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Hybrid GA-PSO Based Pitch Controller Design for Aircraft Control System

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Abstract : In this paper proportional, integral, derivative (PID) controller is used to control the pitch angle of the aircraft when the elevation angle is changed or modified. The pitch angle is dependent on elevation angle; a change in one corresponds to a change in the other. The PID controller helps in restricted change of pitch rate in response to the elevation angle. The PID controller is dependent on different parameters like Kp, Ki, Kd which change the pitch rate as they change. Various methodologies are used for changing those parameters for getting a perfect time response pitch angle, as desired or wished by a concerned person. While reckoning the values of those parameters, trial and guessing may prove to be futile in order to provide comfort to passengers. So, using some metaheuristic techniques can be useful in handling these errors. Hybrid GA-PSO is one such powerful algorithm which can improve transient and steady state response and can give us more reliable results for PID gain scheduling problem.

Keywords : pitch rate, elevation angle, PID controller, genetic algorithm, particle swarm optimization, phugoid
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