1056-37-261   **Chihchien Yu*** (`lyu@uafortsmith.edu`), PO Box 3649, 5210 Grand Avenue, Fort Smith, AR 72903. *Conditions for the Existence of a Steady State Solution for a Competition System of Plankton Population.*

I use topological methods to analyze biological models in my research. I examined a model of competing system of plankton populations. The populations are modeled by a system of parabolic PDE's. My equation is similar but not the same as the reaction-diffusion equations. The similar part is that I am dealing with almost the same equation and the different part is that I have to deal with new boundary conditions. I established conditions for a steady state solution for the single species case. I can generalize the necessary conditions to the n-species case, but the sufficient condition is much harder. I use numerical simulations to help me to find the solution. (Received August 21, 2009)