

Full Calibration for Helicopter Simulation

Flight simulators are employed by civil and military pilots, as well by engineers, in order to increase the security through the training of crew, and to find out the behavior of the aircraft under different conditions. However, it is necessary to calibrate the simulator software to have good fit to reality. In this process, parameters in the mathematical code for flight simulation needs to be identified, becoming the simulation as close as possible to the real dynamic. With appropriated values of these parameters, the simulator will be ready to be used in human resources for training or assessing aircraft. This can be described as a type of inverse problem: parameter identification, formulated as an optimization problem. Our simulator is designed to simulate the helicopter AS355-F2 dynamics. The tested helicopter was equipped with the Aydin Vector Data Acquisition System (AVDAS) PCU-816-I, ATD-800 digital recorder. The system measures a total of thirty-five different parameters for each mode (longitudinal and latero-directional). First, we did the identification for both modes completely uncoupled after the coupled (complete) mode was realized. The calibration of a dynamic flight simulator is achieved by two meta-heuristics: Genetic Algorithm (GA), and a new approach named Multiple Particle Collision Algorithm (MPCA). Preliminary results show a good performance of the new approach employed.