

**Meeting:** 1007, Santa Barbara, California, SS 10A, Special Session on Complexity of Computation and Algorithms

1007-68-24            **Vladimir Gontar\*** (galita@bgumail.bgu.ac.il), Ben-Gurion University of the Negev, 1  
Hashalom St. P.O.Box 653, 84105 Beer Sheva, Israel. *Modeling Complexity of Living and Thinking  
Systems by Calculus of Iterations in Discrete Time and Space.*

Traditional use of fundamental principles of the calculus of infinitesimal and correspondingly continuous time space differential equations (DE) in the physics of inert matter hardly could be expended to the description of living and thinking systems. Appearance of digital computers not only drastically increase our computational facilities but brought to the opening of a new type of DE solutions: computer generated chaotic solutions. These results of computer discrete calculations leads to the new understanding of difference equations (iterations) as a mathematical language for complex, living and thinking systems dynamics and finally should bring us to the creation of calculus of iterations. Discrete time and space of difference equations versus continuous time and space of DE will be analyzed. Construction of the special types of difference equations from the first principles of discrete chaotic dynamics (DCD) will be presented. (Received December 05, 2004)