Formation control laws for a group of autonomous quadrotor-type helicopters

The underactuated quadrotor model is highly nonlinear. This research deals with basic control problems of a multi-quadrotor system. The main control objective is to maintain a desired formation during flight. We consider in particular control strategies for a string-like formation (where all vehicles involved are linked by a virtual thread) and for a rigid formation. The concepts of flat system and virtual formation play essential roles in the current framework. A key element in the established approach is a multiple-vehicle tracking strategy that ensures smooth convergence of the group members to their assigned locations in the formation. The research is concentrated on the low level control problems. The propose control scheme allows formation splitting and merging and collision avoidance (provided the relevant data are available in real time by communication/sensing means) during flight.