The Fuzzy Control of Anti-lock Brake System

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ABSTRACT

Due to the efficiency problem of the mechanical anti-lock bra-king system (ABS) for motorcycle, this thesis aims to study the electrical-control ABS. Wecompare two kind of ABS for experiment,and design the fuzzy controllers respe-ctively for them. In simulation, we develop the mathematical models of the vehicle dynamics, braking force and hydraulic system dynamics. We find out the relationship of friction force and slip in order to design the fuzzy controller with slip as the reference input. Also, we design the fuzzy controller that its input isthe angular velocity and acceleration of the wheels. Matlab is utilized to si-mulate dy-namics of ABS to provide some reference for the design of the actualcontroller. In experiment, we design the test platform to test and understand the func-tion of anti-lock brake system. In the platform, we can mea-sure the desired experiment data. Further, we can adjust the controller parameters to improve the ABS operation. It is certified that the developed fuzzy controller has achieved its desired result by experiment result.

Keywords : 防鎖死煞車系統 ; 模糊控制 ; 滑差 ; 車輪角速度 ; 煞車機構與控制測試 ; 動態測試

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