

Real-Time Adaptive Obstacle Avoidance with DS Method and the Influence of Dynamic Environments Change on Different DS

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Abstract : In this paper, we present real-time obstacle avoidance approach for both autonomous and non-autonomous DS-based controllers and also based on dynamical systems (DS) method. In this approach, we can modulate the original dynamics of the controller and it allows us to determine safety margin and different types of DS to increase the robot's reactivity in the face of uncertainty in the localization of the obstacle and especially when robot moves very fast in changeable complex environments. The method is validated in simulation and influence of different autonomous and non-autonomous DS such as limit cycles, and unstable DS on this algorithm and also the position of different obstacles in complex environment is explained. Finally, we describe how the avoidance trajectories can be verified through different parameters such as safety factor.

Keywords : limit cycles, nonlinear dynamical system, real time obstacle avoidance, DS-based controllers

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