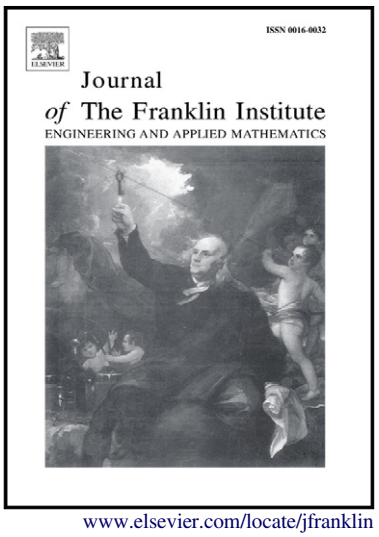

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Abstract

This work addresses the model reference tracking control problem. It aims to highlight the encountered difficulties and the proposed solutions to achieve the tracking objective.
Based on a literature overview of linear and nonlinear reference tracking, the achievements and the limitations of the existing strategies are highlighted. This motivates the present work to propose clear control algorithms for perfect and approximate tracking controls of nonlinear systems described by Takagi-Sugeno models. First, perfect nonlinear tracking control is addressed and necessary structural conditions are stated. If these conditions do not hold, approximate tracking control is proposed and the choice of the reference model to be tracked as well as the choice of the criterion to be minimized are discussed with respect to the desired objectives. The case of constrained control input is also considered in order to anticipate and counteract the effect of the control saturation.

Keywords: Tracking control, nonlinear systems, constrained input, perfect and approximate state tracking.

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