Robust Neural Output Feedback Tracking Control for a Class of Uncertain Nonlinear Systems Without Time-delay

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Abstract: This paper investigates the problem of adaptive tracking control by output feedback for a class of uncertain nonlinear systems. These nonlinear systems are subjected to various structured and unstructured uncertainty due essentially to modelling errors, parameter variations and unmodelled dynamics. With the help of error signals generated by the simple linear observer, a radial basis function neural network (RBF NN) is established to approximately compensate on line for these uncertainties. In this note, the neural network operates over system input/output signals without time delay. The stability analysis and tracking performance of the closed-loop system are confirmed through Lyapunov stability theory. The potential of the theoretical results is demonstrated through computer simulations of both nonlinear systems, Van der Pol and tunnel diode circuit.

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