Design of a Neural Network-Based Controller for Antilock Braking System

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Abstract

This paper proposes a neural network-based controller to enhance the effectiveness of antilock braking systems. Simulations of integrated controller of vehicle anti-lock braking system are illustrated first with traditional continuous PID controller and then with the proposed back-propagation neural network model controller. The slip ratio is selected as the main control parameters. Effects of vehicle speed and slip ratio are investigated on braking torque to reveal the performance of anti-lock braking system. Quarter vehicle single-wheel system is studied in this paper to illustrate the controller performance in maintaining the required slip reference trajectory. This can provide a guideline to design an anti-lock braking system.

Keywords: Antilock braking system, Wheel slip, Nonlinear control, Neural network

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