

Electronic Stability Control for a 7 DOF Vehicle Model Using Flex Ray and Neuro Fuzzy Techniques

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Abstract : Any high performance car has the tendency to over steer and Understeer under slippery conditions, An Electronic Stability Control System is needed under these conditions to regulate the steering of the car. It uses Anti-Lock Braking System (ABS) and Traction Control and Wheel Speed Sensor, Steering Angle Sensor, Rotational Speed Sensors to correct the problems. The focus of this paper is to improve the driving dynamics and safety by controlling the forces applied on each wheel. ESC Control the Yaw Stability, traction controls the Roll Stability, where actually the vehicle slip rate and lateral acceleration is controlled. ESC uses differential braking on all four brakes independently to control the vehicle's motion. A mathematical model is developed in Simulink for the FlexRay based Electronic Stability Control. Vehicle steering is developed using Neuro Fuzzy Logic Controller. 7 Degrees of Freedom Vehicle Model is used as a Plant Model using dSpace autobox. The Performance of the system is assessed using two different road Scenarios, Vehicle Control under standard maneuvering conditions. The entire system is set using Dspace Control Desk. Results are provided by comparison of how a Vehicle with and without Electronic Stability Control which shows an improved performance in control.

Keywords : ESC, flexray, chassis control, steering, neuro fuzzy, vehicle dynamics

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