

Tempo Following Behavior in Musical Accompaniment

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Abstract

Recent investigations into the timing behavior of musicians undergoing ritardando and accelerando have indicated that the curve produced by plotting song position over time is neither linear nor exponential (e.g., Feldman, Epstein, & Whitman, 1992). The results of several experiments run on piano accompanists are presented, showing a rather consistent damped oscillatory behavior in response to unanticipated tempo changes. In the experiments, trained piano accompanists were given the task of accompanying an electronically controlled lead voice line which changed tempo. The task of the subjects was to follow the lead voice, to the best of their ability, through various kinds of tempo changes. Subjects' tempo fluctuations in response to these changes were measured, and their tempo vs. time responses consistently exhibit a damped oscillation. Reported is a continuous parametric model which describes the behavior, and offers ramifications for a cognitive model that would attempt to explain it. One explanation for this behavior is based on the cognitive limitations of the accompanist. A full model of tempo following is directly beneficial to designers of flexible real-time computer-based accompaniment systems, where the model can enable natural-sounding tempo changes to be produced artificially.

Keywords: timing, temporal perception, auditory perception, tempo, tempo following, accompaniment, music, cognition, computer music.