

Meeting: 1001, Evanston, Illinois, SS 23A, Special Session on Mathematical Techniques in Musical Analysis

1001-15-416 **Elaine Chew*** (echew@usc.edu), University of Southern California, Epstein Dep of Industrial & Systems Eng, 3715 McClintock Avenue GER 240, Los Angeles, CA 90089-0193. *Measuring Musical Dissimilarity: First and Second Order Center of Effect (CE) Differences Inside the Spiral Array*. Preliminary report.

The Spiral Array (Chew 2000) is an arrangement of tonal objects as an array of spirals in three-dimensional space so that inter-object distances match their perceived closeness. The outermost helix is the spiral configuration of the "tonnetz" (see Cohn 1998), in which pitches separated by a perfect fifth are neighbors along the spiral and those separated by a major third are vertical neighbors. The helical structure allows interior points to be defined as convex combinations of pitch classes that summarize and approximate musical context at various hierarchical levels.

The distance between these interior points, called centers of effect (CEs), measures the difference between two tonal contexts. This first order difference can be used to assign a value to contextual dissimilarity between two musical selections. When the selections are neighboring segments of music, peaks in the first order difference time series correspond to segmentation boundaries. This talk will present the idea of the first order CE difference and extend it to a second order difference inside the Spiral Array space. As the name suggests, the second order difference will measure dissimilarity between the directions of pitch context change within two musical segments. (Received August 31, 2004)