Master's Thesis Defense Announcement
Mechanical and Aerospace Engineering Department
University of Texas at Arlington

Fixed Wing Aircraft Collision Avoidance Using Collision Cone Theory

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Teams Link

Abstract

In two dimensions, it is possible to extrapolate the trajectories of two fixed-wing aircraft to determine if they are on a collision course, both when viewing the aircraft from the side along the longitudinal axis, and from above along the lateral axis. In this work, guidance, navigation, and control components are considered and combined in MATLAB/Simulink simulations to create collision scenarios between two aircraft in both of these 2-D inertial frames, and to test collision avoidance therein. The programs developed determine if collision will occur, then if so, generate a lateral acceleration (latax) from the derived guidance law. This latax is used in a derived control law, which, in conjunction with the nonlinear dynamics of the aircraft, deflects the craft's control surface(s) until the flight path is altered enough so that collision is avoided. The background, derivations, simulations, and results are presented, along with the conclusions and possible work to be done in the future using this material.