

Formation Adaption for Obstacle Avoidance and Environment Survey with UAVs

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Abstract

A formation adaption algorithm is proposed for obstacle avoidance and environment survey in three dimension space. Firstly, singular value feature of incidence matrix for feasible control graph is derived. Then, an effective diameter has been proposed to characterize the dimension of 3D formations, and been estimated under various operations including transition, rotation, scaling as well as inner motions. Finally, an optimal scale factor is figured out for uniform scaling on the basis of a similarity function. Numerical experiments demonstrate the effectiveness and efficiency of the proposed algorithm.

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