

1046-92-1815

Daniel L Kern* (kernd@unlv.nevada.edu), Dept of Mathematical Sciences/UNLV, 4505 Maryland Parkway, Box 454020, Las Vegas, NV 89154-4020. *Optimal Control Model for Cancer Chemotherapy Subject to Drug Resistance.*

Optimal control techniques are used to optimize a chemotherapy treatment regime. Cell cycle-specific chemotherapy is examined when drug resistance reduces the effectiveness of treatment over time, and toxicity levels place limitations on the course of treatment. The resulting treatment level thus needs to balance multiple factors.

The governing state equations are developed for a four-compartment model indicating the development of resistance over time, resulting in a coupled system of nonlinear differential equations. The optimal control is characterized for the problem through the Hamiltonian and the adjoint system. This allows for some numerical simulations using an iterative forward-backward sweep in time. (Received September 17, 2008)