

During the last decades, Unmanned Aerial Vehicles (UAV) quadrotors have been widely used for many applications; furthermore, various techniques for their modelling and control have been proposed. Among the challenges encountered in the design of controllers for a quadrotor is the fact that it is a highly coupled and nonlinear multivariable system. It is also known as being an under-actuated system because it uses four actuators to control six degrees of freedom. In this work, the nonlinear dynamic model of the quadrotor is formulated using the Newton-Euler method. Then SMC and PD controllers are designed in order to investigate linear and nonlinear trajectory tracking capabilities of the quadrotor. Step input response tests are also performed in order to study the performance of both controllers. Chattering effect of SMC controller is minimized using the boundary layer solution technique and genetic algorithm (GA) is used to tune the parameters of both PD and SMC controllers for better performance. The simulation is carried out using MATLAB Simulink and both techniques are compared in order to evaluate their dynamic performance and tracking capabilities