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## **PROBLEMS AND ACHIEVEMENTS IN THE DIGITALIZATION OF BULGARIAN FOLKLORE MUSIC**

**Abstract.** Bulgarian folklore music is an important part of Bulgarian cultural heritage. The goal of this article is to describe briefly some achievements in digitalization of music – music archives, methods and techniques; to discuss what is done till now for Bulgarian folklore music and to outline directions for future work. We give short descriptions of tools for writing scores and mention special features of Bulgarian folklore music concerning the process of digitalization. Bulgarian folklore music has many common characteristics with the folklore music of other Balkan countries and the principles, methods and technologies for digitalization of Bulgarian folklore music can be used in other countries of south–eastern Europe.

### **1. Introduction**

Current state of the art still distributes music either on paper or on CD or similar media. However, the possibility to distribute music in several other formats, such as digital audio and as images of music scores opens several new directions for research. At the same time, Internet technologies are changing the distribution mechanisms of music in important ways. The main assignment for this is the digitalization of music.

*What means digitalization of music?*

Digital audio (MIDI, MP3, other audio files), full audio records or audio examples, different interpretations and performers.

Scores, sheet music (written in MusiXTeX, PMX, etc.; presented in PDF, PostScript files, etc.), different arrangements.

Information (text, pictures) about authors, pieces, instruments; sources, references.

Database, music archive, Internet publications.

In this article we accentuate writing scores as an important and difficult part of whole conception for music digitalization. The information source is entirely available on the Internet.

### **2. Overview of music archives**

**Werner Icking Music Archive** [1] It is hosted by the SunSITE server at the University of Aalborg, Denmark. Werner Icking founded the GMD Music Archive of scores, software, email, and other music related items, and diligently maintained it for the

benefit of any Internet traveler who might happen by free sheet music archives. It contains ready-to-print sheet music, most in the form of PDF files. Now this archive contains over 200 composers and is open for adding new composers and items. This is the definitive archive of software related to **MusiXTeX** [6], a music typesetting system based on TeX.

*Examples:* Allegro Molto Sonate D-Major from L. v. Beethoven (1770–1827), Op. 6 [See <http://www.math.bas.bg/~nkirov/2003/digit/gadagio.gif>]

Vivaldi, Cessate, omai cessate Cantata ad Alto solo con Instrumenti (Violino I, Violino II, Viola, Basso, Cavicembalo) (RV684) – edited by Luigi Cataldi; with M-TX/PMX/MusiXTeX–source [See <http://www.math.bas.bg/~nkirov/2003/digit/Cb.gif>]

**Classical Sheet Music Downloads** [2] Virtual Sheet Music is a music oriented website which distributes classical sheet music on the Web for immediate purchase and download to musicians and music lovers. The desired music can be downloaded from the website directly to the user's home computer, and subsequently displayed and/or printed. The sheet format is pdf and it produces the high quality printout. *Example:* Chopin, F., Nocturne Op.9 No.1 for piano solo {See <http://www.math.bas.bg/~nkirov/2003/digit/chopin1.gif>}

**Popular music notes** [3] A small site contains Popular Chinese music, World classic, Japanese music, Movie themes, and Western music. All the sheets are jpeg pages, directly scanned from paper sources. *Example:* Chinese song: "xinsheng" [See <http://www.math.bas.bg/~nkirov/2003/digit/xinsheng1.jpg>]

**Traditional and folksong archive** [4] Garrett Hope maintains a small database of traditional and folk songs. Due to the nature of public domain he posts these songs so that they can be viewed, played, downloaded, and printed for free. The database now contains folk songs from America, Austria, Canada, England, France, Germany, Ireland, Norway, Scotland, Switzerland, Tyrol and Wales. The samples are offered in two formats: Scorch and Bitmap. Scorch is a free, unique and original browser plug-in developed by Sibelius (complex music notation software). Scorch allows the surfer to view, listen to, transpose, and print the displayed music. *Example:* Switzerland – Von Meinem Bergli [See <http://www.math.bas.bg/~nkirov/2003/digit/sib.gif>]

**Free-scores.com** [5] Free-scores.com is a directory of free sheet music and MP3 on the web, and also featured sheet music to buy in the store section. 1202 Free sheet music sites in the directory, classified mainly by instruments. 20th place for Balkanfolk.com (8/13/2003).

### 3. Tools and technologies for writing scores

**MusiXTeX** [6] MusiXTeX is a set of macros and fonts that enables the system TeX to typeset polyphonic, orchestral and vocal music. It is still under continuing development.

Usually TeX source files are typeset as texts with some control sequences, used mainly for the presentation of formulas. But MusiXTeX source files are filled with macros to type musical marks, and they look so complicated that many people hesitate at a glance. MusiXTeX is not so easy, that's true. But once mastered, one can produce scores of no less quality than the ones on market.

To simplify inputting instrumental music there is the preprocessor PMX, which creates a TeX input file. For vocal music, there is M-Tx, a preprocessor for PMX. These methods are used in Werner Icking Music Archive [1] and there is a detailed documentation [6a] for the methods implementation. *Example:* MusicTeX file [See <http://www.math.bas.bg/~nkirov/2003/digit/A162.tex.txt>]

**Note Editor – Editor for musical notation** [7] Note Editor is an editor for music notation that supports an unlimited number of staves and up to 9 voices per staff. The import formats are MIDI files, recorded from MIDI keyboards and TSE3. The export formats are MusiXTeX [6], LilyPond, PMX, MUP, and TSE3. *Example:* NoteEdit [See <http://www.math.bas.bg/~nkirov/2003/digit/notedit.gif>]

**Sibelius** [8] There is a lot of software for digitalization and presentation music. Let us describe briefly Sibelius – complex music notation software. The main features of Sibelius are: creating music, composing and arranging, playback, page layout and part extraction, publishing and Internet publishing.

*Creating music.* MIDI input: Flexi-time™ is Sibelius's unique system for notating music as it is played on a MIDI keyboard in real time.

*Mouse & keystrokes:* Pick note-values and accidentals from the keypad with the mouse, and click to place them in the score.

*Scanning:* Sibelius includes PhotoScore™ Lite – the state-of-the-art program for scanning printed music.

*File conversion:* Sibelius opens Finale™, SCORE™, Allegro™, PrintMusic™, and MIDI files.

*Composing and arranging.*

*Text & lyrics:* Sibelius puts different types of text, such as dynamics, titles and lyrics, in the appropriate font, size and position. You can edit these text styles to change text consistently throughout the score.

*Arrange™:* Arrange is a feature to help with arranging and orchestration.

*Checking for mistakes:* Sibelius saves the time by spotting all kinds of mistakes such as rhythms which do not add up, or notes which are too high/low to play. Sibelius knows every instrument's range, which it can adjust for players of different abilities.

*Playback.* Playing back the score: Click the play button to hear the music. Sibelius reads, understands and plays back all standard markings – including trills, repeats, cresc./dim. hairpins, 8vas, glissandos, percussion and drum sets, guitar tab, and even quarter-tones.

*Page layout and part extraction. Publishing and Internet publishing.*

*Scorch.* Sibelius Scorch is a free web browser plug-in that lets play, transpose, change instruments, save and print Sibelius scores on the Internet.

*PhotoScore.* The PhotoScore family of products allows scanning printed music into computer. One can then plays it back, transpose it or edit it. *Example:* The Scorch toolbar [See <http://www.math.bas.bg/~nkirov/2003/digit/scorch.html>]

#### 4. The state of digitalization of Bulgarian folklore music

**WebFolk project** [9] The project WebFolk.BG is a result of over 5 years work, realized by a research team under the conduction of Dr. Lubomir Kavaldjiev at the Institute for

Art Studies – Bulgarian Academy of Sciences. It contains Multimedia Database for Authentic Bulgarian Musical Folklore – over 8000 records including text (both lyrics and analytical data), audio (MP3), notes, photos (GIF) and video material (RM) in Bulgarian folk music. Some records include scores, directly scanned from paper sources. There is also Search engine with good possibilities for searching by all indicators – fields in the database record.

**Balkanfolk.com** [10] Folk music and folk songs chart. There are free audio samples in MP3 or RA formats, also free notes (sheet music) for some songs in PDF and GIF files. It takes 20th place in Free-scores.com (8/13/2003). Examples: Magda\_tsvete\_brala [See <http://www.math.bas.bg/~nkirov/2003/digit/magda.html>], Breznishko horo [See <http://www.math.bas.bg/~nkirov/2003/digit/brel.gif>]

Fig.1. Bulgarian folk song  
“Izlel e Delyo haidoutin”

**Bulgarian books and music** [11] The site contains data about Bulgarian folklore instruments with sound samples in MP3 files. Some books concerning Bulgarian folklore music are announced. For example Anthology of Bulgarian folk musicians contains scores of some songs. Examples: [See <http://www.math.bas.bg/~nkirov/2003/digit/668.jpg>], *Izlel e Delyo haidoutin* [See Fig.1]

#### **Authentic folklore from South–West Bulgaria** [12]

The database and website are granted by the National foundation "Cultura". It includes 47 authentic danceable melodies (horo) described by prof. Ilija Manolov. 21 of them have full records audio files in MP3 and WMA formats.

### **5. Special features in Bulgarian folklore music**

- There are some difficulties in writing scores of Bulgarian folklore music.
- Different notations of one and the same piece (song, melody or danceable music) written by different musicians, performs in different areas, changing in the time.
  - Several texts of one and the same song – the same argument.
  - Irregular measures or lack of measure.
  - Specific musical instruments – typical for Bulgarian folklore music.
  - Language (Cyrillic letters or Latin letters) – no standard to write in Bulgarian with Latin letters.

*Scores of Bulgarian folklore song in MusiXTeX*

MM  $\text{♩} = 192$

Три бюл-бю-ла пе-ят, три бюл-бю-ла пе-ят, три бюл-бю-ла пе-ят, го-ре в'пла-ни-не-то.

Fig. 2. Bulgarian folk song “Tri bjulbjula pejat”

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