1003-65-1262 **ChiChia Chiu** (chiu@math.msu.edu), A205 Wells Hall, Michigan State University, E.Lansing, MI 48823, and **Jui-Ling Yu*** (yujuilin@msu..edu), A533 Wells Hall, Michigan State University, E.Lansing, MI 48823. *An Optimal Explicit Method for Solving Reaction-Diffusion-Chemotaxis Systems.*

ABSTRACT: Reaction-diffusion-chemotaxis systems have been proved to be fairly accurate mathematical models for many pattern formation problems in chemistry and biology. These systems are important for computer simulations of the patterns, parameter estimations as well as analysis of the biological properties. In order to solve reaction-diffusion-chemotaxis systems, efficient and reliable numerical algorithms are essential for the pattern generations. In this talk, a general reaction-diffusion-chemotaxis system is considered and specific numerical issues are discussed. We propose a fully explicit discretization combined with a variable optimal time step stradgy for solving the reaction-diffusion-chemotaxis system. Theorems about stability and convergence of the algorithm are given to show that the algorithm is highly stable and efficient. Numerical experiment results are given for one testing problem and one real experimental problem. (Received October 04, 2004)