10.4 Design Project

The objective of this assignment is to implement Algorithms 3 and 4. Note the addition of two blocks labeled PathManager and PathFollower. The output of the path manager is

$$y_{manager} = \begin{pmatrix} flag \\ V_g^d \\ r \\ q \\ c \\ \rho \\ \lambda \end{pmatrix}$$

where flag=1 indicates that $P_{line}(r,q)$ should be followed and flag=2 indicates that $P_{orbit}(c, \rho, \lambda)$ should be followed, and V_g^d is the desired ground speed.

10.1 Modify `path_follow.m` to implement Algorithms 3 and 4. By modifying `path_manager_chap10.m`, test both the straight-line and orbit-following algorithms on the guidance model given in equation (9.19). An example Simulink diagram is given in `mavsim_chap10_model.slx`. Test your design with significant constant winds (e.g., w_n= 3, w_e = −3). Tune the gains to get acceptable performance.

10.2 Implement the path following algorithms on the full six-DOF simulation of the MAV. An example Simulink diagram is given in `mavsim_chap10_6DOF.slx`. Test your design with significant constant winds (e.g., w_n= 3, w_e = −3). If necessary, tune the gains to get acceptable performance.

Tip
- Refer to page 184 of the textbook for the Algorithm 3 and 4.
- In the report, you should describe how the guidance model matchs with the 6-DOF model.