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Author: Mr. Adam Cowling  
National Aeronautics and Space Administration (NASA), Ames Research Center, United States,  
adam.l.cowling@nasa.gov

PITCH-CONTROL PREDICTOR-CORRECTOR AND NEURAL NETWORK ASCENT GUIDANCE

**Abstract**

A pitch-control predictor-corrector ascent guidance algorithm has been developed and evaluated for a rocket-based upper stage of a two-stage-to-orbit launch vehicle. Detailed descriptions of the predictor-corrector algorithm and a neural network loop medication are given. The mission requirement is insertion into a stable 50x100 nmi orbit at 375,000ft altitude, coasting toward apogee at a positive inertial flight path angle. Three degree-of-freedom trajectory analysis is performed using the Program to Optimize Simulated Trajectories 2. Results of Monte Carlo simulations including uncertainties in atmosphere, thrust, aerodynamics and initial state are presented and compared to trajectories optimized for maximum injected weight.