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Development of Fuzzy Controlled ABS Systems for Motorcycles

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Abstract

In this paper, we present the design and implementation of a new mechanism for an antilock brake system (ABS) pressure regulator on motorcycles. We use static tests to ensure the pressure regulation function. The dynamic test is constructed in the experimental bench for the closed-loop motorcycle ABS control. Furthermore, two fuzzy controllers are designed and tested in the platform (respectively). The first one directly uses the slip ratio error and its change as two inputs to the controller. However, in most implementations, the slip ratio is not available. Thus, the other controller that uses wheel speed and its change rate as inputs is also used in the experiments. The performances of these two control systems are verified in the platform. Both controllers can achieve their goal of tracking the desired slip ratio.

Key words：Antilock brake system (ABS); Motorcycle; Pressure regulator; Fuzzy control; Hydraulic