THE HIDDEN CODE OF MUSICALITY : A REAL TIME SOLUTION

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A real time model realised mainly on a PDP-11-23 that plays melodies of the great composers with authentic and moving expressiveness will be presented. It is based on two major functions :

1.   Individual tone amplitude shapes appropriately calculated for each tone of the melody. The shape expressed by Beta functions is skewed forward or backward from a median shape in proportion to the positive or negative slope of the melodic contour, measured to the next tone. This gives the amplitude shape a predictive function, adding to the feeling of continuity as well as to the continuity of feeling. (This function appears to apply to music in general. Examples from Bach to Tschaikowsky and Bartok will be performed).

2.   Music of classical composers of the period 1750-1900 is found to incorporate a microstructure of a pulse matrix distinctive of the composer. The pulse matrix influences both the amplitude proportions of component tones within a pulse group and their time duration deviations from notated values for a given meter. Matrix values for Mozart, Beethoven and Schubert will be specified, which appear to apply generally to the works of these composers.

Combining both functions   creates expressiveness of a higher order. Further improvement can result from modification of some amplitudes and/or shapes according to essentic form* and the addition of micropauses. Melodies played in artistically meaningful form and subtle detail by the computer program according to these functions will be presented.

No attempt is made to copy the sound of traditional instruments. Instead, we ask how much expressiveness is possible using only sinusoidal carrier tones with individually shaped amplitude contours, and subtle timing, eliminating timbre effects. Surprisingly, most expressive nuances can in fact be well realised in this way. Changes in timbre within the course of individual tones as further expressive means can then be studied, as a separate function.

The functions found appear to represent, to a considerable extent, a cracking of the code of musicality : they allow computers to sound no longer "dead" but rather with appropriate living expressiveness - neither insufficient nor exaggerated. This livingness is achieved not by imitating the noise factors in music making but by understanding the nature of expressiveness. The importance of this for the teaching of music, for the musical use of computers by young people, and for understanding the nature and subtlety of musical meaning is considerable. It also makes it readily possible for anyone to work out their own meaningful interpretations, without manual dexterity - with only a developing musical ear.#

* Clynes and Nettheim, The living qualities of music, in Music, Mind, and Brain : The Neuropsychology of Music, ed. M. Clynes, Plenum Press, N.Y. 1982.
# Clynes, M., Expressive microstructure in music, linked to living qualities. pps. 107. Publication of the Royal Swedish Academy of Music, Stockholm. ~~July~~, 1983.
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