

Font Design of Psaltic (Byzantine) Notation for Greek Musical Repertoires

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Abstract

The possibility of rendering scores of Greek Chant repertoires from the 3rd to the 21st century A.D. with the use of the computer opens new horizons in musicological research. In this poster a synoptic overview concerning the historical development of notational types used for Greek chants is given. This is followed by a record of various fonts and software for Byzantine neumes created since 1989. The goal of the poster is to present a new font for psaltic notations of the first and second Christian millennium, displaying the great variety of signs, neume families and neume combinations which are encountered in musical manuscripts and theoretical treatises of the Psaltic Art. These by far exceed the Byzantine neumes found today in the unicode system.

The future development of suitable software can facilitate interdisciplinary studies with other traditions and contribute to the communication between musicologists and musicians belonging to different areas of expertise.

Introduction

This poster aims at presenting a new font for writing Byzantine neumes of various periods. Although different fonts for Byzantine notations already exist, there are still many signs and sign combinations of the older layers of Byzantine neumations which have not yet been designed. This is why we would like to proceed to a more thorough inventory of the extant neumes in their historical evolution and to the creation of a more complete font, in order to allow for a faithful transcription of pieces in various notational types, for their edition, analysis, and interpretation.

1 Overview of the History of the Notation of Psaltic Art

Christian hymnography in Greek language has been foreseen with different kinds of musical notations sporadically during the first millennium A.D. and at large scale from the 10th century onwards. The various notational types expose highly interesting interconnections to each other and, as 'living art tools', they have undergone a complex history of evolution (see Table 1) [22].

Some of the most important types of notation used in connection with Greek hymns are the ancient Greek alphabetical vocal notation occurring in the Papyrus Oxyrrhynchus 1786 (2nd half of the 3rd century A.D.), the *theta* and *diple* notations, the Sinitic notation (ca. 9th–12th century), and the two great types of main-stream Byzantine notations: ekphonetic and melodic.

The latter has undergone an impressive development history since the 10th century until today. It comprises the Palaeobyzantine notations (10th–12th century, Coislin/Hagiopolite and Chartres/Athonite, and with mixed forms), the Middle Byzantine notation (ca. middle of the 12th to middle of the 19th century), and the notation of the so-called New System (since 1814/15 until today). Besides these, the 14th-century manuscript Kastoria 8 with its famous red hyperstases (extra large signs referring to entire formulas and their cheironomy) also features a highly interesting notation based on older layers of notations for melismatic repertoires.

The neumes of the various notational types exceed the number of 600. If we take into account also the most characteristic neume combinations (the so-called *theseis*, around 80 for the Middle Byzantine notation) as well as the different graphic variants of the neumes, a very impressive corpus of music signs emerges. This corpus still waits, in many aspects, for thorough apprehension and codification.








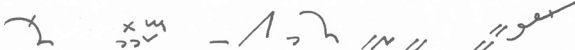
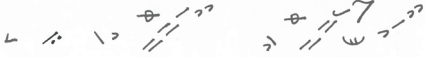


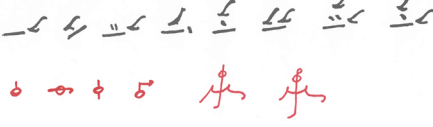

Notation	Examples	Reference
Ancient Greek alphabetical vocal notation	 (Papyrus Oxyrrhynchus 1786, 2 nd half of 3 rd century A.D.)	[22, p. 228]
Notation in Papyrus Berlinensis 21319 (6 th –8 th century)		Sarischouli, <i>apud</i> [22, p. 232]
Hermoupolis notation (ca. 8 th century)		Papathanasiou & Boukas, <i>apud</i> [22, p. 233]
Sinaitic notation	 (Codex Liturgicus Sinaiticus, 9 th century)	[1, tables 14 and 17]
Theta notation (10 th century)		[22, p. 138]
Protoekphonic notation	 (Uspenskij Gospel, A.D. 835)	[22, p. 130]
Ekphonic notation with peculiarities	 (Vindob. suppl. gr. 128, beginning of 12 th century)	Martani, <i>apud</i> [22, p. 195–197]
Palaeobyzantine notation	 (Laurensis Γ 67, f. 101r, beginning of 11 th century, mixture of Coislin and Chartres [Floros])	[22, p. 266]
	 (Vatopedensis 1488, f. 117v, 2 nd half of 11 th century, Coislin V [Floros])	[22, p. 267]
Early Middle Byzantine notation: <i>symphona</i> and signatures	 (Theoretical text, Petropolitanus gr. 495, f. 2r, 1 st half of 13 th century [Gertsman])	[22, p. 313]
Late Middle Byzantine notation	 (Atheniensis 2458, f. 11r, A.D. 1336)	[22, p. 308]
Late Middle Byzantine notation: <i>emphona</i> , i.e., interval signs, in various combinations and modulation signs (<i>phthorai</i>)	 (Theoretical text, Docheiariou 338, f. 2r, A.D. 1767, and Vaticanus Barberinus graecus 300, f. 3r, 15 th century [Floros])	[22, p. 321 and 336]
Asmatikon: hyperstases (signs showing entire formulas and their cheironomy)	 (Kastoria 8, f. 58v, 14 th century)	[22, p. 526]

Table 1: Some examples of neumes belonging to different notational systems and categories.

2 Brief History of the Written Record of Psaltic Notation in the Computer Age (Fonts and Software)

The first use of the computer in research about Byzantine music was made by the musicologist Nana Schiødt in Copenhagen in the 1970's. In this case, no font was used, as the computer served to find basic principles in melody construction of Byzantine chant with an algorithm [15].

The creation or existence of a font that contains the signs of psaltic notation is essential in order to show and encode the signs through the computer. An exception is the use of coloring apps, where the user can directly draw the signs using the mouse, his/her hand, or an e-pencil on touch screens. In the case of using a font, it is necessary to use also another software, so that the user can write a digital score with the musical and poetic text in an environment with several visualized commands. The first efforts in this direction were usually related to the creation of fonts and at the same time to the development of software for writing Byzantine music.

The first font for Byzantine Music was prepared by Dimitrios Gianellos in 1989, with the parallel creation of a software called "Byzantinus" [25]. Between 1994 and 2002 Byzantine writing software was implemented by Vellissarios Gezerlis, who created the "Byzwriter" (Byzantinographos), of which we have the second version today [24]. The program supports writing musical texts in the New Method and a small selection of signs belonging to the older notation.

An important step in the evolution of fonts with historical scope and including the signs of older layers of Byzantine musical notation is due to Gregorios Stathis. He started in 1995, and his font was directly related to the standard of ELOT 1373 (Hellenic Organization for Standardization), which was later included in the unicode system [28, 29, 30, 31, 32, 33, 34]. There were 246 characters in this proposal, and the last documentation was produced by Nick Nicholas in 2006.¹

Ioannis Arvanitis implemented his own fonts with the extended notation of the New Method, which he used in his book *The Akathist Hymn* (1997) [23]. The typeset comprises two fonts with a total of 121 signs. Between 1999 and 2002, a similar font was created by the rev. Konstantinos Terzopoulos of blessed memory. This font, with the name "Ephesios", was inspired by Petros Ephesios' historical editions, issued 1820 in Bucharest, and contains also some signs of the older neumatic layer.²

The *NEUMES Project* is an acronym for Neumed & Ekphonic Universal Manuscript Encoding Standard. The project had two phases: October 2001 – March 2003 and March 2005 – August 2007 (extended to February 2008). The main goal was to design and build a software infrastructure for digital transcription and description of medieval chant manuscripts (including psaltic notation) [4]. This represents a very important approach for the encoding of neumes belonging to various traditions by using XML formats. In this context, the contribution of Annalisa Doneda should be mentioned, which focuses on the *hyperstaseis* of the Manuscript Kastoria 8 [6].

In 2005, Ioannis Vamvakas implemented his own open source package for writing Byzantine music in the TeX program language and, assisted by Panagiotis Kotopoulos, created a special font [21]. Another effort, which is also related to missionary action in America, was made in 2006 by Stefanos Souldatos and father Ephraim Arizonitis with the ED, EZ, and BZ packages, basically for the neumes of the New Method, working in the context of the OfficeSuite.³ Roughly in the same period, P. Bakalis developed his "Byzantini Kalamos", a software programme for the neumes of the New Method [3].

In 2008, Savvas Papadopoulos implemented a program of Byzantine music writing with the name "Melodos". The latest version of this software is "Melodos 2013".⁴ This program refers to the New Method and contains one font with 151 signs, which, however, allows for the rendering of many sign combinations. It also offers, among other features, a facility for optical music recognition and a midi player for scores with Byzantine notation. In 2009, Demitrios Manousiakis released the software "Virtual Psaltica"; two years later, Petros Moustakas

1 Nick Nicholas. "Byzantine Musical Notation" (Unicode Technical Note, 20), <https://www.unicode.org/notes/tn20/> (accessed January 12, 2022).

2 Rev. Konstantinos Terzopoulos. "Ephesios. Byzantine Music Symbol Computer Font Set. User's Guide" (1992–2002), <https://docplayer.net/133105750-Ephesios-font-user-s-guide-ephesios-byzantine-music-symbol-computer-font-set-user-s-guide.html> (accessed January 12, 2022).

3 Package of Byzantine music writer "BYZANTINA (BZ)": <http://www.melodima.gr/index.php?pg=downloads&lg=gr> (accessed January 12, 2022).

4 "Melodos 2013": <https://www.melodos.com/> (accessed January 12, 2022).

implemented the program “Pandouris”.⁵ In 2012, Erik Ferguson developed another software called “Byzscribe: A program for scribing Byzantine chant”, written in the Racket programming language.⁶ One year later, Demetrios Papadopoulos released version 4.3.3 of his open source tool “Musical texts”, a very user-friendly program, which is on version 6.5 today.⁷

In 2016, Charalampos Cornaros presented the third edition of his TeX package for Byzantine music writing. As part of this package, a graphical user interface (GUI) by Zisis Tsiatsikas was implemented to facilitate its use. It is important to mention that there are examples in old notation created with this package that are very close to the notation found in the musical manuscripts themselves.⁸

Another font called “Chourmouzos”, containing neumes of the New Method, has been used in a series of editions issued by the Society *United Romiosyne* [26]. Most recently (2020), George Douros prepared documentation for the rendering of Byzantine music with the standards of the Unicode system and OpenType, including fonts such as “Symbola” (prepared by the aforementioned author) or “Garamond-free” (by Daniel Benjamin Miller and Bob Tennent †), and the open source software LibreOffice.⁹ John Daly created the open source software “Kassia” on Github in 2016, which was then improved by Trevor Bullock and others in 2020.¹⁰ This program uses Python and XML.

Finally, Petru Dimitriu and Vasile-Ion Manta developed a scorewriter application in 2018 that allows, among others, to produce transcriptions from the Byzantine notation of the New Method into staff notation [5].

The fonts and software for Byzantine chant we have seen above could be categorized into three groups: fonts and software with a) neumes of the New Method, b) neumes of the New Method and of older notational layers of Byzantine Chant, and c) Byzantine neumes in a wider context of various neumatic notations. While today the first group presents a wide gamut of choices, the second one still needs joint efforts in order to provide – as far as possible – a complete inventory of the extant neumes of the different psaltic notations across the centuries. The present poster is a step in this direction. It is a *desideratum* that Byzantine notation, both in its older and more current layers, be incorporated in the format of the Music Encoding Initiative (MEI) in the future, and we hope that this paper can contribute to that end.¹¹

3 Attempt to Systematically Record and Design the Neumes

Continuing previous work in the field, our attempt is to carefully record the neumes of the various types and stages of neumatic notation occurring with Greek hymns and troparia of the 3rd–21th century. This is done with the help of music theoretical writings (neume lists and treatises), the existing palaeography manuals, and on the base of representative musical sources for each type of notation.¹²

To this end, the simple neumes will be collected as basic digits, along with their main graphical variants. Afterwards, the various combinations made of simple neumes, both as neume constellations and ligatures, will be systematized, again together with their main graphical variants. The systematic mapping of the ‘neumatic landscape’ will include all categories of musical signs, such as the neumes for sounds, musical rendition (rhythm, ornaments, etc.), modal signatures, and modulation signs. For the creation of the font, the different types of historical classifications of neumes will be taken into account in order to match the different signs with their appropriate names according to the notational type to which they belong. Table 2 shows an example of a

5 Virtual Psaltica: <https://docplayer.gr/amp/10479612-Virtual-psaltica-2009-2009-paketo-syggrafis-tis-vyzantinis-moysikis-virtual-psaltica-2009.html>, and Pandouris: <https://pandouris.wordpress.com/> (both accessed January 12, 2022).

6 Ferguson, Erik. “Byzscribe” [GitHub Repository] (2013), <https://github.com/muraiki/byzscribe> (accessed January 12, 2022).

7 Papadopoulos, D. “Musical texts”. Version 6.5 (2021), <http://papline.gr/> (accessed January 12, 2022).

8 Cornaros, Charalampos M. “Documentation for the byzantinemusic.sty Package” (2016), <http://mirrors.ibiblio.org/CTAN/support/byzantinemusic/doc/byzantinemusic-documentation-en.pdf>. For examples with old psaltic notation, cf. <https://analogion.com/forum/index.php?attachments/byzantinemusic-tests-pdf.95089/> (free account required; both links accessed January 12, 2022).

9 Font “Symbola”: <https://fontlibrary.org/en/font/symbola>. Font “garamond-libre”: <https://ctan.org/pkg/garamond-libre>. Documentation: <https://dn-works.com/wp-content/uploads/2020/UFAS-Docs/EEMusic.pdf> (all accessed January 12, 2022).

10 Daly, John. “Kassia” [GitHub Repository] (2016), <https://github.com/jdaly101/kassia>; Bullock, Trevor. “Kassia” [GitHub Repository] (2021), <https://github.com/t-bullock/kassia> (both accessed January 12, 2022).

11 Cf. <https://github.com/music-encoding/music-encoding/issues/707> (accessed January 12, 2022).

12 See, for example, [2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 27, 35].

neume family, along with different graphic variants of the signs, in order to illustrate the immense richness of neumatic shapes and some basic challenges for the creation of a complete psaltic font.

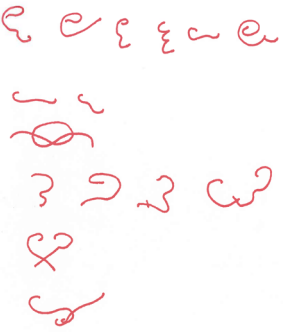
Neumes	Note
	<p>The family of the <i>parakalesma</i> in the fully developed, late and exegetic Middle Byzantine notation:</p> <p><i>Parakalesma</i> (the first shape is the most frequent one)</p> <p><i>Heteron parakalesma</i> (another <i>parakalesma</i>)</p> <p><i>Allon</i> (another one)</p> <p><i>ektstrepton</i> (inverted <i>parakalesma</i>)</p> <p><i>diploparakalesma</i> (double <i>parakalesma</i>)</p> <p><i>homoion</i> (and a similar double <i>parakalesma</i>).</p> <p>[22, p. 538]</p>

Table 2: Complex neume families and multiple graphic shapes: challenges for font design.

Conclusion

The immense wealth of musical signs found in sources containing Greek texts from the 3rd to the 21st century is still waiting to be thoroughly systematized in a machine-processable language by notational types, categories of neumes, neume families, and graphical variants in historical perspective. The production of a comprehensive neume inventory will allow for an efficient completion of the digital neume forms and the creation of a font that attempts to cover all previously known signs from manuscripts and prints containing Greek liturgical chant through the centuries. Further steps will include the creation of a rendering software for psaltic neumes. This can lead to the preparation of a proposal for an MEI Schema. In turn, this will promote editorial work, transcriptions, and analyses of Byzantine chant as well as many new interdisciplinary studies.

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Works Cited

- [1] Alexandru, Maria. "Writing Music on Greek Texts during the First Christian Millennium" (forthcoming).
- [2] Alexandru, Maria. "Some Thoughts on the Didactics of Byzantine Music Palaeography" *Καλοφωνία* 9 (2018), 17–32.
- [3] American Society of Byzantine Music and Hymnology. "Program of the Second International Conference: Byzantine Musical Culture, June 10–14, 2009, Athens, Greece". 2009, 10, <http://www.asbmh.pitt.edu/page9/page13/page20/ASBMH%202009%20Final%20Program.pdf>.
- [4] Barton, Louis. "The NEUMES Project: Digital Transcription of Medieval Chant Manuscripts", in *Proceedings of the Second International Conference on Web Delivering of Music (WEDELMUSIC 2002)*, 211–218, <https://doi.org/10.1109/WDM.2002.1176213>.
- [5] Dimitriu, Petru, and Vasile-Ion Manta. "Scorewriter Application with Features Aimed at Byzantine Music Processing" in *Proceedings of the 2018 22nd International Conference on System Theory, Control and Computing (ICSTCC 2018)*, 385–390, <https://doi.org/10.1109/ICSTCC.2018.8540701>.
- [6] Doneda, Annalisa. "Information Management in the Representation, Storage, and Analysis of Byzantine Chant Repertories" in *Music Analysis East and West*, ed. Walter B. Hewlett and Eleanor Selfridge-Field (Computing in Musicology, 14). Cambridge (Mass.): The MIT Press, 2005–2006, 113–120.
- [7] Fleischer, Oskar. *Die spätgriechische Tonschrift*. Berlin: Georg Reimer, 1904.
- [8] Floros, Constantin. *Universale Neumenkunde*, 3 vols. Kassel: Bärenreiter Antiquariat, 1970.
- [9] Gastoué, Amédée. *Introduction à la paléographie musicale byzantine: Catalogue des manuscrits de musique byzantine de la Bibliothèque nationale de Paris et des bibliothèques publiques de France*, première partie. Paris: Impressions artistiques L.-Marcel Fortin & Cie., 1907.
- [10] Høeg, Carsten. *La notation ekphonétique* (Monumenta Musicae Byzantinae. Subsidia, I/2). Copenhagen: Levin & Munksgaard, 1935.

- [11] Panțiru, Grigore. *Notația și ehurile muzicii bizantine*. Bucharest: Editura muzicală a Uniunii Compozitorilor, 1971.
- [12] Papathanasiou, Ioannis, and Nikolaos Boukas. "Early Diastematic Notation in Greek Christian Hymnographic Texts of Coptic Origin. A Reconsideration of the Source Material" in *Palaeobyzantine Notations III, Acta of the Congress held at Hernen Castle, The Netherlands, in March 2001*, ed. Gerda Wolfram (Eastern Christian Studies, 4). Leuven, Paris, Dudley (Mass.): A.A. Bredius Foundation, Peeters, 2004, 1–25.
- [13] Petrescu, Rév. Père Ioan D. *Études de paléographie musicale byzantine*. Bucharest: Éditions musicales de l'Union des Compositeurs de la République Socialiste de Roumanie, 1967.
- [14] Petrescu, Rév. Père Ioan D. *Studii de paleografie muzicală bizantină*, vol. II, ed. Titus Moisescu. Bucharest: Editura muzicală, 1984.
- [15] Schiødt, Nana. "A Computer-Aided Analysis of Thirty-Five Byzantine Hymns" in *Studies in Eastern Chant*, vol. 2, ed. Miloš Velimirović. London: Oxford University Press, 1971, 129–154.
- [16] Strunk, Oliver. *Specimina Notationum Antiquiorum. Folia selecta ex variis codicibus saec. x, xi, & xii phototypice depicta*, 2 parts (Monumenta Musicae Byzantinae. Facsimiles, 7). Copenhagen: Ejnar Munksgaards Forlag, 1966.
- [17] Tardo, Lorenzo. *L'antica melurgia bizantina nell' interpretazione della Scuola Monastica di Grottaferrata* (Collezione meridionale disetta da U. Zanotti-Bianco, 3). Grottaferrata: Scuola tip. italo-orientale "S. Nilo", 1938.
- [18] Thibaut, Jean-Baptiste. *Monuments de la notation ekphronétique et hagiopolite de l'église Grecque* [St. Petersburg, 1913], reprint with appendix, introduction by Oliver Strunk. Hildesheim, New York: Georg Olms, 1976.
- [19] Tillyard, H.J.W. *Handbook of the Middle Byzantine Musical Notation* [Copenhagen, 1935], 2nd ed. with a postscript by Oliver Strunk (Monumenta Musicae Byzantinae. Subsidia, I/1). Copenhagen: Levin & Munksgaard, 1970.
- [20] Troelsgård, Christian. *Byzantine Neumes. A New Introduction to the Middle Byzantine Musical Notation* (Monumenta Musicae Byzantinae. Subsidia, 9). Copenhagen: Museum Tusulanum Press, 2011.
- [21] Vamvakas, Ioannis A., and Panagiotis Kotopoulos. "BYZLATEX: A Package for Typesetting 'Byzantine' Music" *TUGboat* 26, no. 3 (2005), 224–232, <https://tug.org/TUGboat/tb26-3/tb84vamvakas.pdf>.

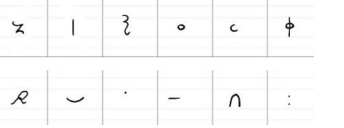
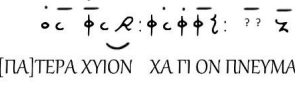
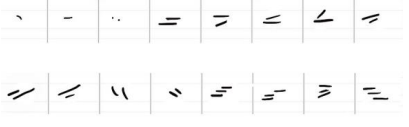

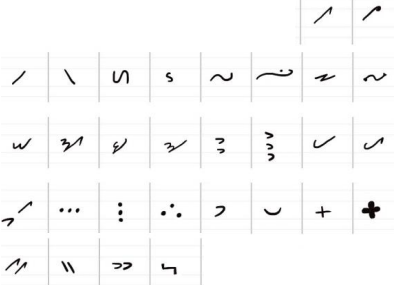
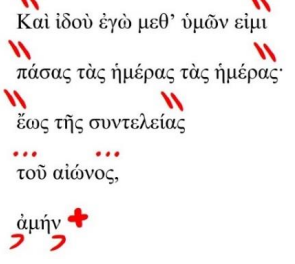

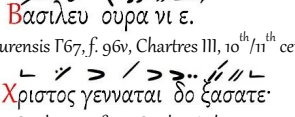

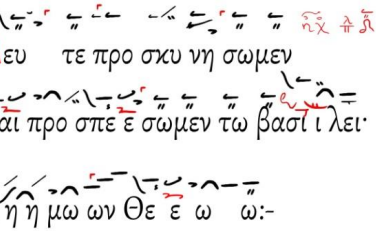
Works in Greek

- [22] Alexandru, Maria (Αλεξάνδρου, Μαρία). *Παλαιογραφία Βυζαντινής Μουσικής. Επιστημονικές και καλλιτεχνικές αναζητήσεις* [*Palaeography of Byzantine Music. Scientific and Artistic Approaches*]. Athens: Hellenic Academic Ebooks, 2017, <https://repository.kallipos.gr/handle/11419/6487> (opens with Mozilla).
- [23] Arvanitis, Ioannis (Αρβανίτης, Ιωάννης). *Ο Ακάθιστος ύμνος* [*The Akathist Hymn*]. Athens: En Plo, 1997.
- [24] Gezerlis, Velissarios (Γκεζερίλης, Βελισάριος). "Βυζαντινογράφος 2.0. Ένα πλήρες σύστημα για τη συγγραφή της Βυζαντινής Μουσικής Σημειογραφίας στον Η/Υ [Byzantinografos 2.0. A Full System for Writing Byzantine Notation on the Computer]" presented at the *Second International Congress of Byzantine Musicology and Psaltic Art* (2003), Athens, Greece, October 15–19, 2003.
- [25] Gianellos, Dimitrios (Γιανέλλος, Δημήτριος). "Η συμβολή της πληροφορικής στην έρευνα και στη διδασκαλία της Βυζαντινής Μουσικής. Μια πρώτη προσέγγιση [The Contribution of Informatics to the Research and Teaching of Byzantine Music]" *Melourgia* 1 (2008), 199–209.
- [26] Persinakis, Dimitrios E. (Περσυνάκης, Δημήτριος Ε.), ed. *Κοινωνικά παλαιών διδασκάλων: ήτοι κοινωνικά μελισθέντα υπό παλαιών διδασκάλων και εξηγηθέντα εκ της παλαιάς εις την νέαν γραφήν παρά Χουρμουζίου Χαρτοφύλακος* [*Koinonika by Old Masters, that is Koinonika Composed by Old Teachers and Transcribed from the Old Method to the New One by Chourmouzos the Archivarion*]. Thessaloniki: Enomeni Romiosini, 2014.
- [27] Psachos, Konstantinos (Ψάχος, Κωνσταντίνος). *Η παρασημαντική τής βυζαντινής μουσικής, ήτοι ιστορική και τεχνική επισκόπησις τής σημειογραφίας τής βυζαντινής μουσικής από των πρώτων χριστιανικών χρόνων μέχρι των καθ' ήμας* [*The 'Parasemantike' of Byzantine Music, that is Historical and Technical Overview of the Notation of Byzantine Music from the Early Christian Times to Nowadays*], 2nd enlarged ed. G. Chatzitheodorou (Γ. Χατζηθεοδώρου). Athens: Dionisos Publications, 1978.
- [28] Stathis, Gregorios (Στάθης, Γρηγόριος). "Γραφική ακολουθία των σημαδιών της μεσοβυζαντινής και της νέας αναλυτικής μεθόδου [Graphic Arrangement of the Neumes of the Middle Byzantine Notation and of the New Analytical Method]" in "...τιμή προς τόν διδάσκαλον...". *Έκφραση αγάπης στο πρόσωπο του καθηγητού Γρηγορίου Θ. Στάθη. Αφιέρωμα στα εξηντάχρονα τής ηλικίας και στα τριαντάχρονα τής επιστημονικής και καλλιτεχνικής προσφοράς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 257–258.
- [29] Stathis, Gregorios (Στάθης, Γρηγόριος). "Α'. Γένεση και εξέλιξη της ελληνικής βυζαντινής σημειογραφίας και οι τυπογραφικές χαράξεις [A. Birth and Development of the Greek Byzantine Notation and the Typographical Engravings]" in "...τιμή προς τόν διδάσκαλον...". *Έκφραση αγάπης στο πρόσωπο του καθηγητού Γρηγορίου Θ. Στάθη. Αφιέρωμα στα εξηντάχρονα τής ηλικίας και στα τριαντάχρονα τής επιστημονικής και καλλιτεχνικής προσφοράς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 237–246.
- [30] Stathis, Gregorios (Στάθης, Γρηγόριος). "Παρουσίαση του ελληνικού προτύπου Greek Byzantine Musical Notation System – Ελληνο-Βυζαντινό Μουσικό Σημειογραφικό Σύστημα (Ηράκλειο, Δευτέρα 7 Ιουλίου 1997) [Presentation of the Model 'Greek Byzantine Musical Notation System' (Iraklio, Monday, 7th July 1997)]" in "...τιμή προς τόν διδάσκαλον...". *Έκφραση αγάπης στο πρόσωπο του καθηγητού Γρηγορίου Θ. Στάθη. Αφιέρωμα στα εξηντάχρονα τής ηλικίας και στα τριαντάχρονα τής επιστημονικής και καλλιτεχνικής προσφοράς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 235–236.
- [31] Stathis, Gregorios (Στάθης, Γρηγόριος). "Γ'. Η σημειογραφία της βυζαντινής και μεταβυζαντινής μουσικής ήτοι της ελληνικής ψαλτικής τέχνης, είναι το ελληνικό μουσικό αλφάβητο [C. The Notation of Byzantine and post Byzantine Music, that is of the Greek Psaltic Art, is the Greek Musical Alphabet]" in "...τιμή προς τόν διδάσκαλον...". *Έκφραση αγάπης στο πρόσωπο του καθηγητού Γρηγορίου Θ. Στάθη. Αφιέρωμα στα εξηντάχρονα τής ηλικίας και στα τριαντάχρονα τής επιστημονικής και καλλιτεχνικής προσφοράς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 252–256.

- [32] Stathis, Gregorios (Στάθης, Γρηγόριος). "Ο σχεδιασμός των σημαδίων της ψαλτικής τέχνης Stathis Series [The Font Design of the Neumes of Psaltic Art 'Stathis Series']" in "...τιμή πρὸς τὸν διδάσκαλον...". *Ἐκφραση ἀγάπης στὸ πρόσωπο τοῦ καθηγητοῦ Γρηγορίου Θ. Στάθης. Ἀφιέρωμα στὰ ἐξηντάχρονα τῆς ἡλικίας καὶ στὰ τριαντάχρονα τῆς ἐπιστημονικῆς καὶ καλλιτεχνικῆς προσφορᾶς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 223–234.
- [33] Stathis, Gregorios (Στάθης, Γρηγόριος). "B'. Ο σχεδιασμός των σημαδίων Stathis Series [B. The Font Design of the Neumes 'Stathis Series']" in "...τιμή πρὸς τὸν διδάσκαλον...". *Ἐκφραση ἀγάπης στὸ πρόσωπο τοῦ καθηγητοῦ Γρηγορίου Θ. Στάθης. Ἀφιέρωμα στὰ ἐξηντάχρονα τῆς ἡλικίας καὶ στὰ τριαντάχρονα τῆς ἐπιστημονικῆς καὶ καλλιτεχνικῆς προσφορᾶς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 247–251.
- [34] Stathis, Gregorios (Στάθης, Γρηγόριος). "Ἡ μουσικὴ τυπογραφία τῆς ψαλτικῆς τέχνης. (Εἰσαγωγή, 1820–1931) [The Musical Typography of Psaltic Art. (Introduction, 1820–1931)]" in "...τιμή πρὸς τὸν διδάσκαλον...". *Ἐκφραση ἀγάπης στὸ πρόσωπο τοῦ καθηγητοῦ Γρηγορίου Θ. Στάθης. Ἀφιέρωμα στὰ ἐξηντάχρονα τῆς ἡλικίας καὶ στὰ τριαντάχρονα τῆς ἐπιστημονικῆς καὶ καλλιτεχνικῆς προσφορᾶς του* ["...Honour to the Teacher...". *Expression of Love to the Teacher Gregorios Th. Stathis. Festschrift on the Occasion of his Sixtieth Birthday and Thirty Years of Scientific and Artistic Contribution*]. Athens: Anatolis to Periichima, 2001, 211–217.
- [35] Stathis, Gregorios (Στάθης, Γρηγόριος). "Ἱστορικὴ καὶ παλαιολογικὴ θεώρηση τῆς σημειογραφίας τῆς ἑλληνικῆς Ψαλτικῆς Τέχνης [Historic and Palaeographic View of the Notation of Greek Psaltic Art]" in *Τὰ πρωτόγραφα τῆς ἐξηγήσεως εἰς τὴν Νέαν Μέθοδον σημειογραφίας* [The Protographs of the Exegesis into the New Method of Notation], vol. 1, part 1. Athens: Institute of Byzantine Musicology, 2016, 75–192.

Font Design of Psaltic (Byzantine) Notation for Greek Musical Repertories

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Notation type and sources	Neume samples from the process of designing the neumes font <i>Koukouzelis</i> : a work in progress	Example
Ancient Greek alphabetic vocal (2 nd half of 3 rd cent.)		 <p>Papyrus Oxyrhynchus 1786, 2nd half of 3rd cent.</p>
Sinaitic notation (9 th - 10 th cent.)		 <p>Sinai, New Findings ΜΓ 37, 9th-10th cent.</p>
Ekphonic notation (10 th -12 th cent.)		 <p>Dionysiou 587, f. 167v, 12th cent.</p>
Palaeobyzantine notation (10 th -12 th cent.)		 <p>Laurenis Γ67, f. 96v, Chartres III, 10th/11th cent. BnF Coislin 220, f. 9r, Coislin VI, beginning of 12th cent.</p>
Middle Byzantine notation (12 th -19 th cent.)		 <p>NLG 2458, f. 11v, A.D. 1336 Neume design according to tables and sources contained in Αλεξάνδρου, Παλαιογραφία (20217).</p>