



REAL-TIME TRAJECTORY TRACKING OF MOBILE ROBOTS BASED ON SLIDING MODE CONTROL USING IRBFNNs

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ABSTRACT—A control scheme for dynamic tracking of mobile robots is presented, which integrates a velocity controller based on backstepping techniques and a torque controller based on improved RBF neural networks. The proposed torque control strategy derived from sliding modes depends on the dynamics of mobile robots. Because of the uncertainties in robot dynamics, the robustness of the system cannot be guaranteed. In order to decrease the impact of the uncertainties and improve the robustness of the system, improved RBF neural networks are designed online by the integrated resource allocating network method, which is used to model the dynamics of the mobile robots online in the torque controller. Thus the proposed torque controller is composed of a neural network controller and a robust compensator. Simulation studies show that the proposed system is competent for robust tracking control of mobile robots and the tracking performance is improved effectively.

Key Words: Mobile robots, trajectory tracking, improved RBF neural network, sliding mode control.