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Observer-based state estimation and unknown input reconstruction for nonlinear complex dynamical systems.

Summary: This paper considers the issues of both state estimation and unknown information reconstruction for a class of uncertain complex dynamical networks subject to unknown inputs. First, a robust adaptive sliding mode observer which can be used to estimate the states of complex networks through available measurement outputs is developed by employing both adaptive technique and sliding mode control approach. Second, a high-gain second-order sliding mode observer is considered to exactly estimate the derivatives of the output vectors in a finite time. Third, by using the estimates of the states and output derivatives, a kind of algebraic unknown input reconstruction method is proposed. Finally, some numerical simulation examples are given to illustrate the effectiveness of the proposed methods.

Keywords: complex network systems; adaptive sliding mode observer; high-gain observer; unknown input reconstruction
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