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# Modeling and Controlling the Rotational Degree of a Quadcopter Using Proportional Integral and Derivative Controller

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**Abstract :** The study of complex dynamic systems has advanced through various scientific approaches with the help of computer modeling. The common design trends in aerospace system design can be applied to quadcopter design. A quadcopter is a nonlinear, under-actuated system with complex aerodynamics parameters and creates challenges that demand new, robust, and effective control approaches. The flight control stability can be improved by planning and tracking the trajectory and reducing the effect of sensors and the operational environment. This paper presents a modern design Simmechanics visual modeling approach for a mechanical model of a quadcopter with three degrees of freedom. The Simmechanics model, considering inertia, mass, and geometric properties of a dynamic system, produces multiple translation and rotation maneuvers. The proportional, integral, and derivative (PID) controller is integrated with the Simmechanics model to follow a predefined quadcopter rotational trajectory for a fixed time interval. The results presented are satisfying. The simulation of the quadcopter control performed operations successfully.

**Keywords :** nonlinear system, quadcopter model, simscape modelling, proportional-integral-derivative controller
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