Nonlinear adaptive switching control for a class of non-affine nonlinear systems (2015–0482)

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一类非仿射非线性系统的非线性自适应切换控制

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Abstract An improved nonlinear adaptive switching control method is presented to relax the assumption on the higher order nonlinear terms of a class of discrete-time non-affine nonlinear systems. The proposed control strategy is composed of a linear adaptive controller, a neural network (NN) based nonlinear adaptive controller and a switching mechanism. An incremental model is derived to represent the considered system and an improved robust adaptive law is chosen to update the parameters of the linear adaptive controller. A new performance criterion of the switching mechanism is designed to select the proper controller. Using this control scheme, all the signals in the system are proved to be bounded. Numerical examples verify the effectiveness of the proposed algorithm.

Keywords Non-affine nonlinear systems; nonlinear adaptive switching control; incremental model.

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