

G.2. PERFORMANCE COMPUTING BASED ON NATURE-INSPIRED MODELS

SILVIA MUNTEANU, VICTOR ABABII, VIORICA SUDACEVSCHI, OLESEA BOROZAN, VICTOR LAȘCO

*Technical University of Moldova, Chisinau, Republic of Moldova
email: silvia.munteanu@calc.utm.md*

Abstract. In the last three decades, special attention has been given to the application of nature-inspired models, particularly in areas such as planning and organizing performance computing processes. There have been already achieved the theoretical and applicative scientific results that attest performance and efficiency of such systems. Particular attention is paid to the development of computational models for decision-making problems based on multi-objective optimization. As examples of nature-inspired computing models can be mentioned: cellular automata, neural computation, evolutionary computation, swarm intelligence, artificial immune systems, membrane computing, etc. Membrane computing represents a particular case of nature-inspired computational models, based on the use of paradigms, mechanisms and working principles of biological cells (living cells), such as: the structure of the cell, the mode of interaction between cells and their physiological properties. These models provide an efficient formal description of hierarchical, parallel/concurrent and synchronous/asynchronous computing processes oriented to the

BACAU 2023 Conference Proceedings – ABSTRACTS

data flow processing. The objectives of the research presented in this paper are the development of a methodology for implementing membrane computing models in reconfigurable hardware architectures oriented towards processing data flow that can be applied in multi-objective decision-making systems.

Keywords: Nature-inspired models, Membrane computing, Decision-making systems, Multi-objective optimization, FPGA architecture.