

## ISE575c paper review (week 2)

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### 1. Found Methemathical Objects , Tom Johnson

The purpose of this lecture is to find object of the music itself with the help of mathematical objects. The author tried to change the concept of music in listener's mind. The impressive phrases, "Music is number" and "Let the music do what it wants to do", are clear messages how the lecture was presenting.

The author showed two out of three types of automation process of the notes. The first method is to use the direct transformation from given mathematical formulas to the musical notes. The assignment rule can be changed but the structure of the basic rule should be maintained. The second method is to generate the music of Narayana's Cow's sequence. Another approach was derived from Pascal's Triangle. The first attempt is to use the Chord Catalogue. Then three lines of Pascal's Triangle (1 1, 1 2 1, 1 3 3 1) are symbolized as possible two-note three-note, four-note chords, respectively. The last transform is to use Pascal's model into 7 note scale, which is applied by modulo 7 systems. The '1-6-1-6 cadences' with lines  $7^n$  are repeated infinitely.

The next subject tends to go 'looping'. The first is the self-replicating melodic loops. By contrast, a rhythmic canon only deals with the rhythm looping. Those two are cases that small loops can fit into large loops in given rules. Then 'Loops for Orchestra' was proposed with the use of group theory. He showed one example of  $Z/21Z$  (21-note cycle with modulo 21) as the first loop, and added secondary loops. The recent advance in this field is the polyrhythmic canons, by Thomas Noll. He suggested the musical notation with (0,1,2,4,5,8,9,11) rhythmic loop can be played with three 3:1 ratio voices. Because all the details of the looping patterns are based on group theory, each note in every beat is appeared one at different voice. He also showed (0,1,2,8) rhythmic loop in period 16 and many other pairs with his observations.

The author finally mentioned his 26-voice canon liken to Alhambra's crystallographic. His work has 26 voices which have their own pitch with 4-note rhythm in one of the 4 tempos with the variation of 3:1 ratio voice to 11:1 voice. He finally mentioned we should focus on the notes instead of sound itself. The most interesting fact of his works is that we can compose music with the use of mathematical theory or patterns in the nature, which is more naturally generated, instead of artificially created chunk of notes by human.

## 2. Rhythm as motion discovered, Javier Alvarez

The first chapter started the relation between language and material, and the concept of the musical material as an electroacoustic composer. He compared origami with the musical material. With the use of Borges's words, he defined the symbols as the sound objects and the reality as composer, and language as the composer's sense and the sound. The rhythm is defined as all such discrete, aurally identifiable gestures. The rhythmic object contains accented (pulsed pattern) and unaccented parts (sound objects). And its repetition and variation with periodic or aperiodic moving was explained. When the stroboscopic light is used, we focus on the on/off framework when the action is unchanged or predictable, but focus on the action when the action is varied. It makes slow movement seem slower, and fast movement seem a lot faster. This feature was used for 'Temazcal' (1984). With the taped combinations of traditional Latin American rhythmic cell patterns, the player responds to the pulse and objects on tape to make larger patterns. The result is very attractive because the performer is an active listener and dancer and even the taped rhythm is not affected as a straightjacket.

The second chapter referred to the relation between the object and process. If we change its scale in zooming in and out or speeding up and down in tape, we can earn the effect of contraction. Durations are comparable to sub-audio frequency (<20Hz), which is too large to be heard. This technique was used for his Temezcal with the idea of spatial magnitude. If the harp as a source generate material, both as a texture speeded up and the real object harp are appeared.

In the third chapter, all the musical time, structure, and rhythmic objects were described in the context of the work 'Papalotl' (1987). Before digging deeply, he mentioned the composer's role is to alter the flow of referential clues presented to the listener so that the listener can discovery the musical meaning. I agree with this, and he believed it is important. In his work 'Papalotl', the nearly 200 constant shifts between the periodic and aperiodic pulses implied by the given rhythmic cell patterns made listener constantly trying to find simple pulses. This drastically varying rhythm pattern is the most important structure in his work. Piano part plays simple rhythm and chords, then transformation with addition, alteration, and prolations generated the result. Tape part was generated from the resonance of the piano inside and replicated. Finally, the author mainly considered in his work that the most important goal is to make motion as a structure by using zoom-in and out characteristics mentioned above.