JOURNAL ARTICLE

Approximations of the set of trajectories and integral funnel of the non-linear control systems with L_p norm constraints on the control functions

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Abstract

In this paper, approximations of the set of trajectories and integral funnel of the control system described by non-linear ordinary differential equation with integral constraint on the control functions are considered. The set of admissible control functions is replaced by a set, consisting of a finite number of piecewise-constant control functions. It is shown that the set of trajectories generated by a finite number of piecewise-constant control functions is an internal approximation of the set of trajectories. Further, each trajectory generated by a piecewise-constant control function is substituted by appropriate Euler's broken line and it is proved that the set consisting of a finite number of Euler's broken lines is an approximation of the set of trajectories of given control system. An approximation of the system's integral funnel by a set consisting of a finite number of points is obtained.

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