Scilab case study project on

Pitch simulation of an aircraft employing Xcos

Naini Diwan

Indian Institute of Science Education and Research, Bhopal

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Abstract

Air vehicle orientation and movement control is a not a linear process. It involves three critical parameters (the angles of rotation in three dimensions about the vehicle's centre of gravity), known as pitch, roll and yaw. In this project, simulation of the pitch of an aeroplane is carried out. It is determined by the axis perpendicular to the longitudinal plane of symmetry. The study is accomplished using a PID (Proportional – Integral – Derivative) controller system on Xcos. Xcos is an open-source application of Scilab that supports modelling and simulating dynamic systems.

Pitch is controlled by adjustment of the elevator, present at the rear side of the plane. These are Flight Control Surfaces (FCS) which redirect the air flow and the action of pressure on the wings. Further, longitudinal dynamic stability is also a crucial feature. It denotes the damping of stabilizing moments, that prevents persistent or rising oscillations in pitch. A decent pitch control ensures safe descend and ascend of the aircraft.