AE 457/641 – Navigation and Guidance

Tutorial 7, November 6, 2007

1. At the time of launch, a missile launched at a speed of 900m/s is directly in the path of a target moving along a straight line at 300m/s. A launch error causes the missile to be launched at an angle of $20°$ with the path of the target. If the range between the target and the missile is 13km when the missile is launched, use MATLAB and a full nonlinear model to plot the missile and target trajectories in the 2D engagement plane assuming the missile follows a proportional guidance strategy with $\lambda = 3$ and $\lambda = 4$. Also plot the missile LATAX as a function of time. Plot all plots till the instant of closest approach between the missile and target (where either the range or the closing velocity is zero). In case the missile does not achieve an intercept, find the miss distance. Superpose on the respective plots the trajectories and acceleration predicted by linearized analysis. Neglect any lags in the missile. (**Dahlia Nadkarni** (04D01011))

2. Rework the whole problem above in the case where the missile flight control system can be modelled as a transfer lag of 1 second. Assume $\lambda = 16/3$. As in the previous question, perform the nonlinear simulation and compare with the prediction of linearized analysis. (**Suraj Thulkar (04D01020)**+Prateek Gupta (04D01019))