

Optimization Based Obstacle Avoidance

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Abstract : Based on a non-linear single track model which describes the dynamics of vehicle, an optimal path planning strategy is developed. Real time optimization is used to generate reference control values to allow leading the vehicle alongside a calculated lane which is optimal for different objectives such as energy consumption, run time, safety or comfort characteristics. Strict mathematic formulation of the autonomous driving allows taking decision on undefined situation such as lane change or obstacle avoidance. Based on position of the vehicle, lane situation and obstacle position, the optimization problem is reformulated in real-time to avoid the obstacle and any car crash.

Keywords : autonomous driving, obstacle avoidance, optimal control, path planning

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