Assignment 2, part 3

Task 1d

If we assume that

- the velocity vector has a non zero component only in the x direction
- the velocity is constant
- the square of the rudder angle can be approximated as zero

then we can compute cruise speed as stated in the assignment.

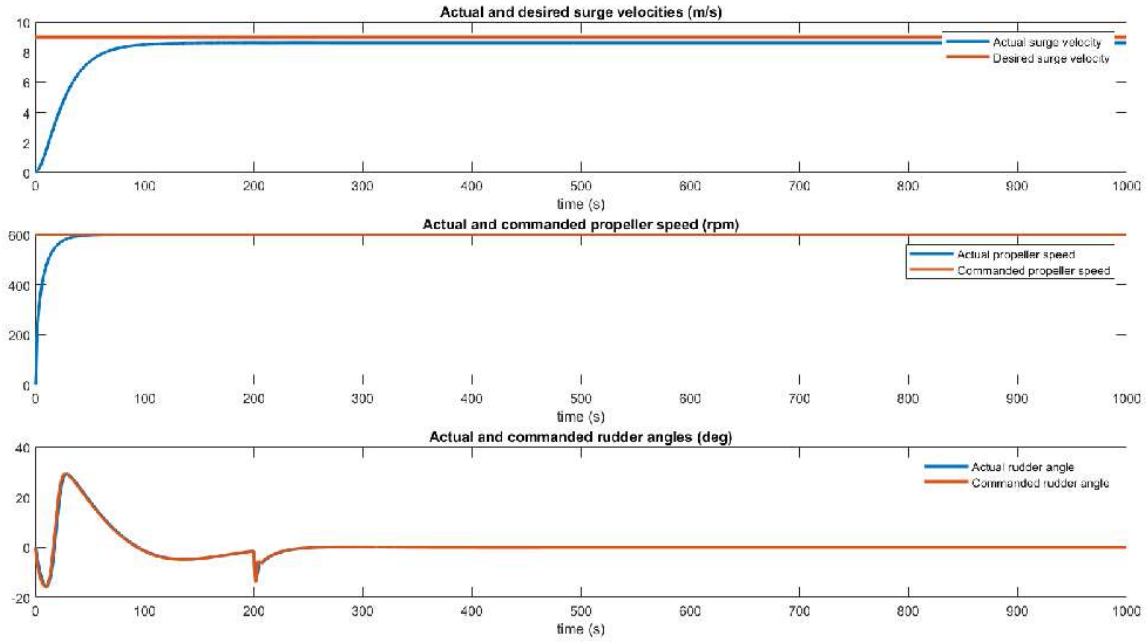
This is readily seen from equation 6.136.

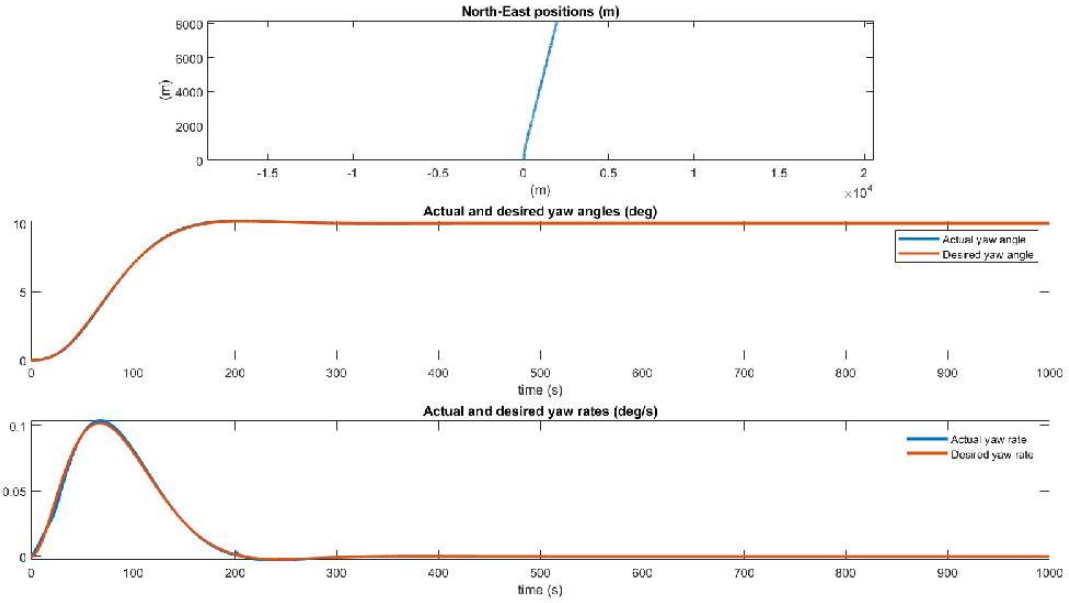
Task 1e

When the commanded propeller speed is set constantly to 10 rps, we see that the heading the surge behaves quite nicely.

There is a small constant deviation between desired and acctual surge. To remove this we would have to use a closed loop

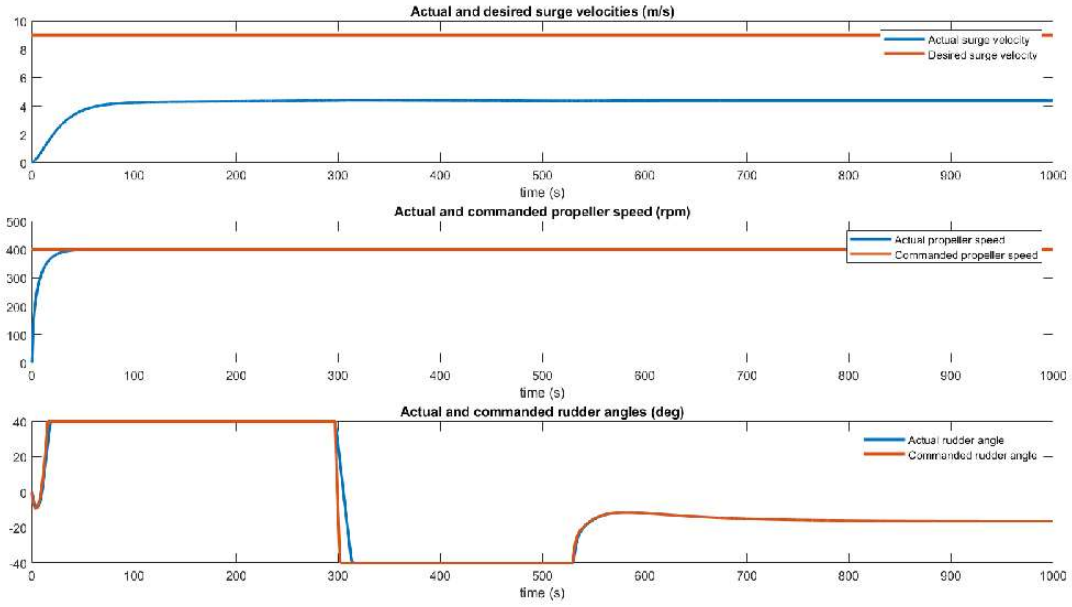
controller for commanded propeller speed, preferably with integral action.

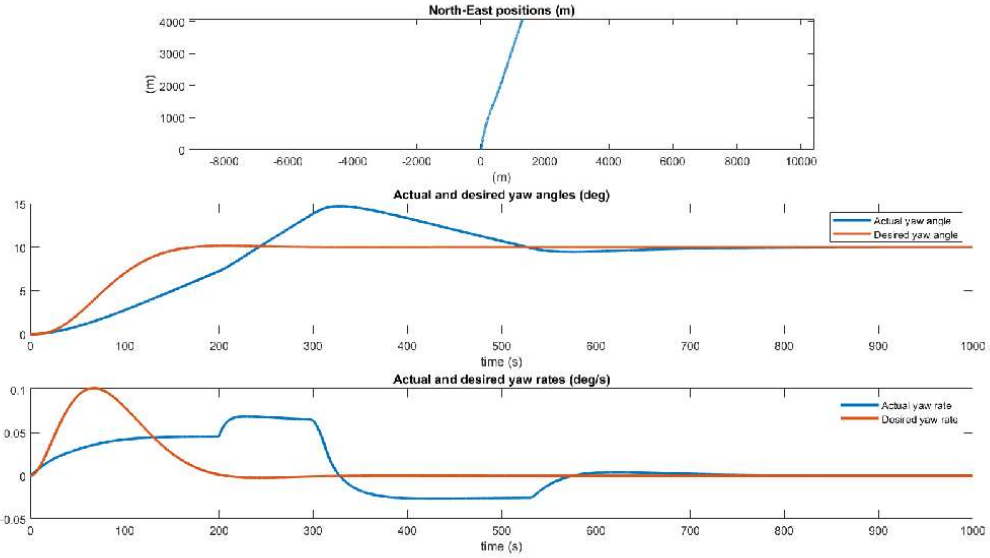




When the open loop speed controller is used, the propeller speed is constant to 6.7 rps instead of 10 rps. This gives very

different behavior as seen in the figures below.




North-East positions (m)
(m)
(m)
Actual and desired yaw angles (deg)
Actual yaw angle
Desired yaw angle
time (s)
Actual and desired yaw rates (deg/s)
Actual yaw rate
Desired yaw rate
time (s)