APPLICATION OF INVERSE KINEMATICS TO CONTROL A 2-DOF ROBOTIC ARM ON A HEXACOPTER DRONE

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ABSTRACT

This research is motivated by industrial demands for devices capable of transporting goods, leading to the development of intelligent robotic arm systems. Inverse kinematics is a modeling method used to calculate joint angle configurations based on position inputs. The focus of this study is the analysis and implementation of the inverse kinematics method for a 2-DOF robotic arm mounted on a hexacopter drone. The research follows systematic steps, including problem identification and formulation, defining research objectives, conducting literature reviews, designing and prototyping the system, performing inverse kinematics analysis based on the developed prototype, implementing inverse kinematics, conducting tests, and compiling a project report. System testing was carried out in several stages, beginning with servo motor testing, followed by gripper testing, and finally coordinate point testing. The results showed an average error of 1.67% for servo 1 and 20.33% for servo 2. Gripper testing indicated that it took 3 seconds to perform both opening and closing movements. Coordinate point testing produced an average Euclidean error of 0.1192 coordinate units between the target and predicted coordinates.

Keywords: 2-DOF Robotic Arm, Robotic Control System, Inverse Kinematics, Hexacopter.