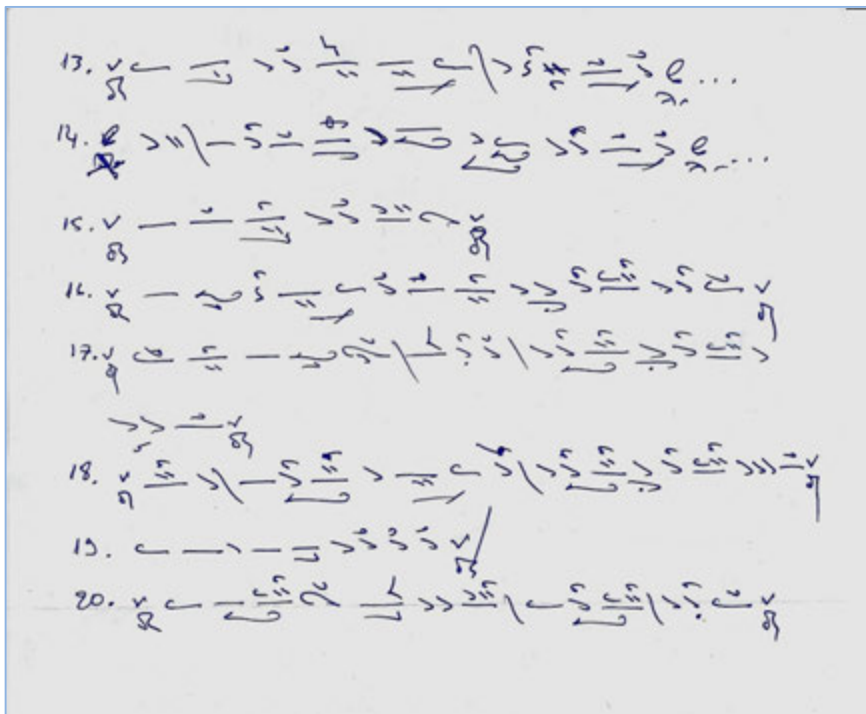
“Above you can find a chain of intervals in the plagal of the fourth mode. Try to create for your pupils a didactic poem having as structural tones or as intervallic frames the above chain. Please give several possibilities of filling in each intervallic frame. As text, feel free to choose whatever you consider suitable for didactic purposes”.

For the idea of using structural tones of a Byzantine troparion as a base for new composition, thanks to our student, Miss Aikaterini Polychronopoulou.

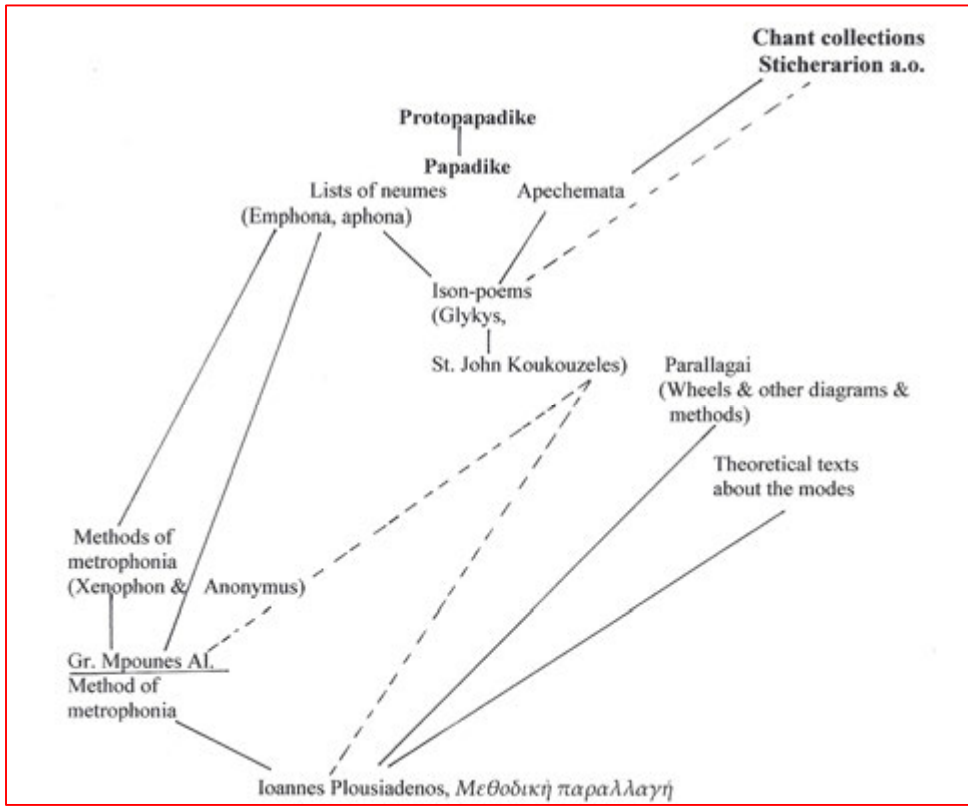
Σύνταξη δίφωνα ΝΗ-Βα

The image displays 12 numbered examples of musical notation for the Ni-Vou diphtong in the fourth mode. Each example consists of a sequence of notes and rests on a four-line staff, with some notes marked with a 'v' for voice. The notation is written in a traditional Greek style, using various note heads and stems to represent pitch and rhythm. The examples show different ways to fill the diphtongic frame, with some using longer notes and others using shorter notes with rests. The examples are numbered 1 through 12, and each is followed by a small 'v' or 'x' mark, possibly indicating a specific rhythmic or melodic feature.

**Example 23.a. Possibilities of filling in the diphtonic frame Ni-Vou in the plagal of the fourth mode, in actual chanting practice: a draft by Ioannis Liakos, Precentor of the Metropolitan Cathedral St. Gregory Palamas in Thessaloniki, XII<sup>th</sup> August 2011.**



**Example 23.b. Continuation of the same draft.**



**Example 24. Gregorios Mpounes Alyates' Method of metrophonia in the context of Byzantine theoretika.**

(Source of inspiration for this diagram: C. Troelsgård, "The Development of a Didactic Poem. Some remarks on the Ἴσον, ὀλίγον, ὄξεια by Ioannes Glykys", in *Byzantine Chant. Tradition and Reform*, Acts of a Meeting held at the Danish Institute at Athens, 1993, ed. C. Troelsgård, Monographs of the Danish Institute at Athens [Athens, 1997], vol. 2, 80, fig. 1).



**Observations on the diastematic principles  
in Byzantine musical notations, with emphasis  
on Gregorios Mpounes Alyates' method of metrophonia, and  
some links to analogous phenomena in Western Chant**

**ABSTRACT**

The starting point of our investigation is Oliver Strunk's observation about the major importance of the adoption of diastemata in Middlebyzantine notation (*Specimina notationum antiquiorum*, MMB VII, Pars Suppletoria, Copenhagen 1966, p. 1).

The paper begins with a brief reference to the diastemata in the Hermoupolis-Notation, and some considerations on the gradual change from adiastrumatic Palaeobyzantine notation to diastematic Middlebyzantine neumes in comparison with the development of diastematic notations in Western Chant (part I with Ex. 1-8).

In part II with Ex. 9-16, focus is shifted on the teaching of the Protopapadike, the later Papadikai and other theoretical texts about the intervals and the notion of metrophonia (intervallic counting, in different levels of theoretical and practical application), which represents a multi-stratified key-concept for the understanding of diastemata in Byzantine musical tradition.

Part III with Ex. 17-24 concentrates on issues concerning the preparation of a critical edition of Gregorios Mpounes Alyates' well-known didactic Method of metrophonia *Ne, houtōs oun anabaine* (first part of XV<sup>th</sup> cent.), which forms a precious guide both for the investigation of diastemata and musical texture, and represents a stable element of the late Papadike, transmitted up to the beginning of the XIX<sup>th</sup> century.

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