Gene Network Modeling and Electromechanics Controlling Based on Computational Intellignece

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ABSTRACT

PART Ⅰ Gene Network Modeling Computational intelligent approaches is adopted to construct the S-system of Eukaryotic cell cycle and Yeast cell cycle for further analysis of genetic regulatory networks. A highly nonlinear power-law differential equation is constructed to describe the transcriptional regulation of gene network from the time-courses dataset. Global artificial algorithm, based on hybrid differential evolution, can achieve global optimization for the highly nonlinear differential gene network modeling. The constructed gene regulatory networks will be a reference for researchers to realize the inhibitory and activatory operator for genes synthesis and decomposition in Eukaryotic cell cycle and Yeast cell cycle. PART Ⅱ Electromechanics Control The approach is to design an intelligent fuzzy controller for nonlinear inverted pendulum-and-crane system. The inverted pendulum system is first analytically modeled convert as a T-S fuzzy model. A robust optimal fuzzy controller is then designed to achieve angle- and position-control of the complex physical system. Simulation results show the proposed controller can balance the fuzzy system in very short time.

Keywords : cell cycle ; S system ; hybrid differential evolution ; T-S fuzzy model ; Inverted pendulum

Table of Contents

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