

Integrated Braking and Traction Torque Vectoring Control Based on Vehicle Yaw Rate for Stability improvement of All-Wheel-Drive Electric Vehicles

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Abstract : EVs with independent wheel driving greatly improve vehicle stability in poor road conditions. Wheel torques can be precisely controlled through electric motors driven using advanced technologies. As a result, various types of advanced chassis assistance systems (ACAS) can be implemented. This paper proposes an integrated torque vectoring control based on wheel slip regulation in both braking and traction modes. For generating the corrective yaw moment, the vehicle yaw rate and sideslip angle are monitored. The corrective yaw moment is distributed into traction and braking torques based on an equal-opposite components approach. The proposed torque vectoring control scheme is validated in simulation and the results show its superiority when compared to conventional schemes.

Keywords : all-wheel-drive, electric vehicle, torque vectoring, regenerative braking, stability control, traction control, yaw rate control

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