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David Murrugarra* (murrugarra@uky.edu), Mathematics Department, University of Kentucky, Lexington, KY 40506-0027. *Optimal Control Methods for Stochastic Gene Regulatory Networks.*

One of the main goals of computational biology after the post-genomic era is to develop optimal control strategies to find efficient medical treatments for changing the state condition of a cell into a new desirable state. The state of a cell is commonly modeled as a Gene Regulatory Network (GRN) which determines the interaction between the different genes involved in an specific cell function. In this context, given a GRN, the possible control actions can be represented as manipulation of nodes and edges of the GRN. Node manipulation requires technology to completely repress or fully activate a particular gene product while edge manipulations only requires a drug that inactivate the interaction between two gene products, which is a realistic control action for medical treatment. The combination of the two possible actions, node and edge manipulations, may produce more effective control strategies for realistic GRNs currently available. For this talk, having a set of intervention targets represented by control nodes and edges, optimal control algorithms for the identification of the best combination of control targets will be discussed. This talk will also focus on algebraic tools for identifying potential intervention targets. (Received September 10, 2014)