"Getting to Grips with Musical Complexity"
Third International Conference on Computational and Cognitive Musicology (ICCCM25)
Aalborg University, Aalborg, Denmark
8-10 October 2025

Oral presentation

Authors:
Lucas Hofmann, Julius-Maximilians-Universität Würzburg,
lucas.hofmann@uni-wuerzburg.de
Christoph Finkensiep, Universiteit van Amsterdam,
c.finkensiep@uva.nl
Fabian C. Moss, Julius-Maximilians-Universität Würzburg,
fabian.moss@uni-wuerzburg.de

Title: **Metric Complexity in Polyphonic Music: A Theoretical Framework and Quantitative Analysis of Hugo Distler's Motets**

Keywords: meter, metric complexity, metric stability, computational analysis, Hugo Distler

Musical meter typically functions as a structural constant in music, providing a framework of regular pulses upon which rhythms unfold. In Western music, meter generally remains consistent over extended musical sections, or even throughout entire pieces. However, this regularity is occasionally disrupted by metric shifts or polymetric structures, which challenge conventional conceptions of meter.

Here, we understand meter as composed of smaller units—simple meters—that serve as its basic building blocks. This view allows for the decomposition of both regular and irregular metric structures into their fundamental components. In doing so, it provides a means to analyze and quantify the structural complexity of individual meters as well as of sequences of meters in both monophonic and polyphonic music.

Based on this perspective, we propose a measure for the complexity of meters and sequences of meters that depends on the cardinality (i.e., the number of pulses) and the number and type of its component simple meters. In this context, we also outline the concept of metric stability, a holistic feature of a piece of music. It serves as a new parameter for describing the degree to which a meter remains consistent over time. We demonstrate our music-theoretical framework through computational analyses of Hugo Distler's motets, which are characterized by pronounced metric irregularities.

Key findings show that Distler's motet collection *Der Jahrkreis* employs a total of 16 distinct time signatures, resulting in an overall high degree of metric complexity. Individual motets feature up to six different meters, with an average of 2.57 distinct meters per piece. The metric complexity values exhibit substantial variability across the motets and are, on average, approximately five times higher than those found in Bach's chorales, which themselves show very low variability. Similarly, Distler's motets exhibit fluctuating metric stability, whereas Bach's chorales demonstrate high stability.