عنوان مقاله:

Design of an Adaptive Fuzzy Controller for Antilock Brake Systems

محل انتشار:

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خلاصه مقاله:

The control of Antilock Braking Systems (ABS) is a difficult problem, because of their nonlinearities and uncertainties appearing in their dynamics and parameters. To overcome these issues, this paper proposes a new adaptive controller for the next generation of ABS. After considering a complex vehicle dynamic, a triple adaptive fuzzy control system is presented. Important parameters of the vehicle dynamic include two separated brake torques for front ands rear wheels, as well as longitudinal weight transfer which is caused by the acceleration or deceleration. Because of the nonlinearity of the vehicle dynamic model, three fuzzy-estimators have been suggested to eliminate nonlinear terms of the front and rear wheels' dynamic. Since the vehicle model parameters change due to variations of road conditions, an adaptive law of the controller is derived based on Lyapunov theory to adapt the fuzzy-estimators and stabilize the entire system. The performance of the proposed controller is evaluated by some simulations on the ABS system. The results demonstrate .the effectiveness of the proposed method for ABS under different road conditions

کلمات کلیدی:

Antilock Braking System, Adaptive Fuzzy Controller, Universal Approximation