A Fuzzy-algorithm-based Sliding Mode Control Approach for Acceleration Slip Regulation of Battery Electric Vehicle

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Abstract

Due to large torque and quick response of electric motor, the traction wheels of battery electric vehicle (BEV) are easy to slip during the initial phase of starting. In this paper, an acceleration slip regulation approach based on sliding mode control algorithm is proposed to prevent the wheel slip of BEV. The traction wheel slip ratio is used as the control parameter, and a sliding mode controller is deduced from it. A fuzzy algorithm is employed to revise the switch function of sliding mode controller. After stability and robustness analysis, the sliding mode controller is validated by dynamic simulation of BEV. The sliding mode control law is transferred into vehicle control unit and is verified by road tests, the results of which show that the sliding mode controller is a good candidate to prevent the wheel slip.

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Figures

Figure 1

Vehicle architecture

Figure 2

Adhesion coefficient

Figure 3

Structure of the ASR controller

Figure 4

Single wheel model

Figure 5

Membership function of variables

Figure 6

Control approach

Figure 7

Simulation results of low adhesion conditions

Figure 8

Simulation results of high adhesion conditions

Figure 9

Test platform: (a) VCU; (b) ABS.

Figure 10

Vehicle test on dry road condition

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