Spectral Transformation and Cross Synthesis of Sinusoidal Analysis Peaks

Theodore Apel
Dartmouth College

This paper presents a set of techniques for spectral transformation based on a new class of cross synthesis methods. These techniques allow (i) the 'harmonizing' or 'deharmonizing' of a sound with a previously defined spectral model and (ii) the time varying transformation of the frequency components of one sound to another. These techniques can be used to investigate the correlation between spectra and scale. This is an area that has begun to be explored by cognitive ethnomusicologists such as Catherine Vaughan and others. The files produced by the McAulay-Quastieri (MQ) method of sinusoidal analysis are used as the basis of these cross synthesis methods. This representation of sound provides a flexible and perceptually intuitive format for frequency domain transformations because of its abstraction of exact frequency spectra as amplitude peaks.

A Macintosh application McAulay-Quastieri Transformation (MQT) will be presented which performs these spectral transformations on data created by the "Lemur" analysis/synthesis program. MQT allows users to combine MQ frequency and amplitude peak data with various methods of cross synthesis. New MQ files are created which are resynthesized using Lemur. Example sounds will be played which demonstrate these techniques and a simple user interface will be shown for the application of these techniques.

(This paper will be provided as an addenda upon receipt. (editor))