



香港浸會大學
HONG KONG BAPTIST UNIVERSITY

Department of Mathematics
Faculty of Science
Joint Research Institute for Applied Mathematics

Distinguished Applied Mathematics Lecture Series

Mathematical Models of Competing Phytoplankton Species for Light in a Water Column



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SIAM Fellow, 2013
MOE National Chair Professor, 2011
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Date: 13 May 2013 (Monday)

Time: 4:00 pm - 5:00 pm (Preceded by Reception at 3:30 pm)

Venue: RRS905, Sir Run Run Shaw Building
Ho Sin Hang Campus, Hong Kong Baptist University

Abstract

Phytoplankton are microscopic plant-like organisms that drift in the water column of lakes and oceans. They grow abundantly around the world and are responsible for the consumption of at least 60% carbon dioxide on earth. They are the foundation of the marine food chain. Nutrients and light are the essential resources for the growth of the phytoplankton. In this talk we shall restrict our attentions to eutrophic ecosystems where nutrient supplies are ample, and species compete only for light.

First we consider the competition of species in a well-mixing water column. The model takes a form of system of ordinary differential equations. In this case we consider the effect with or without photo-inhibition to the growth of phytoplankton species. We classify the asymptotic behavior of the solutions. Then we consider the competition of species in a poorly mixing water column. The model takes a form of nonlocal reaction-advection-diffusion system. We first prove the global convergence of the solution for the case of single population growth. Then we apply the global bifurcation theory to obtain the coexistence of two species.

✦ ✦ ✦ **All are welcome** ✦ ✦ ✦

For enquires please contact Ms. Claudia Chui, 3411 2348.

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