Summary: This study reports adaptive neural network tracking control problem for a class of uncertain strict-feedback nonlinear systems with quantized input and the output constraint. To successfully overcome the obstacle caused by quantized input and the output constraint, the disintegration of hysteresis quantizer and a log-type Barrier Lyapunov function are exploited. During the control design, uncertain nonlinearities are approximated by radial basis function neural networks. Moreover, the number of adaptive law is only one, thereby reducing the computational burden. Under the proposed quantized tracking control scheme, the boundedness of all signals in the closed-loop system is validated and the output tracking error converges to an arbitrarily small domain of origin. At the same time, it can be ensured that the output constraint isn’t violated. Finally, two simulation examples are provided to verify the effectiveness of the control scheme.

MSC:

93Cxx Model systems in control theory
93Dxx Stability of control systems
93Bxx Controllability, observability, and system structure

Keywords:
adaptive tracking control; neural network; quantized input; hysteresis quantizer; output constraint

Full Text: DOI

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