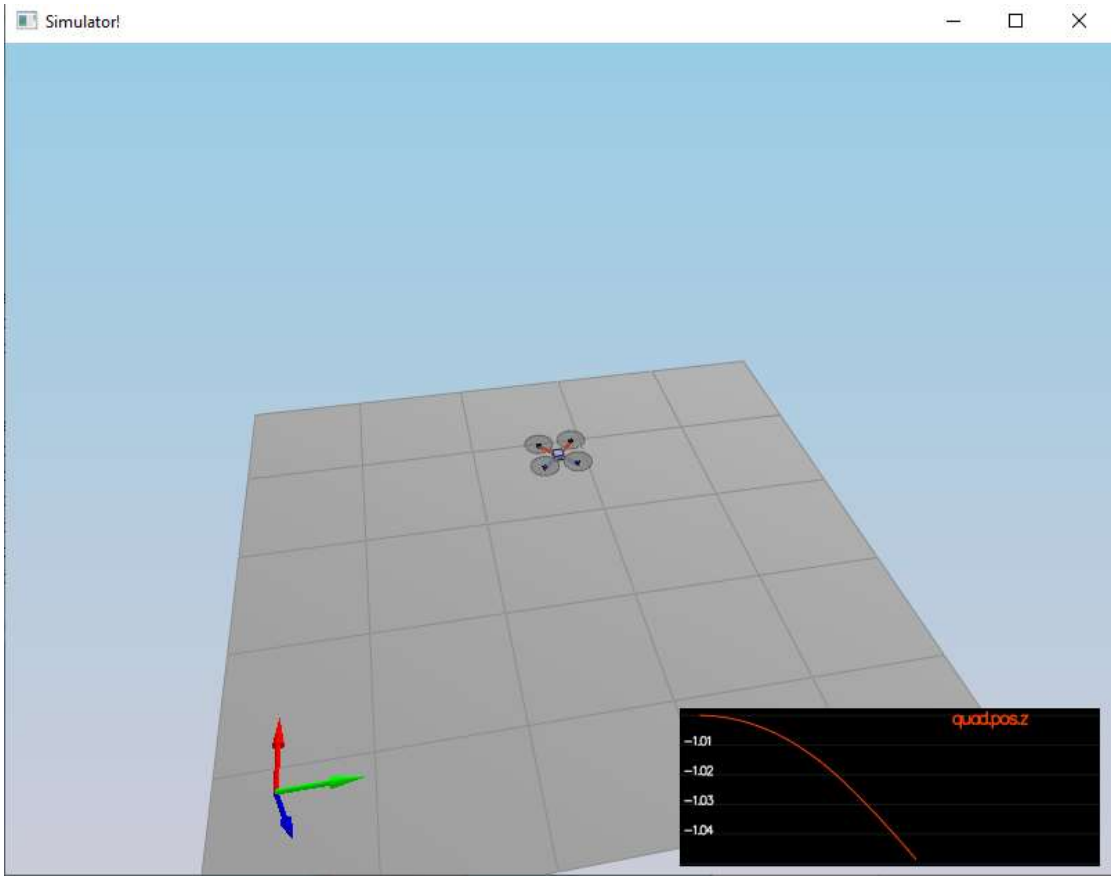
Project Steps

First cloned the repository and gotten familiar with the C++ environment as outlined in C++ Setup.

Completed each of the scenarios outlined in the C++ project readme. This involve implementing and tuning following controllers:

Scenario 1:
Set the Mass 0.5 to get the following solution:

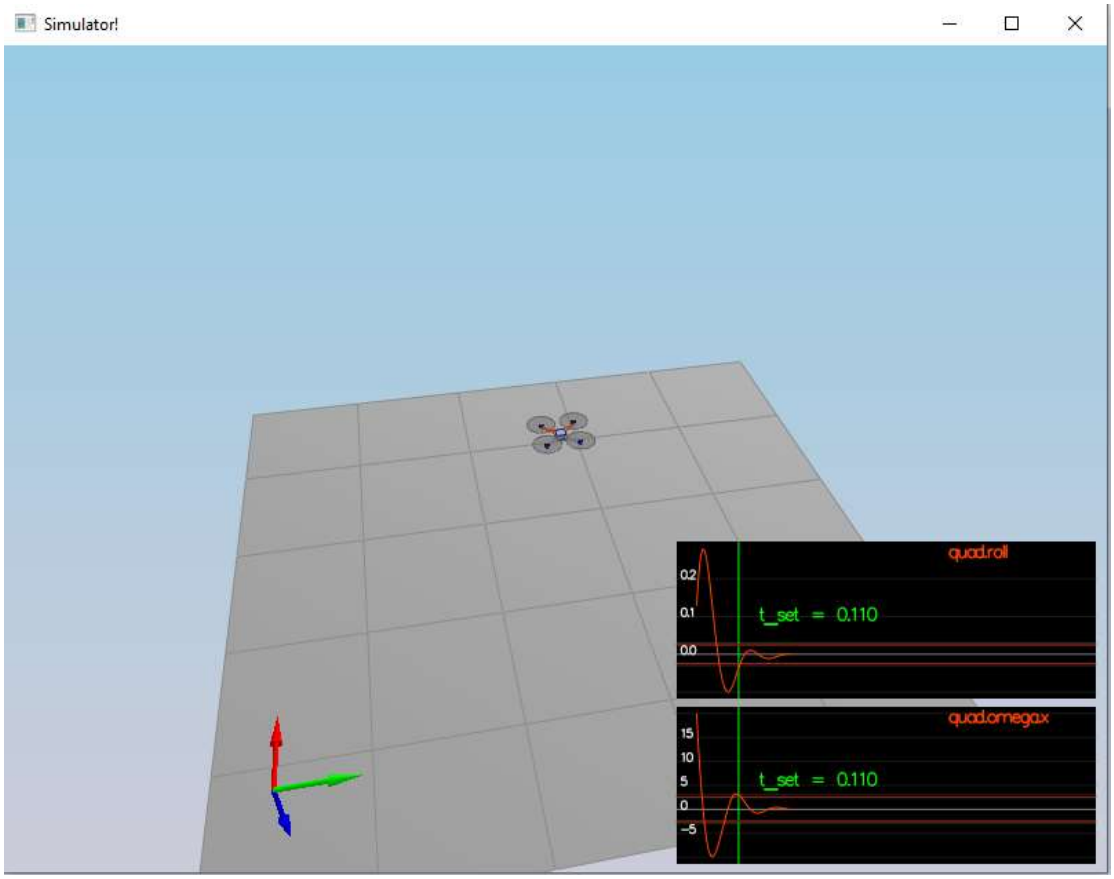
Simulation #145 (../config/01_Intro.txt)
PASS: ABS(Quad.PosFollowErr) was less than 0.500000 for at least 0.800000 seconds



Body rate and roll/pitch control (scenario 2)

Implemented the body rate control by applying the code in the function GenerateMotorCommands() and function BodyRateControl()
Tuned kpPQR = 80, 80, 25 in QuadControlParams.txt to get the vehicle to stop spinning quickly but not overshooted.
Implemented roll / pitch control in the function RollPitchControl()
Tune kpBank = 15 in QuadControlParams.txt to minimize settling time but avoid too much overshoot
got the following result:

Simulation #270 (../config/02_AttitudeControl.txt)
PASS: ABS(Quad.Roll) was less than 0.025000 for at least 0.750000 seconds
PASS: ABS(Quad.Omega.X) was less than 2.500000 for at least 0.750000 seconds



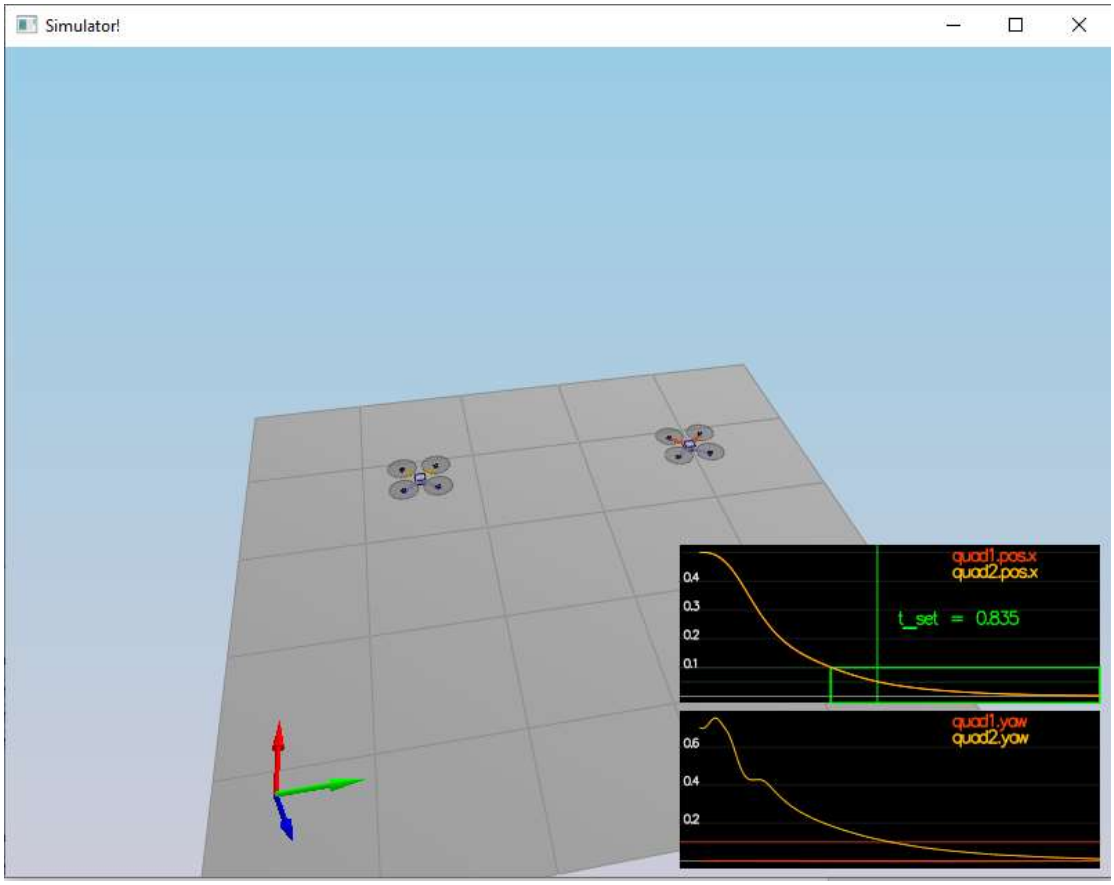
Position/velocity and yaw angle control (scenario 3)

implemented the code in the function LateralPositionControl(), AltitudeControl() and YawControl().
Tuned

Position control gains	kpPosXY = 30, kpPosZ = 30, kiPosZ = 38
Velocity control gains	kpVelXY = 12.0, kpVelZ = 10.0
Angle control gains	kpBank = 15, kpYaw = 2, kpPitch = 5
Angle rate gains	kpPQR = 80, 80, 25

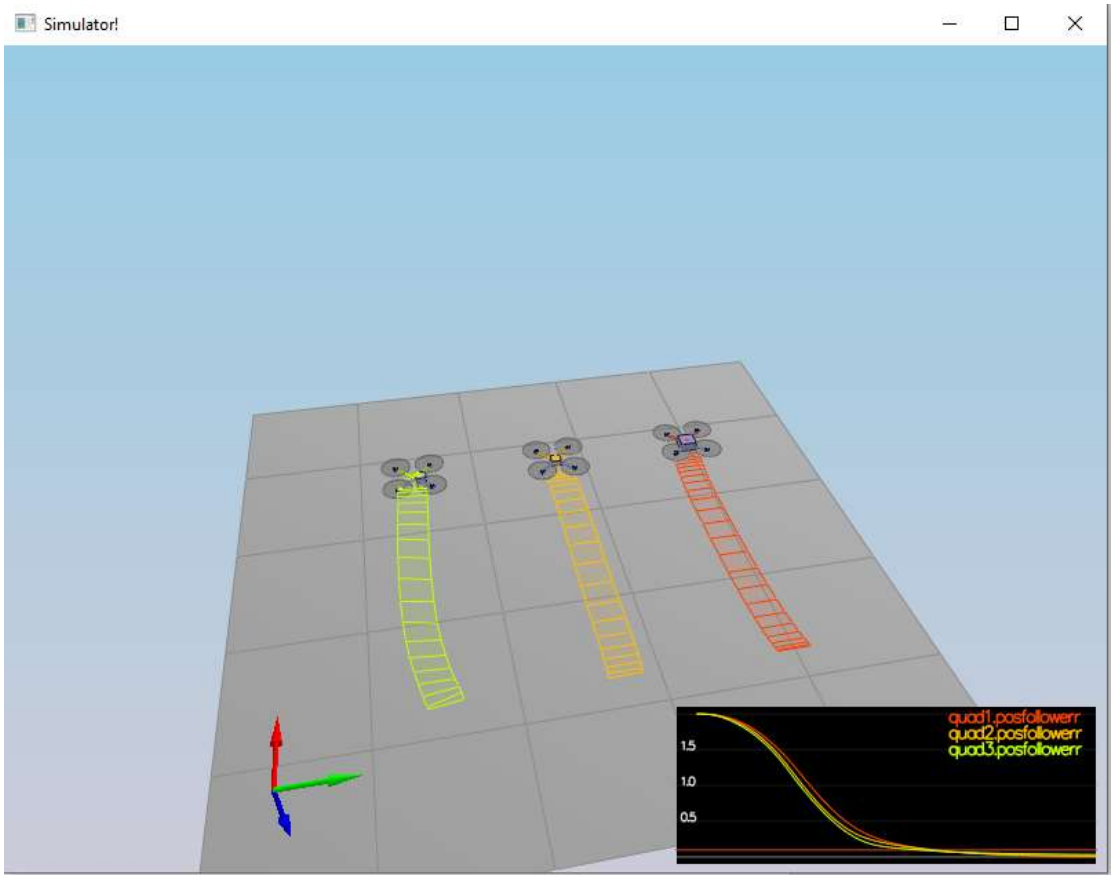
Simulation #339 (../config/03_PositionControl.txt)
PASS: ABS(Quad1.Pos.X) was less than 0.100000 for at least 1.250000 seconds
PASS: ABS(Quad2.Pos.X) was less than 0.100000 for at least 1.250000 seconds

PASS: ABS(Quad2.Yaw) was less than 0.100000 for at least 1.000000 seconds



Non-idealities and robustness (scenario 4)
Tuned the integral control, and other control parameters until all three quads successfully moving. Tuned kpPosXY = 30 in Position control gains and got the following result:

Simulation #20 (../config/04_Nonidealities.txt)
PASS: ABS(Quad1.PosFollowErr) was less than 0.100000 for at least 1.500000 seconds
PASS: ABS(Quad2.PosFollowErr) was less than 0.100000 for at least 1.500000 seconds
PASS: ABS(Quad3.PosFollowErr) was less than 0.100000 for at least 1.500000 seconds



Trajectory Follow: