7.7 Design Project

The objective of this project assignment is to add the sensors to the simulation model of the MAV. The file `sensors.m` will model all of the sensors that update at rate T_s (gyros, accelerometers, pressure sensors), and `gps.m` will model the GPS sensor, which is updated at rate $T_{s,GPS}$.

7.1. Using the sensor parameters listed in appendix H, modify `sensors.m` to simulate the output of the rate gyros (eq. (7.5)), the accelerometers (eq. (7.3)), and the pressure sensors (eq. (7.9) and (7.10)). (Please ignore sensor bias terms.)

7.2. Using the sensor parameters listed in appendix H, modify `gps.m` to simulate the position measurement output of the GPS sensor (eq. (7.18)-7.20)) and the ground speed and course output of the GPS sensor (eq. (7.25)-7.26)).

7.3. Using a Simulink scope, observe the output of each sensor and verify that its sign and magnitude are approximately correct, and that the shape of the waveform is approximately correct.

Tip

*For Eq. (7.17), you can find relevant parameters on Table 2.

*For computing P.rho, see the book page 127 and use the ideal gas model.

*Initialize 'eta' as 0. For other parameters, follow the book.

*Add sensor parameters into the existing parameter file and name it as 'param_chap7'.