



Estimation of Amphibious Aircraft Trajectory Using Particle Filter and Square Root Ensemble Kalman Filter

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Abstract: An amphibious aircraft is a type of aircraft able to take off and land on water. Amphibious aircraft play an important role in air transportation, especially in areas having a lot of water. Amphibious aircraft perform many functions including passenger and freight transportation, medical rescue, tourism and maritime surveillance. Amphibious aircraft require navigation and guidance systems so as to steadily follow a predetermined trajectory. Several navigation guidance system algorithms in the aerospace field can be used, one of which is for amphibious aircraft trajectory estimation. The accuracy of aircraft position estimation is very important to ensure that the amphibious aircraft follows a predetermined trajectory. For this, the navigation and guidance system algorithm requires modeling the motion system of the amphibious aircraft. In this study, the Particle Filter and Square Root Ensemble Kalman Filter methods were used to estimate the trajectory to be followed by the amphibious aircraft. The main purpose of the study was to compare the performance of the two methods to find out which one proved to have a higher accuracy. Based on the simulation results, both methods had a high accuracy, that is, the Particle Filter method had an accuracy of about 98.2%, and the EnKF-SR method had an accuracy of 99.3%.

Keywords: *amphibious aircraft; trajectory estimation; particle filter method; EnKF-SR method.*

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