TTK4255

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Exercise 4

Task 1

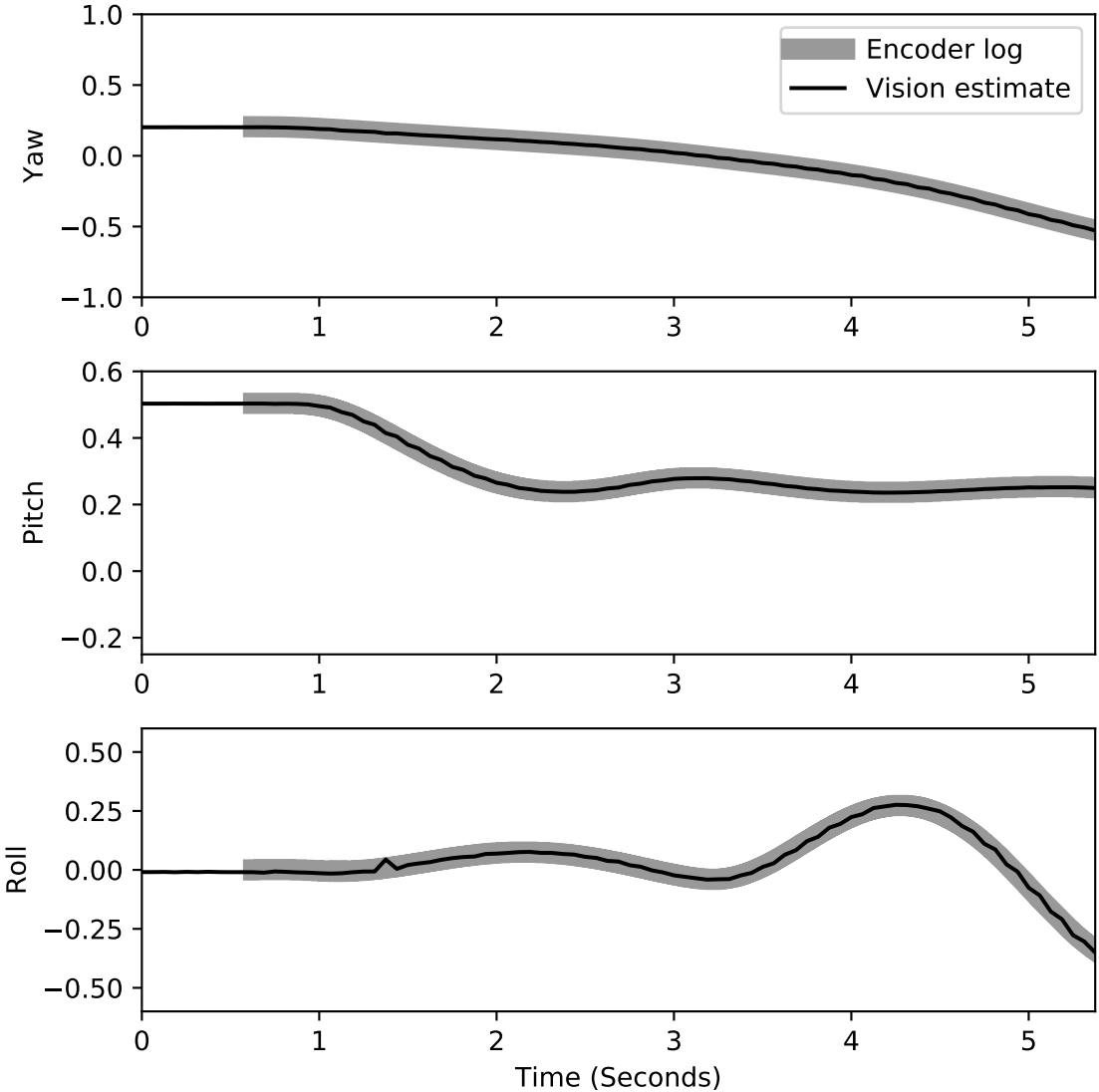
d) The 4 markers on the rotors are not visable in image 87, so the derivatives in roll, pitch and yaw are zero. As the 3 markers on the arm give no information about roll, the column for roll in the Jacobian is all zeros. J^TJ will then have a column with all zeros, and therefore not be invertible

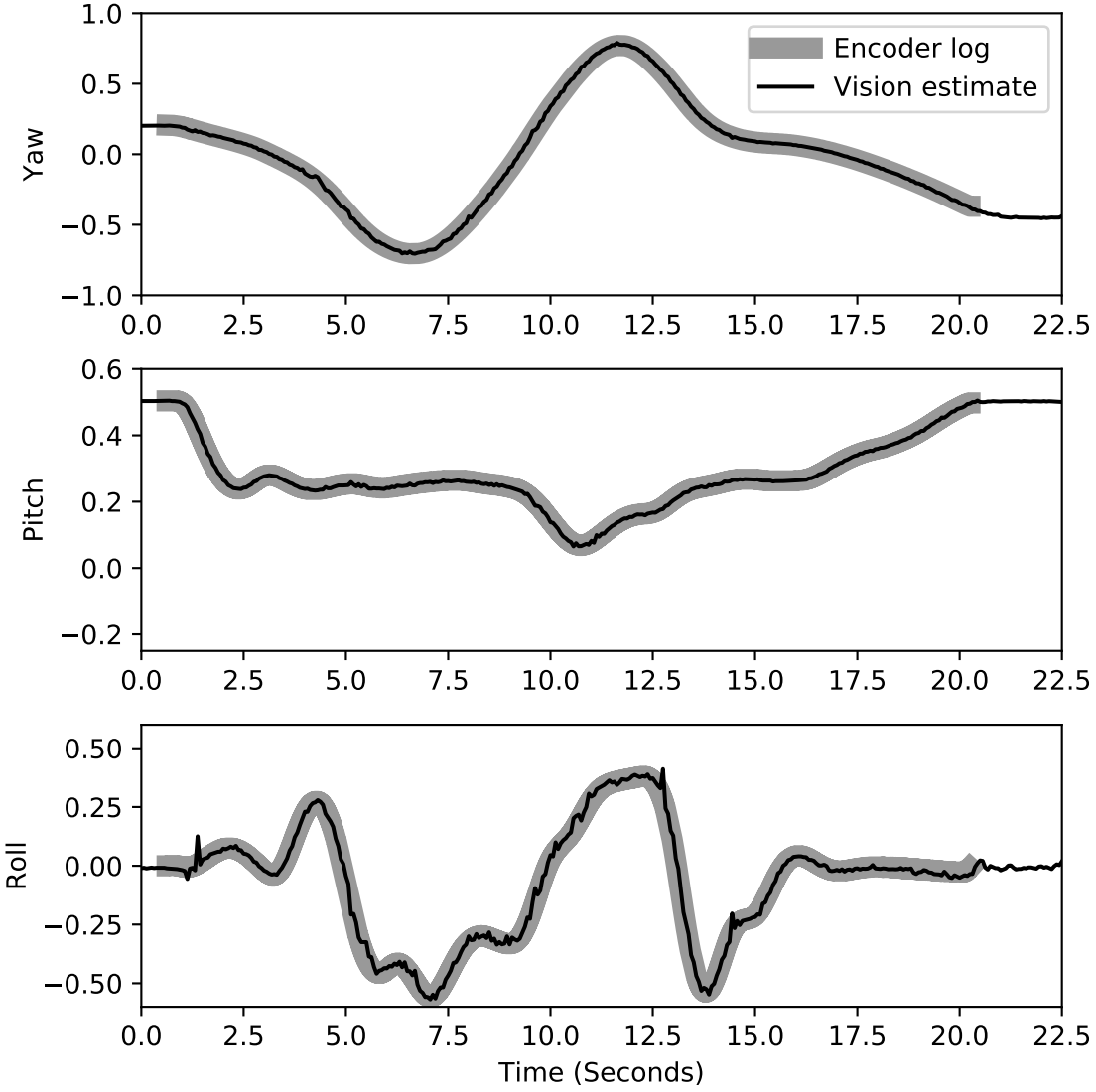
Task 2

a) λ increases and decreases continuously, and ends up at $\lambda = 5,58$

The algorithm never reaches 0,001 radens precision, so there may be something wrong.

b) No error now. J^TJ is still singular, but now we add $\lambda \cdot D$ before inverting, such that it isn't singular.


Encoder log
Vision estimate
Yaw
Pitch
Roll
1.0
0.5
0.0
−0.5
−1.0
0.6
0.4
0.2
0.0
−0.2
0.50
0.25
0.00
−0.25
−0.50
0
1
2
3
4
5
Time (Seconds)


Encoder log
Vision estimate
Yaw
Pitch
Roll
1.0
0.5
0.0
−0.5
−1.0
0.6
0.4
0.2
0.0
−0.2
0.50
0.25
0.00
−0.25
−0.50
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
Time (Seconds)