

عنوان مقاله:

Quadrotor Control for Tracking Moving Target, and Dynamic Obstacle Avoidance Based on Potential Field Method

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خلاصه مقاله:

The purpose of this paper is obstacle avoidance and moving target tracking for a quadrotor. Solving the obstacle crossing problem for the quadrotor includes two parts. The first part is controlling the attitude and position. The second part is path planning to pass obstacles. In this paper, the attitude and position of the quadrotor are controlled by super-twisting sliding mode control (SMC) and non-singular terminal super-twisting SMC. The simulation results of these two methods were compared. In the non-singular terminal ST-SMC method, the convergence time was approximately 5% less than the super-twisting SMC method. Also, the non-singular terminal ST-SMC method has more ability to remove disturbances. Because of the better results, the non-single terminal ST-SMC was used to control the position and attitude of the quadrotor to cross obstacles and track the target. In the second step, to cross obstacles, the potential field path planning algorithm is used. This method is a combination of attraction towards the target and repulsion from obstacles. The results of the simulation of crossing the obstacles were presented in four missions. In the first mission, the obstacles and the target are static, and in the second mission, the obstacles are static, and the target is moving. In the following, the obstacles and the target are dynamic; in the last mission, a combination of static and dynamic obstacles is considered, and the target is moving. The simulation results of four missions show that the quadrotor does not hit obstacles and reaches the desired goal, till the applied method is successful.

کلمات کلیدی:

Quadrotor, Sliding mode, obstacle avoidance, Potential field

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