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ABSTRACT

The thesis is to develop the dynamical equation of motion of a car with seven degrees of freedom including the longitudinal, lateral, yaw motion, and rotational motions of four wheels. The longitudinal force, lateral force and yaw rate are investigated during the vehicle changing its direction of cruise. The simulation studies are divided into two parts. The first part is path following for the desired path. We generate the steering-wheel angles by human being experience for following different paths. The simulation results are used as the training data for the fuzzy controller with ANFIS learning process. The path following fuzzy controller is verified by the computer simulation. The second part is dynamic driving control (DDC). By applying the brake force for each wheel, the yaw moments can be produced to adjust traveling direction of the vehicle. It leads to the better control result for lane change and obstacle avoidance in snowy land. The fuzzy controller can effectively follow the planned path on the dry and snowy road land. By adding the dynamic driving controller in the vehicle, it can enhance its driving control stability on the snowy road surface.

Keywords: Path Following, ANFIS, Fuzzy Control, Dynamic Driving Control

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