

Desdobramentos do contínuo for violoncello and live electronics

Danilo Rossetti¹, William Teixeira²

¹ First Laboratory – Interdisciplinary Nucleus for Sound Communication UNICAMP, Rua da Reitoria, 165 – “Cidade Universitária Zeferino Vaz” – 13083-872 Campinas, SP

² Second Laboratory, Federal University of Mato Grosso do Sul Avenida Costa e Silva, 79070-900, Campo Grande, MS

danilo.rossetti@nics.unicamp.br, william.teixeira@ufms.br

Desdobramentos do contínuo is a work for violoncello and live electronics written in 2016. It was the last live electroacoustic music composed during Rossetti's Ph.D. thesis [1], defended in the same year. The work was composed in collaboration with the violoncellist William Teixeira, for whom it is dedicated.

In terms of structuration, the piece involves two types of electroacoustic procedures, in addition to the instrumental writing of the score. Among the electroacoustic procedures, there are tape sounds, pre-composed in a studio in deferred time [2] and real-time treatments applied to the violoncello sound captured live.

For the composition of the deferred time sounds (tapes), time-frequency analysis procedures of phase vocoder [3] and convolution [4] were employed. From them, pitch-shifting and time-stretching processes could be implemented. Both of these procedures were performed having violoncello recordings as source material.

For the real-time processing, which was implemented in Max MSP, objects of HOA (High Order Ambisonics) Library – developed by the CICM (*Centre de recherche Informatique et Création Musicale*) of Université Paris 8 – were used. Employing the process object belonging to this library it is possible to combine electroacoustic treatments such as granulation, convolution, dephasing and microtemporal decorrelation (among others), with a high order ambisonics spatialization [5].

From a morphologic standpoint, the composed tape sounds have a continuous development in time, while the real-time generated sounds (mainly produced by a granulation process) have a discontinuous structure.

The motivation for this composition comes from an interpretation of René Thom's Catastrophe Theory [6], explained by him as a methodology that allows the organization of experience information in various conditions. Thom searched to describe discontinuities observed in a system evolution. He assumed that a system is presented as a succession of continuous evolutions, separated by abrupt leaps of qualitatively different natures.

We imagine the morphology of the whole piece as a continuity formed by, in its interior, continuous and discontinuous instrumental and electroacoustic sounds which are overlapped. This superposition of different sounds produces the timbre of the piece that can be perceived as one unity of form.

The objective of combining and overlapping deferred time sounds and real-time electroacoustic treatments to the violoncello acoustical sound is to create different layers that would merge together into a single structure. Our hypothesis in relation to both electroacoustic sounds (represented by continuous and discontinuous structures) is that this overlapping would be complementary and permeable in terms of sound morphology, generating a single perceived timbre.

In relation to the dialogue between instrumental and electroacoustic sounds, concepts of interaction and convergence [7] were addressed. Interaction is defined as a kind of action that occurs as two or more objects have an effect one upon another, where the idea of a two-way effect is essential. Convergence can be explained as the movement towards union or uniformity, the independent development of similar characters associated with similarity of an environment, and the merging of distinct technologies or devices into

a unified whole.

As a result of this dialogue, the amplification of the violoncello instrumental possibilities (in terms of information) is expected, and also the creation of new sonorities and transients.

This art submission is related to SBCM 2017 Music Paper “An Analysis of *Desdobramentos do Continuo* for Violoncello and Live Electronics Performed by Audio Descriptors”.

Mechanics and Acoustics, 2016.

References

- [1] Danilo Rossetti. Processos microtemporais de criação sonora, percepção e modulação da forma: uma abordagem analítica e composicional. Tese de Doutorado. Instituto de Artes, Universidade Estadual de Campinas, Campinas, 2016.
- [2] Flo Menezes. Fusão e contraste entre a escritura instrumental e as estruturas eletroacústicas. In Flo Menezes, *Atualidade estética da música eletroacústica*, Editora UNESP, pages 13-20, 1999.
- [3] Richard Dolson. The Phase Vocoder: A Tutorial. In *Computer Music Journal* v. 10, nº 4, 1986, pages 14-27.
- [4] Curtis Roads. Musical Sound Transformation by Convolution. In *Proceedings of ICMC 1993*, pages 102-109. The International Computer Music Association, 1993.
- [5] Pierre Gillot. Documentation de la bibliothèque HOA: Les champs sonores. CICM, Université Paris 8, Labex Arts H2H. <http://www.mshparisnord.fr/hoalibrary/ambisonie/les-champs-sonores/>
- [6] René Thom. *Parábolas e catástrofes*. Entrevista sobre matemática, ciência e filosofia conduzida por Giulio Giorello e Simona Morini. Lisboa: Don Quixote, 1985.
- [7] Danilo Rossetti. Interaction, Convergence and Instrumental Synthesis in Live Electronic Music. In: M. Aramaki, R. Kronland-Martinet, S. Ystad, editors, *Proceedings of the 12th CMMR*, pages 209-216, The Laboratory of