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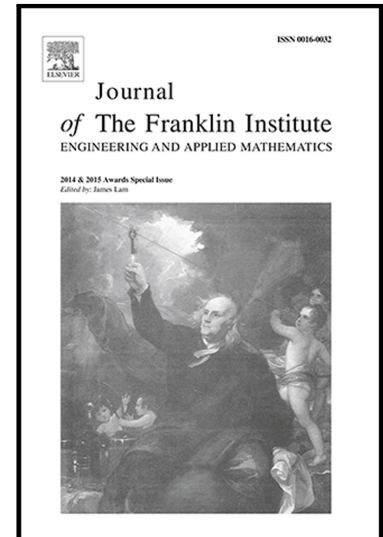
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Adaptive synchronization of multi-agent systems via variable impulsive control

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Abstract This paper mainly focuses on the adaptive synchronization problem of multi-agent systems via distributed impulsive control method. Different from the existing investigations of impulsive synchronization with fixed time impulsive inputs, the proposed distributed variable impulsive protocol allows that the impulsive inputs are chosen within a time period (namely impulsive time window) which can be described by the distances of the left (right) endpoints or the centers between two adjacent impulsive time windows. Obviously, this kind of flexible control scheme is more effective in practical systems (especially for the complex environment with physical restrictions). Moreover, the proposed adaptive control technique is helpful to solve the problem with uncertain system parameters. By means of Lyapunov stability theory, impulsive differential equations and adaptive control technique, three sufficient impulsive consensus conditions are given to realize the synchronization of a class of multi-agent nonlinear systems. Finally, two numerical simulations are provided to illustrate the validity of the theoretical analysis.

Keywords multi-agent system; synchronization; variable impulsive control; impulsive time window; adaptive control

1 Introduction

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