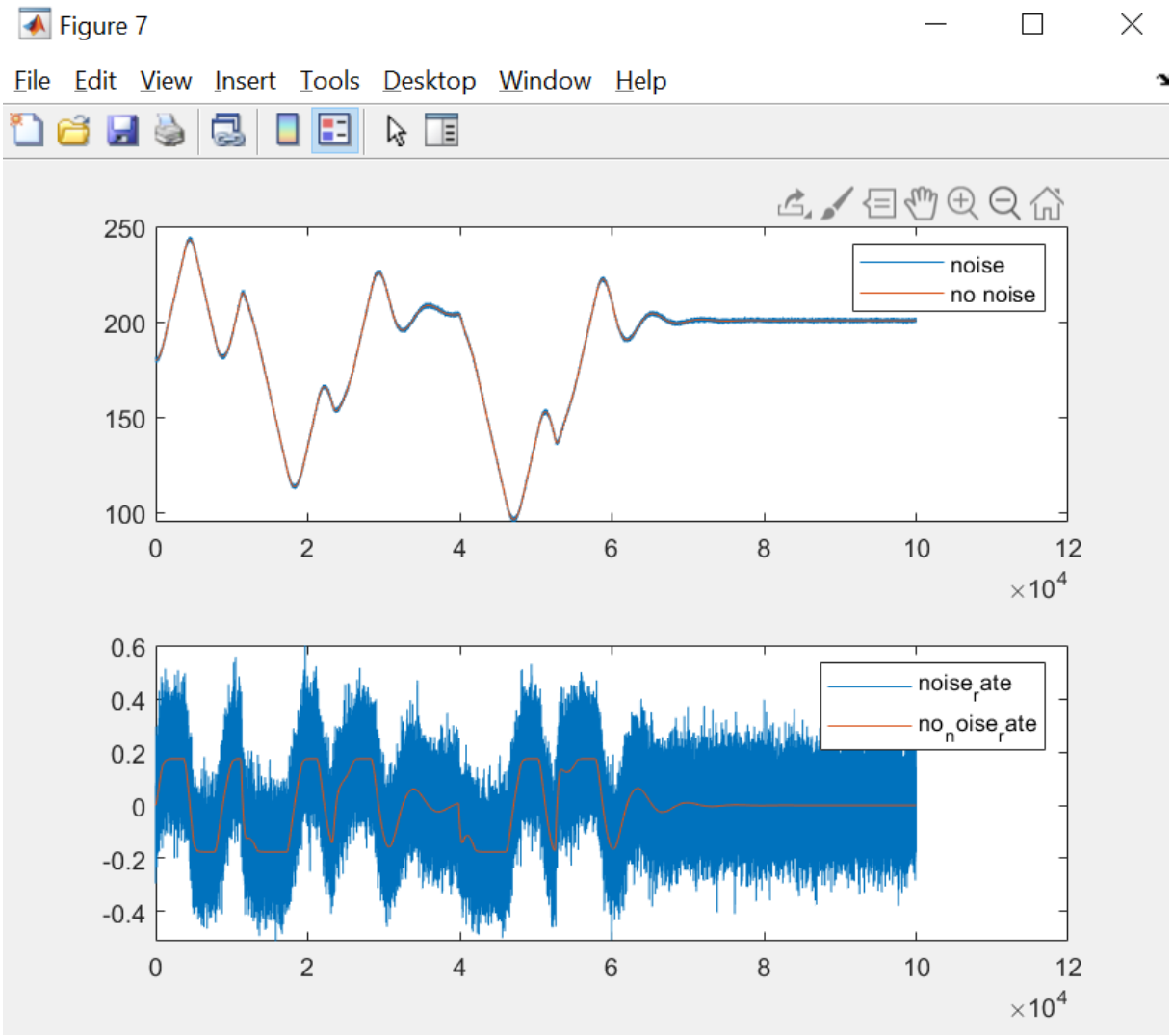
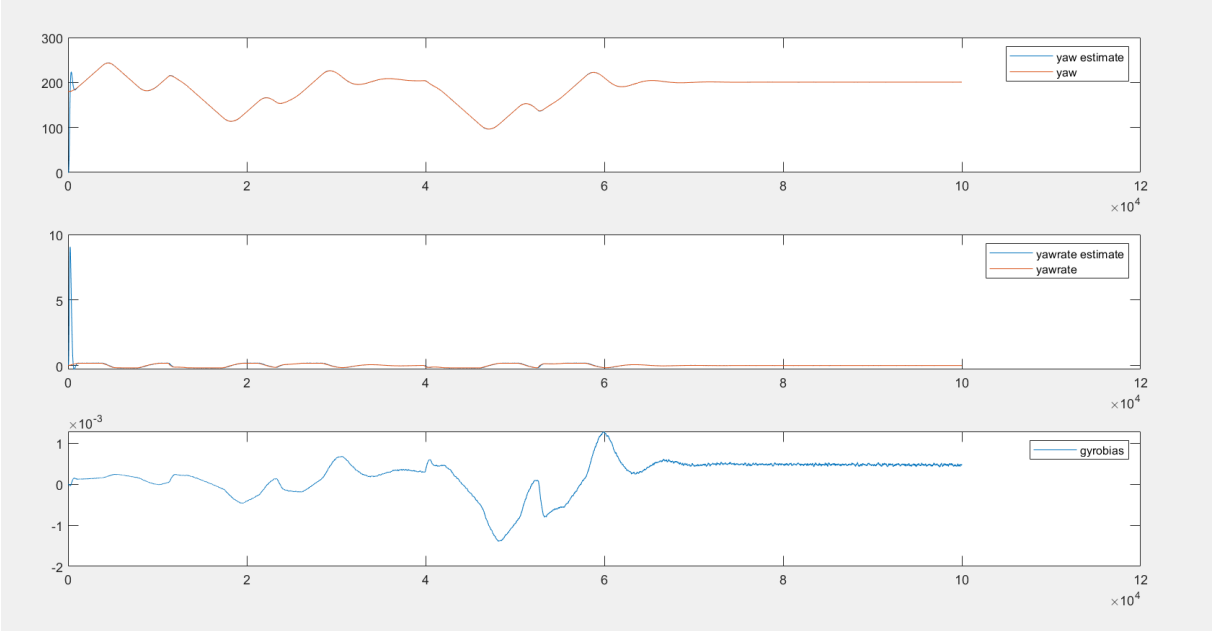
Task2a)



Yaw øverst, yawrate nederst 😊

Task2b)



Very nice 😊

Task2c)

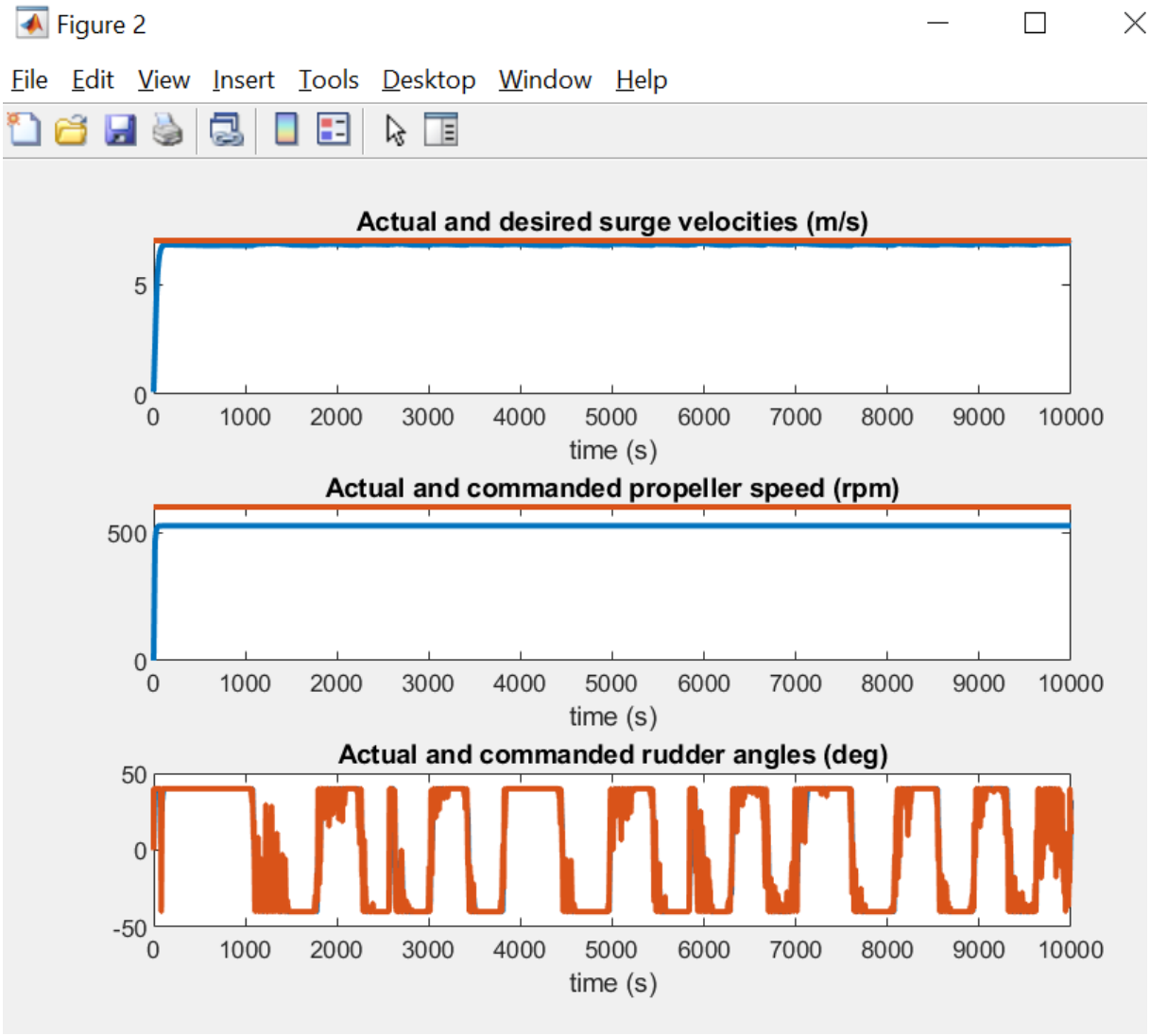


Figure 2
File Edit View Insert Tools Desktop Window Help
Actual and desired surge velocities (m/s)
5
0
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)
Actual and commanded propeller speed (rpm)
500
0
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)
Actual and commanded rudder angles (deg)
50
0
-50
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)

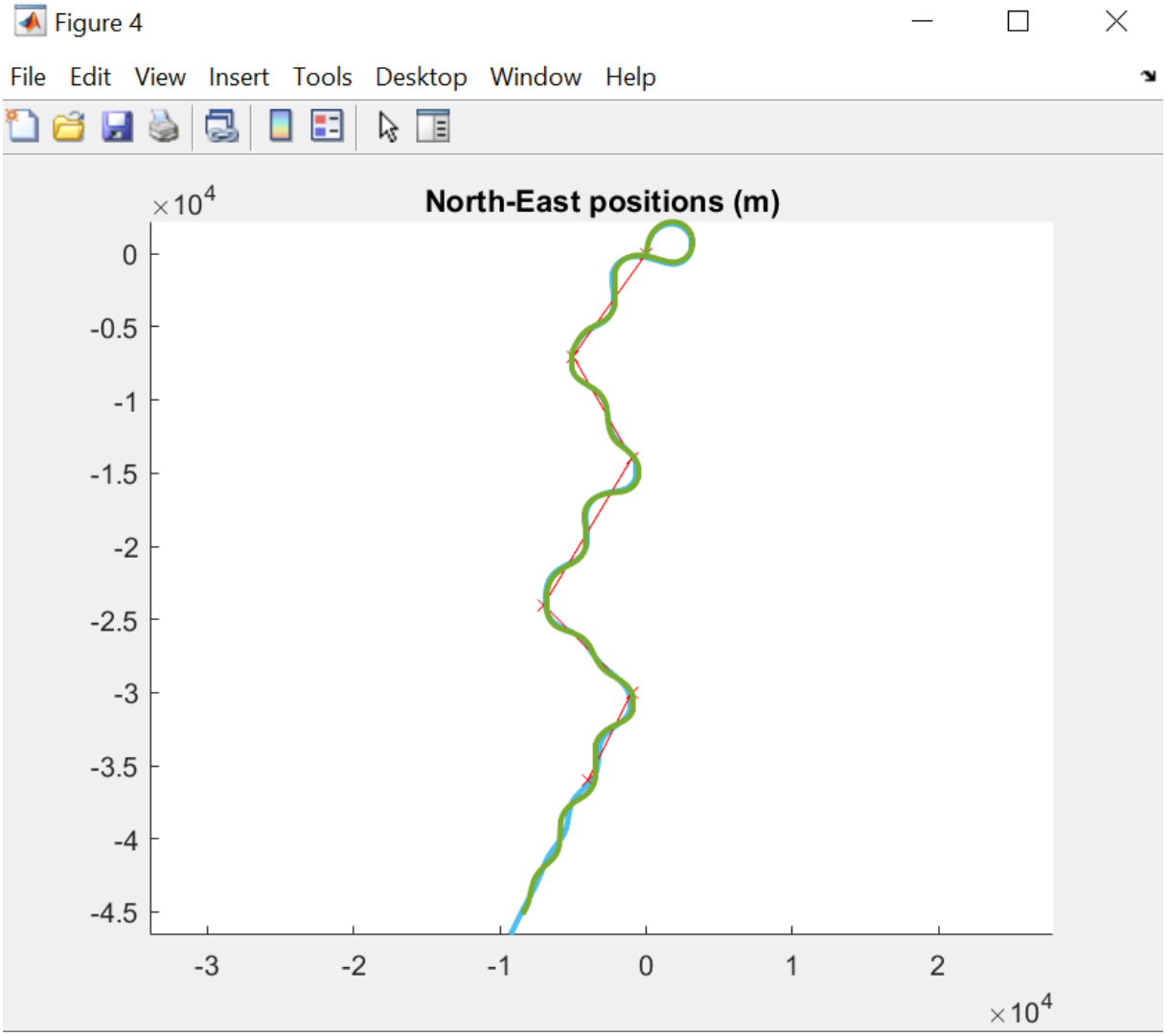
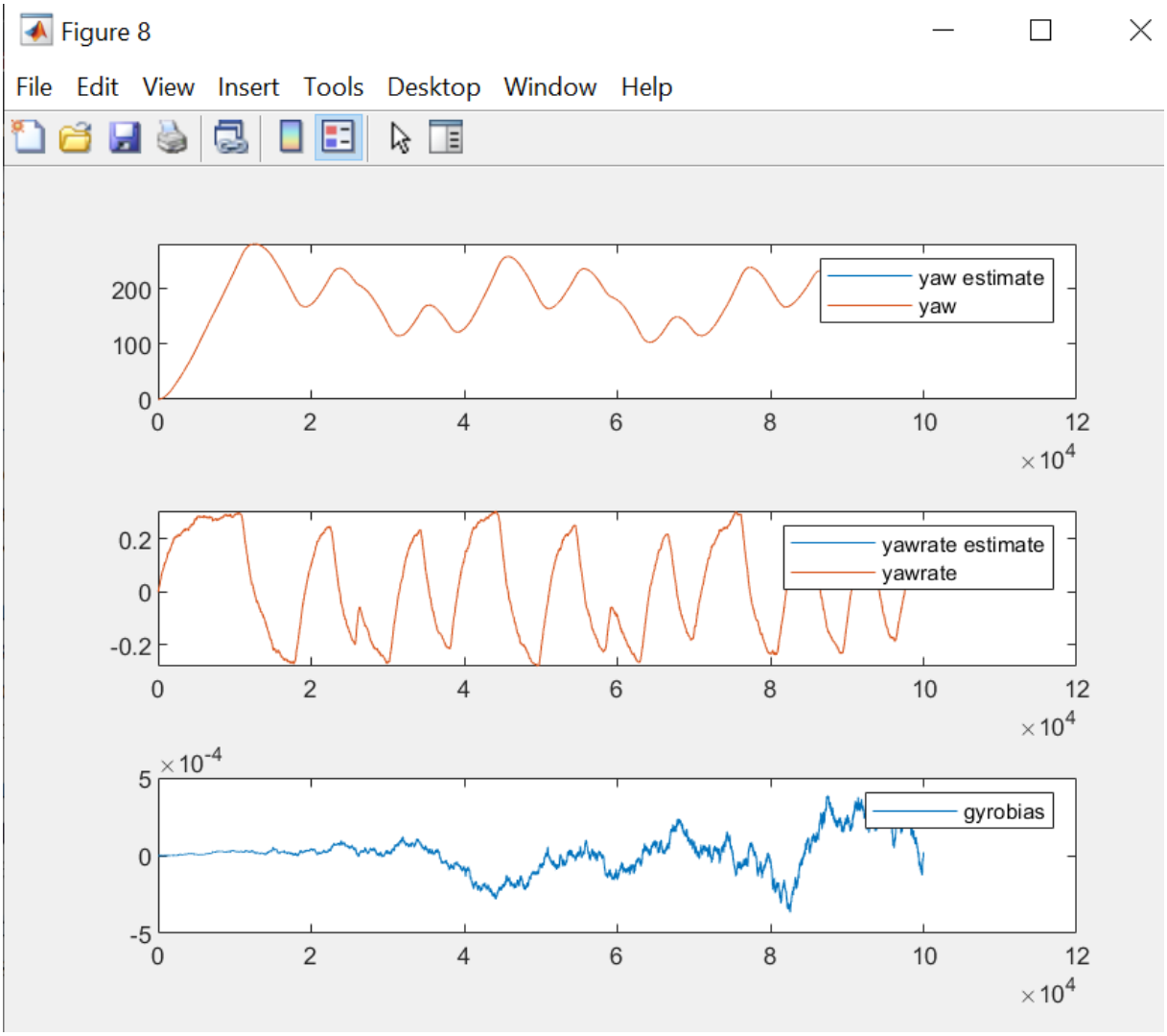


Figure 4
File Edit View Insert Tools Desktop Window Help
North-East positions (m)
×10^4
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
-4.5
-3
-2
-1
0
1
2
×10^4



Looks good. Some bad tuning of the ILOS which gives the snakey trajectory, but the kalman filter works great. You cant see any difference between the estimates and the actual states in the plots so the behavior should be identical. Zooming in (trust me) there is a difference in the beginning, but it quickly converges 😊

Task2d)

So I turn off the waypoints and updating psi_ref? Then it works exactly the same way, just with a constant reference. Perhapts I misunderstood. Here are the plots

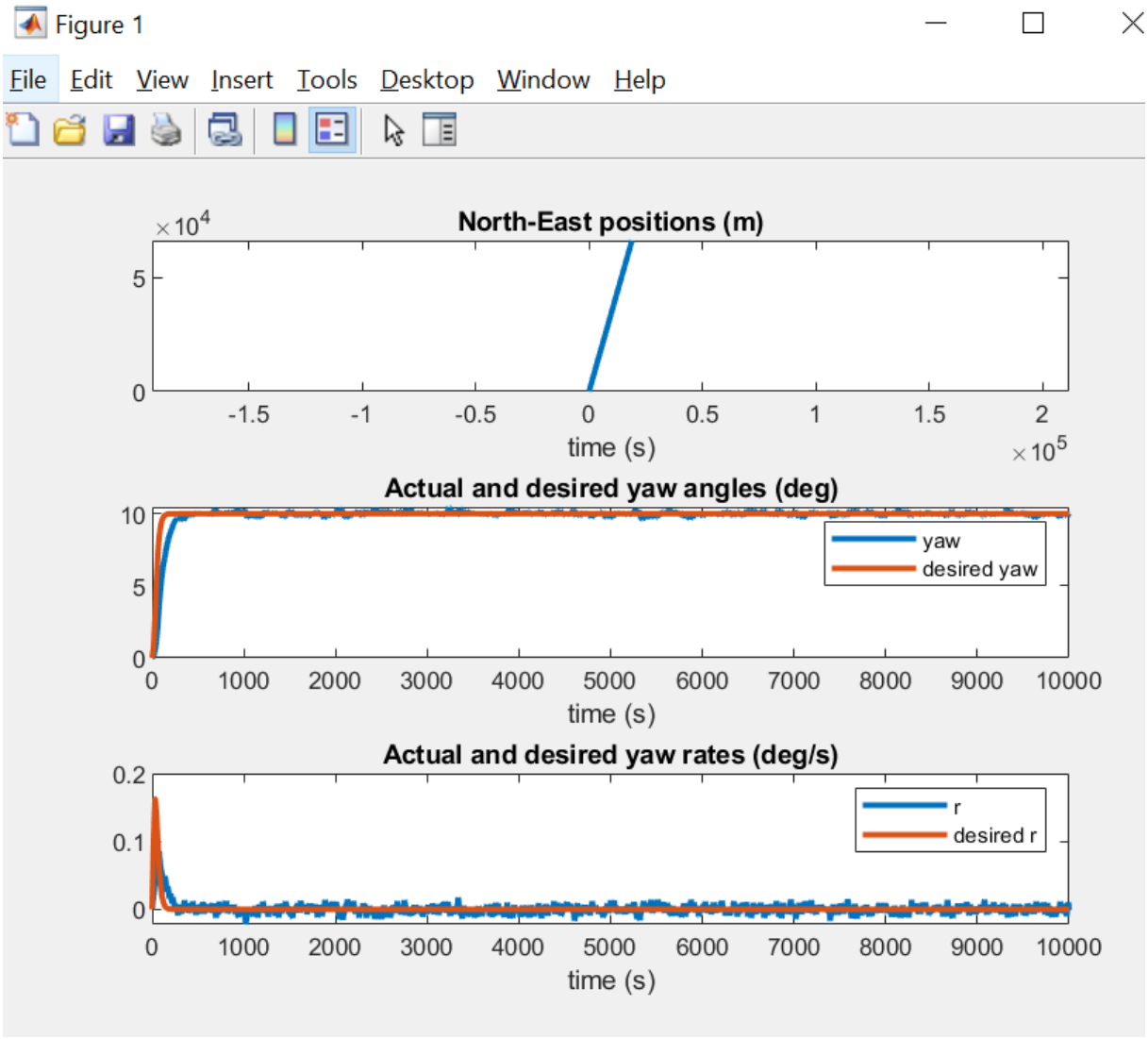


Figure 1
File Edit View Insert Tools Desktop Window Help
North-East positions (m)
×10^4
5
0
-1.5 -1 -0.5 0 0.5 1 1.5 2
time (s)
×10^5
Actual and desired yaw angles (deg)
10
5
0
yaw
desired yaw
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)
Actual and desired yaw rates (deg/s)
0.2
0.1
0
r
desired r
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)

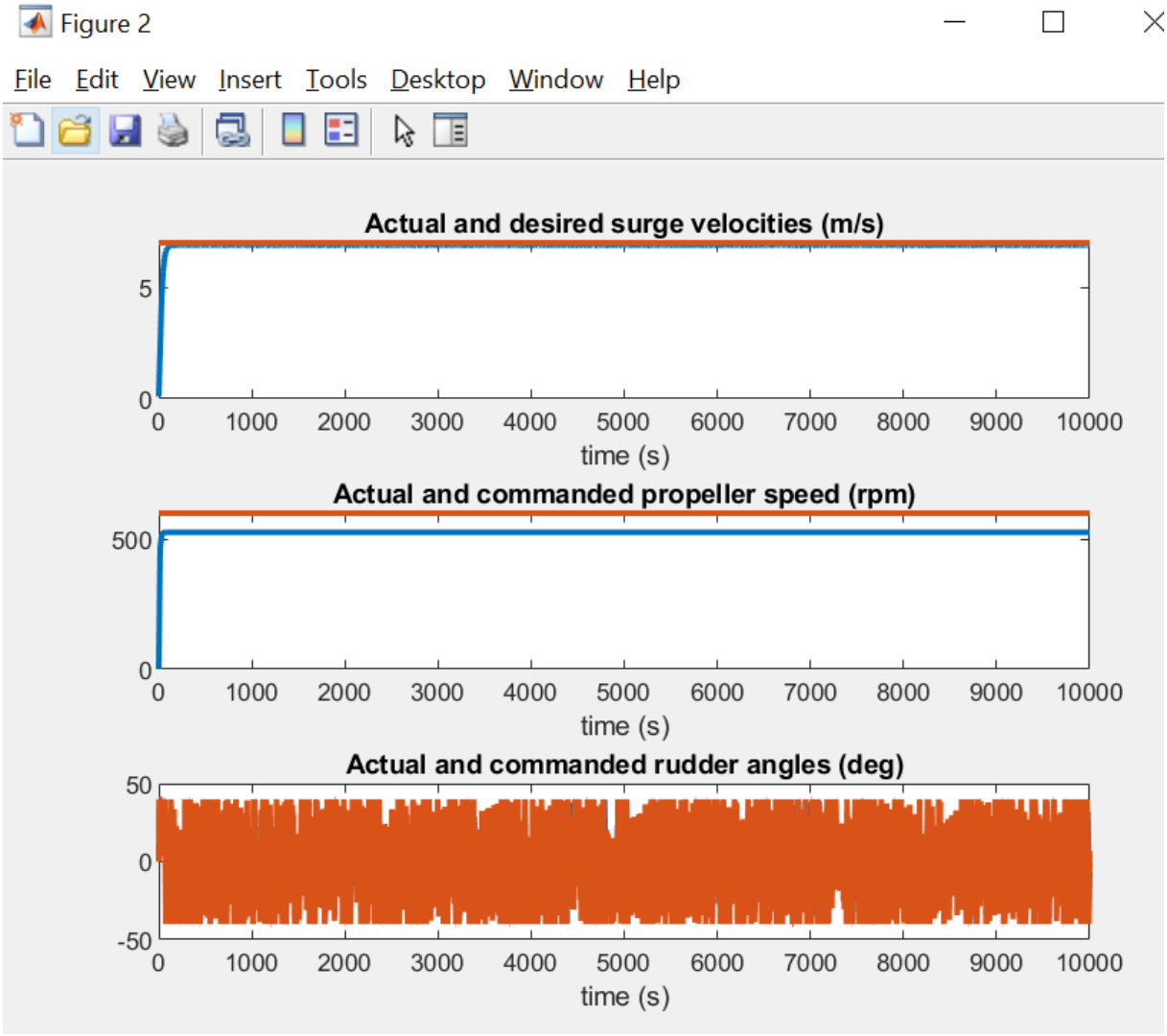
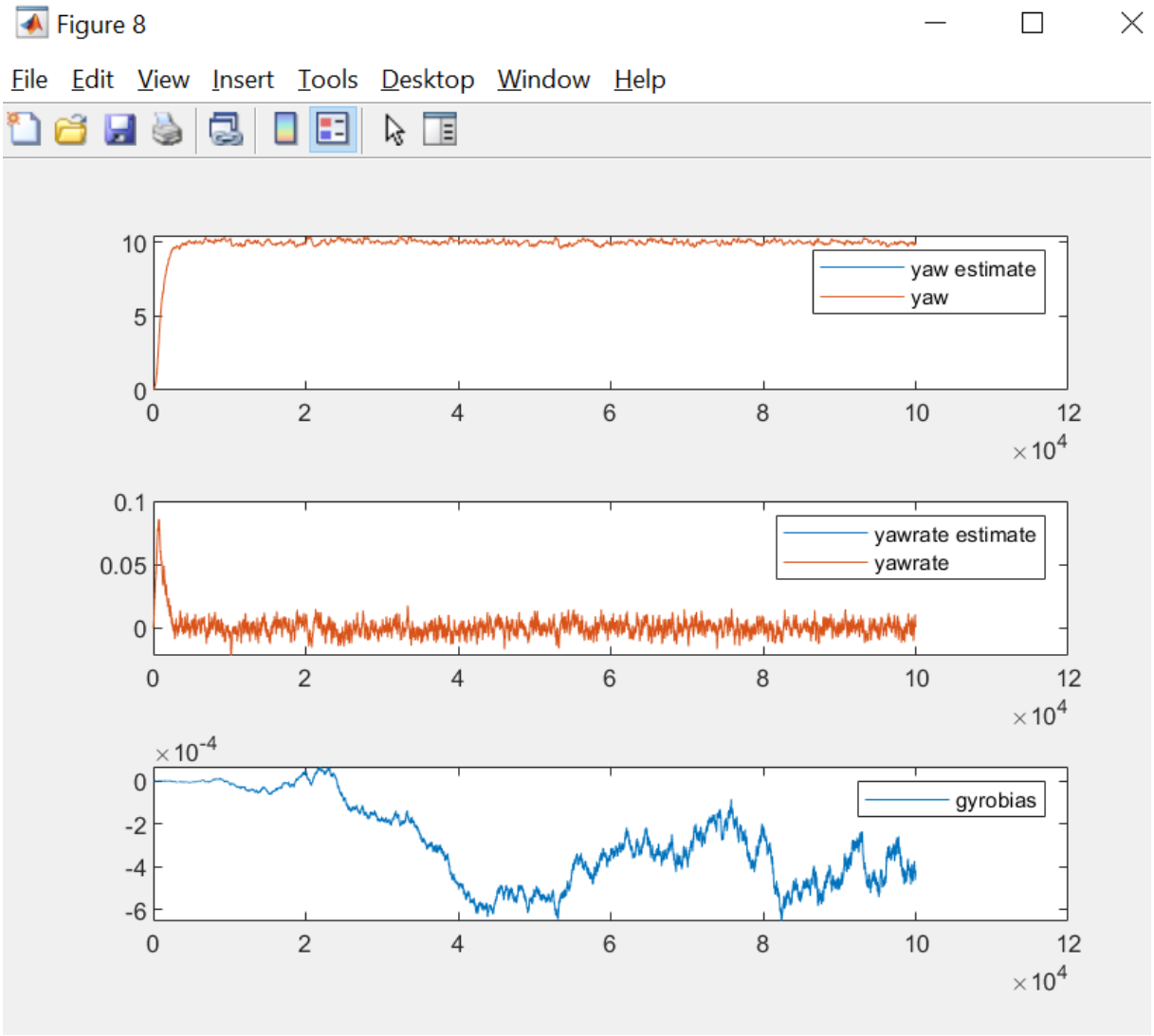


Figure 2
File Edit View Insert Tools Desktop Window Help
Actual and desired surge velocities (m/s)
5
0
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)
Actual and commanded propeller speed (rpm)
500
0
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)
Actual and commanded rudder angles (deg)
50
0
-50
0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
time (s)

Yikes



The estimates are still excellent, but the values themselves are more noisy and varying. Should be stable with a constant reference.