

# Computer-Assisted Analysis and Visualization of 18th-Century Portuguese Keyboard Music

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## Abstract

Portuguese keyboard music from the 18th century is mostly composed of sonatas, with Carlos Seixas (1704-1742) being the author of the first known pieces in this genre. The sonatas by Seixas have a binary structure and are closer to the sonatas by Domenico Scarlatti (1685-1757), who also lived in Portugal in the service of the crown between 1719 and 1729.

Binary structures are at the origin of more complex sonata forms developed from the middle of that century. Many Portuguese composers are representative of this transformation in keyboard music. This repertoire has previously been manually analyzed according to Hepokoski and Darcy's Sonata Theory (2006) and disseminated in conferences, scientific journals, and concerts. However, the latter requires a different approach to capture the audience's attention.

Our current work aims to evaluate the application of the ATAVizM software in analyzing and visualizing the formal structure of Portuguese sonatas. The work has two main components: first, comparing the manual analysis with the ATAVizM analysis; second, associating the ATAVizM visual interface with the musical performance of the sonatas.

ATAVizM (Algorithmic Thinking, Analysis and Visualization of Music) is a free and open-source software funded by the US National Endowment for the Humanities. The software supports producing annotated network (arc) diagrams through pattern discovery and user-selected instances of material related through equivalence and similarity. Methods include transpositional, various types of contour relations for pitch and rhythm, edit distance, pitch class sets, and, most recently, scale degree skeletons (based on the concept of Gjerdingen's Galant Schemata). Versions have been developed and deployed in MATLAB and Python.

ATAVizM has previously been applied to 18th-century Austro-German keyboard music (Carter-Ényì and Rabinovitch 2021), 20<sup>th</sup> and 21st-century Nigerian vocal music (Carter-Ényì 2021), Indian Classical Music and American Commercial Popular Music and Jazz (forthcoming).

Portuguese music is a new application and proof of concept for ATAVizM software as a tool for analyzing and visualizing the structure of Portuguese repertoire, as well as an option to ensure greater public attention and, consequently, better dissemination of this repertoire. For this, we used a sample of three different types of sonata forms from the Portuguese keyboard repertoire. These are the parallel binary form, the Type 2 sonata, and the Type 3 sonata.

Like Austro-German music, thematic (contour-based) and contrapuntal structures (schema-based) methods are highly appropriate for the repertoire, as demonstrated in the visualization of a Sonata composed by Francisco Xavier Baptista below.

In the workshop presentation, we will evaluate and compare traditional manual score analysis (e.g., Hepokoski & Darcy 2006) with computer-assisted symbolic music analysis (e.g., Carter-Ényì, Condit-Schultz & Rabinovitch 2021). A keyboard instrument will be needed to pair the musical interpretation of the brief sonatas with the diagrams produced using ATAVizM software. Similar to applications of ATAVizM in the past, this project emphasizes underrepresented repertoires.

## Sample Visualization

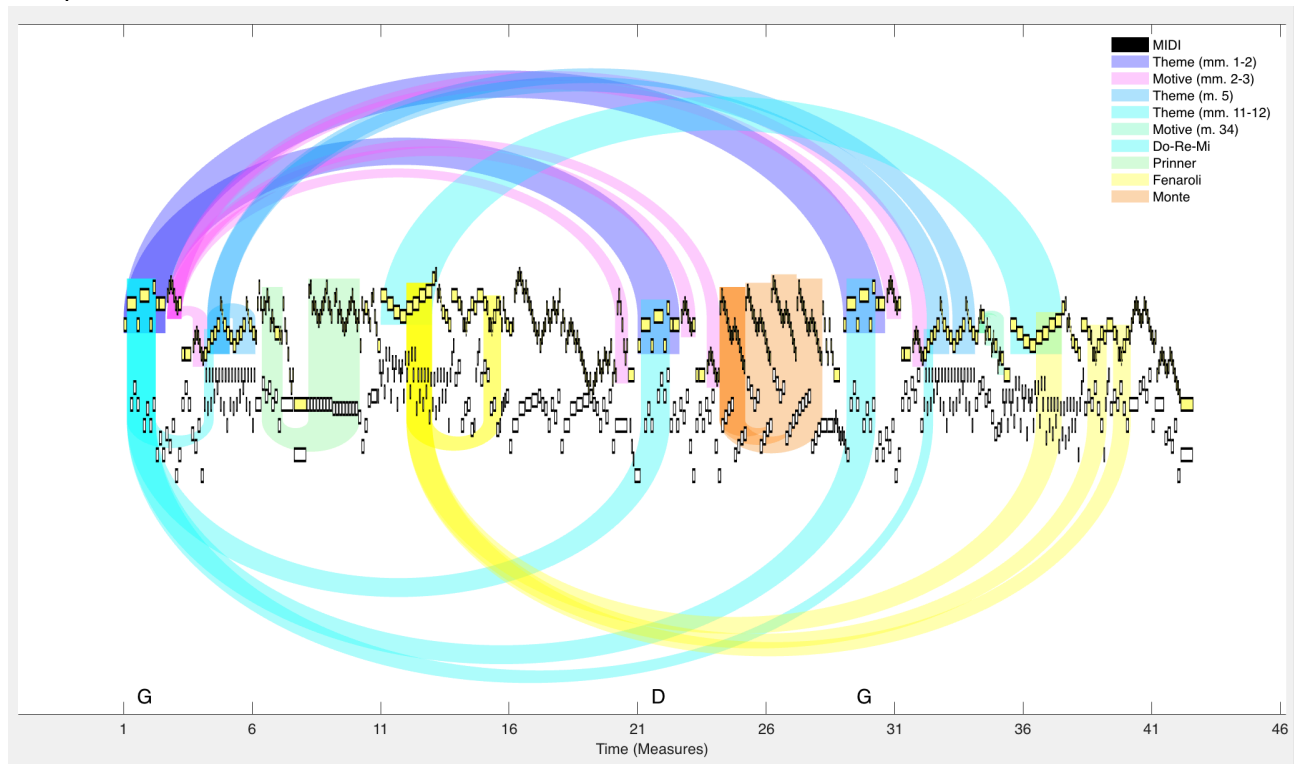


Figure 1: Francisco Xavier Baptista visualization produced in ATAVizM for this project (2023)

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