

1077-49-341

**Wandi Ding\*** ([wding@mtsu.edu](mailto:wding@mtsu.edu)), 1301 E. Main Street, MTSU Box 34, Murfreesboro, TN 37132, and **Volodymyr Hryniv** ([hrynivv@uhd.edu](mailto:hrynivv@uhd.edu)) and **Xiaoyu Mu** ([xiaoyumoon@gmail.com](mailto:xiaoyumoon@gmail.com)).

*Optimal Control Applied to Native-Invasive Species Competition via a PDE Model.*

We consider an optimal control problem of a system of parabolic partial differential equations modeling the competition between an invasive and a native species. The motivating example is cottonwood-salt cedar competition, where the effect of disturbance in the system (such as flooding) is taken to be a control variable. Flooding being detrimental at low and high levels, and advantageous at medium levels led us to consider the quadratic growth function of the control. The objective is to maximize the native species and minimize the invasive species while minimizing the cost of implementing the control. A new existence result for an optimal control with these quadratic growth functions is given. Numerical examples are given to illustrate the results. Our findings will provide suggestions to the natural resource managers for controlling the invasive species. (Received August 24, 2011)