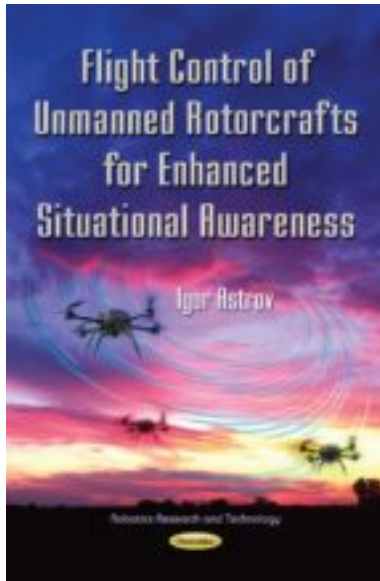


FLIGHT CONTROL OF UNMANNED ROTORCRAFTS FOR ENHANCED SITUATIONAL AWARENESS



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The need for highly reliable and stable maneuvers for unmanned rotorcrafts (URs) class of unmanned aerial vehicle (UAVs) has increased morbidly for critical situations in real-time search-and-rescue operations for fast situational awareness (SA). A rotorcraft is a heavier-than-air flying machine that obtains its lift from rotors. SA is simply being aware of what is going on around you. This book provides basic approaches for the modeling and simulation of control systems on the basis of equations of motion for various types of models of rotorcrafts (miniature helicopter, intermediate helicopter, coaxial rotor/ducted fan mini-UAV, trirotor mini-UAV, vectored thrust mini-UAV, quadrotor mini-UAV, X4-flyer mini-UAV, eight-rotor mini-UAV) with emphasis on the modeling and simulation of realistic dynamics for fast SA. The effectiveness of the proposed research technique has been verified in field of flight simulation tests for chosen control models of the URs using software package Simulink. From the simulation results it can be seen that the UR models demonstrated an advantage in achieving good maneuverability in controlled flight during missions and good performance for fast stabilization of engines during maneuvers, consequently, fast SA with economy in energy of batteries can be asserted during missions, and the duration of missions can be longer. The principal audiences for this book are faculty members, practitioners, researchers, and graduate and postgraduate students.