

1064-65-29

Wenrui Hao* (whao@nd.edu), Math department, Notre Dame, IN 46556. *Homotopy continuation and tumor growth.*

This talk will describe some of the recent work of Jonathan Hauenstein, Bei Hu, Yuan Liu, Andrew Sommese, Yong-Tao Zhang and myself.

Most of mathematical models of tumor growth, which consider the tumor tissue as a collection of proliferating cells, discuss the case of radially symmetric tumors. Since tumors grown in vitro have a nearly spherical shape, it is important to determine whether these radially symmetric tumors are asymptotically stable, and it is also important to understand bifurcation to non-radially symmetric solutions.

The tumor model we study is a free boundary problem with a parameter μ , which is tumor aggressiveness factor. To demonstrate the ability of numerical computational methods applied to free boundary problem, we setup a polynomial system to compute μ_2 and track along the solution branch of non-radially symmetric solutions in the steady-state system. Moreover, we also study the nonlinear stability of these solutions. (Received August 12, 2010)