

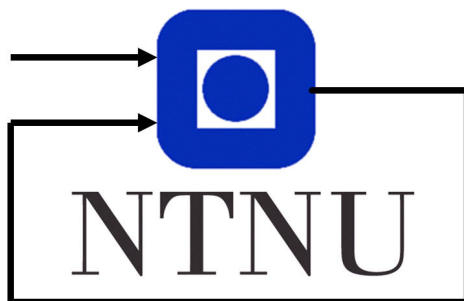
# LaTeX Lab Report Template

Group 42

Martin Albertsen Brandt

Martin Eek Gerhardsen

November 27th 2019



Department of Engineering Cybernetics

## **Abstract**

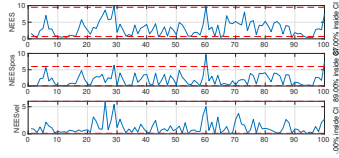
This report will highlight and discuss the results of the three graded assignments for the course TTK4250 Sensor Fusion. The code implemented was tested and tuned for both simulated and real datasets.

## Contents

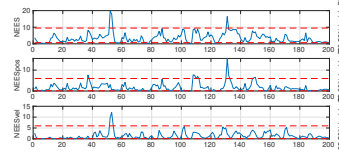
<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Graded Assignment 1</b>	<b>2</b>
<b>3</b>	<b>Graded Assignment 2</b>	<b>3</b>
3.1	INS for simulated fixed wing UAV . . . . .	3
3.2	INS for real fixed wing UAV . . . . .	3
<b>4</b>	<b>Graded Assignment 3</b>	<b>6</b>
<b>5</b>	<b>Conclusion</b>	<b>7</b>
	<b>References</b>	<b>8</b>

# 1 Introduction

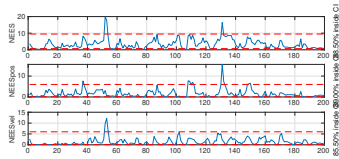
## 2 Graded Assignment 1



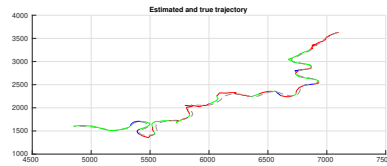
(a)



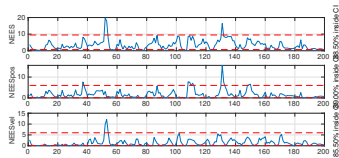
(b)



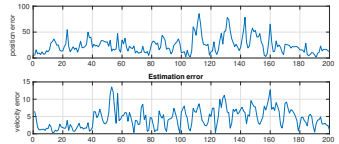
(c)



(d)



(e)



(f)

### 3 Graded Assignment 2

An error-state Kalman filter was implemented in MATLAB. For the relevant theory behind the implementation, see [2] and [1].

#### 3.1 INS for simulated fixed wing UAV

Tuning values, how we tuned (NIS, NEES, RMSE, want bias to converge somewhat, not wander)

Heading observability

Misalignment matrix

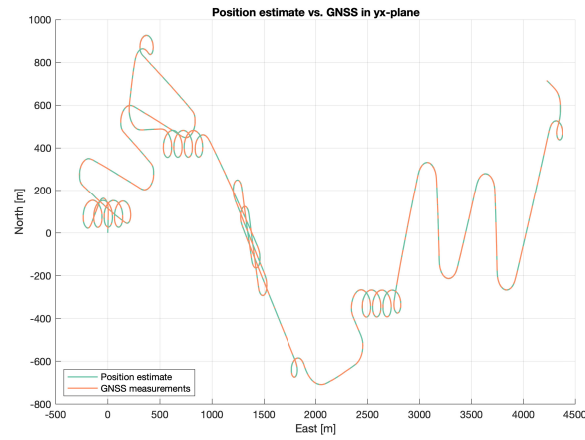
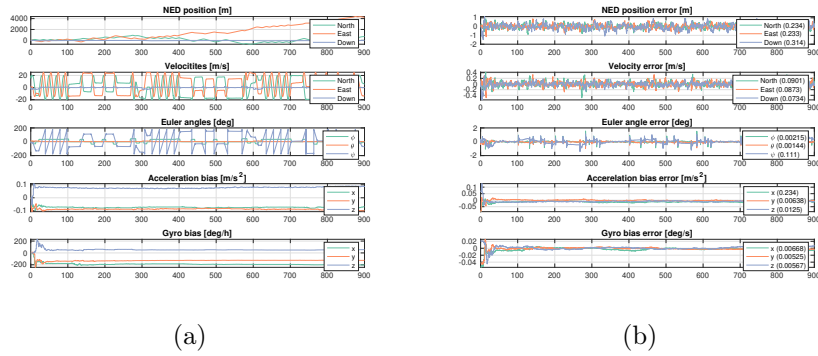


Figure 2



#### 3.2 INS for real fixed wing UAV

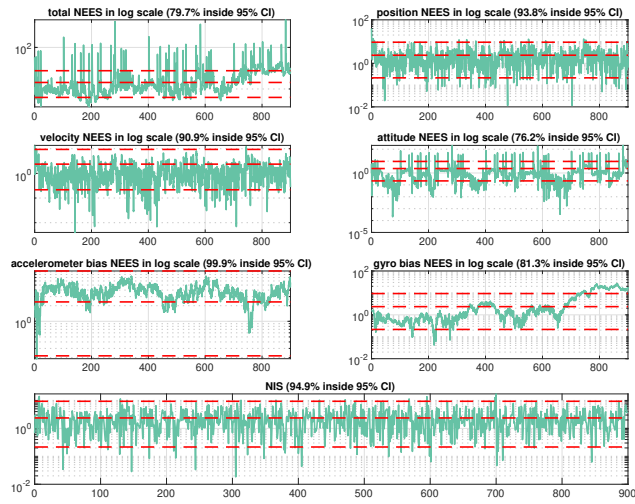


Figure 4

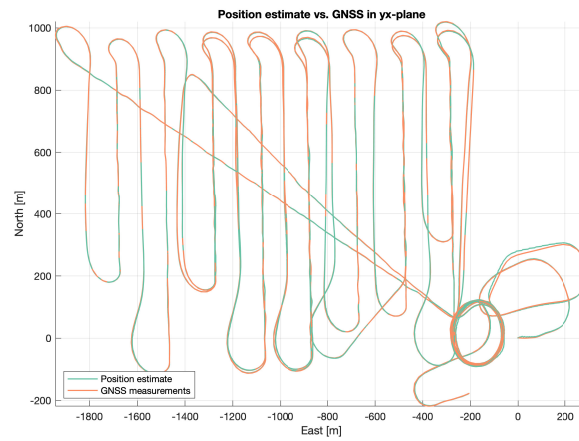


Figure 5

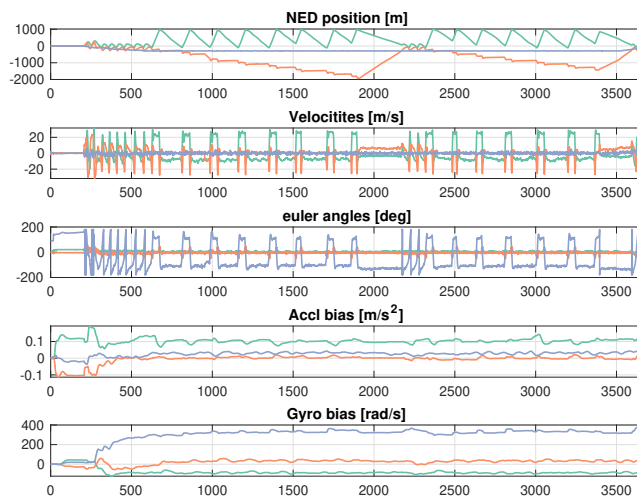


Figure 6

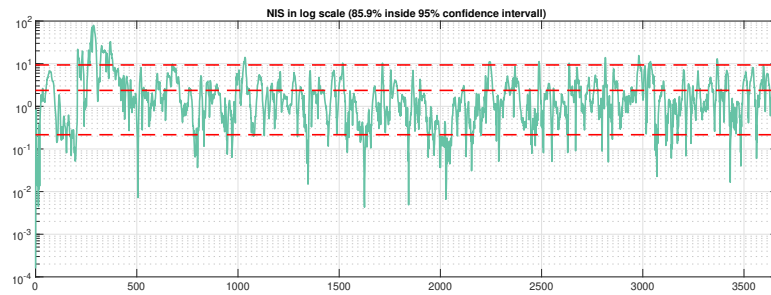


Figure 7



## 4 Graded Assignment 3

## 5 Conclusion

## References

- [1] E. Brekke. *Fundamentals of Sensor Fusion*. 2019.
- [2] J. Solà. *Quaternion kinematics for the error-state KF*. <http://www.iri.upc.edu/people/jsola/JoanSola/objectes/notes/kinematics.pdf>. 2017.