An optimized controller for region of attraction enlargment of underactuated systems using impulse manifold method

ABSTRACT

Impulsive control is an alternative method for enlarging the region of attraction of nonlinear underactuated systems. The goal of this paper is to propose a method based on impulsive control to enlarge the region of attraction and meanwhile, minimize the consumed control energy. A performance index based on the consumed control energy is defined. Then, minimizing this performance index along with the use of impulsive manifold method enlarge the region of attraction with minimum consumption of control energy. The efficiency of the presented method is shown through a simulation.