May 19th, 9:30 AM - 10:00 AM

Optimal Control and the Trojan Y Chromosome Eradication Strategy

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Invasive species are a prevalent problem all over the world. Controlling and eradicating an invasive species is an even more difficult problem. The Trojan Y Chromosome (TYC) eradication strategy is one control method. This method alters the female to male sex ratio by introducing sex reversed males called supermales. These sex reversed males can only produce male progeny. Mathematical models of this strategy have shown that a population can be driven to extinction with a continuous supply of these sex reversed males. Determining the optimal number for introduction is key in this endeavor. However, there are many different mathematical models of this strategy, and most have serious flaws, such as negative solutions or finite time blow up. In this presentation, we will investigate optimal control in regards to the TYC eradication strategy and explore some of the issues found in the various mathematical models.