عنوان مقاله:

Constrained nonlinear model predictive controller design to propose an appropriate anti-angiogenesis treatment program of tumor growth

محل انتشار:

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خلاصه مقاله:

Absence of well-defined tumor vasculature plays an important role in the transport of effective doses of anticancer tumor drugs to the tumor. According to this, antiangiogenictherapy is a novel treatment approach for cancer. In this paper we consider a mathematical model of tumor–cellsinteractions with endothelial cells in presence of antiangiogenesisdrug endostatin. The problem how to schedule a given amount of drugs to achieve a maximum reduction in thetumor volume is considered as an optimal control problem. For this purpose a nonlinear model predictive controller (NMPC)considering drug injection constraints is designed. NMPC originally developed in the community of industrial processcontrol, is a potentially effective approach to optimal schedulingof cancer therapy. Simulation results show that proposed control method can be effectively reduced tumor volume with considering drug injection constraints.

کلمات کلیدی:

Tumor Growth; Nonlinear Model Predictive Control; Cancer Treatment; Anti-angiogenesis; Input Constraints