This research uses a concept of Hardware-in-the-Loop tests for ABS (Anti-lock Braking System). The wheel velocity and solenoid valves control signals can be received and transferred by CAN-bus, then combined with the designed seven degree of freedom vehicle dynamics model and controller to simulate the tire-ground forces acting on vehicle dynamics during braking. Two controllers are designed with the feedback of slip ratio and wheel angular velocity, respectively. They are tested on dry and wet road surfaces to evaluate the control performance. We compare the result of commercial ECU and designed controller, then modify the parameter of the Fuzzy controller on these regions to shorten the braking distance and time on various road surfaces.

Keywords: Hardware in the loop, CAN-bus, Vehicle dynamics, Fuzzy control, Anti-lock Braking System


