AE4-301P

Practical assignment AE4-301P

Objective:
The objective of this practical is to become familiar with classical flight controllers and their design, and to gain insight in handling qualities of open-loop and controlled aircraft.

Case study: Lockheed F-16 Fighting Falcon.

- Compulsory for all C&O students.
- Homework Matlab/Simulink assignment.
- Teams of **max 3** students allowed.

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Background information:

- All information for AE4301p is posted on Brightspace page of AE4301.
- Lecture slides.
- Control theory book: Ogata, Nise, other.
- F-16 model documentation on Brightspace.

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Assignment setup:

1. Choice of flight condition.
2. Trim and linearisation.
3. Open loop analysis.
4. Pitch rate command system satisfying CAP/Gibson.
5. Glideslope and flare controller.
6. Reporting.

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Last digit student number	First letter NetID	Altitude	Velocity
0-2	a-h	$10000ft$	$300ft/s$
	i-p	$10000ft$	$600ft/s$
	q-z	$10000ft$	$900ft/s$
3-5	a-h	$20000ft$	$300ft/s$
	i-p	$20000ft$	$600ft/s$
	q-z	$20000ft$	$900ft/s$
6-7	a-h	$30000ft$	$300ft/s$
	i-p	$30000ft$	$600ft/s$
	q-z	$30000ft$	$900ft/s$
8-9	a-h	$40000ft$	$300ft/s$
	i-p	$40000ft$	$600ft/s$
	q-z	$40000ft$	$900ft/s$

Table 1: Rules for selecting your flight condition. If you work together with somebody else, the rules apply to the person whose name appears first on the cover (you can decide who that will be).

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Reporting:

- Written report includes chosen procedures, answers to all questions, and numerical results.
- Your report must be delivered as a pdf file.
- All code that was written to generate the results in the report must be included in a zip-file.
- So 2 files (pdf+zip) in 1 submission!

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Reporting continued:

- Include Introduction, Conclusions, References etc. like in any technical report.
- Figure captions should clearly explain what is to be seen in the figure.

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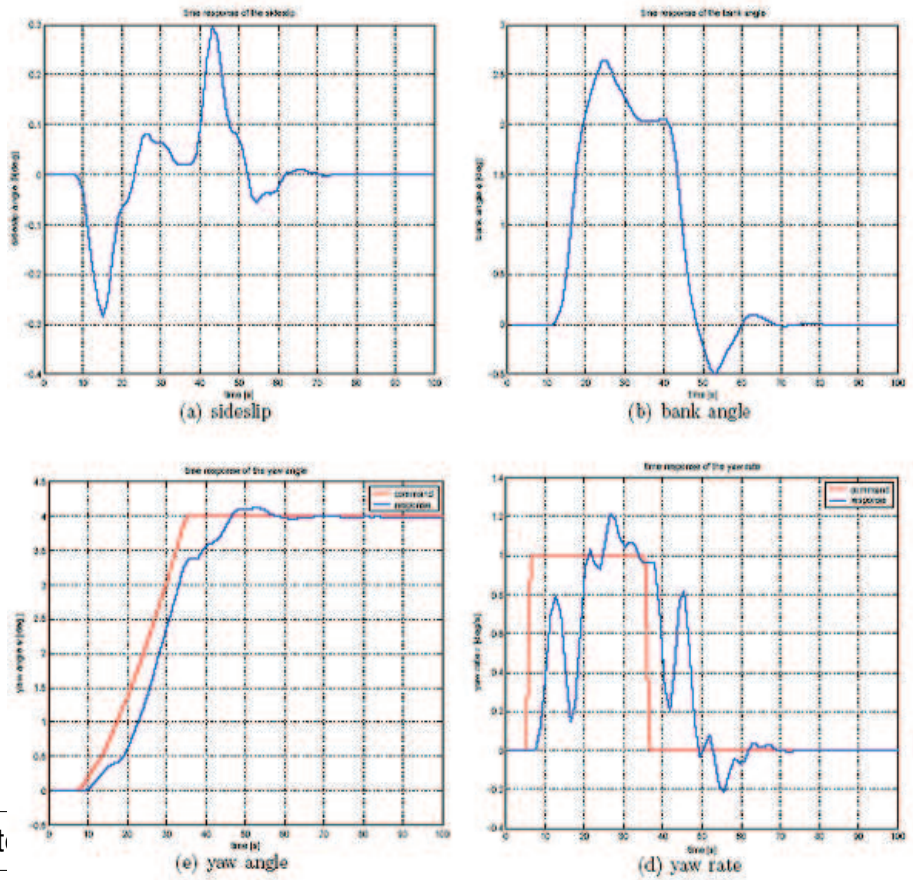
Reporting continued:

- Points deducted for unreadable notations in figures:


(a) sideslip

(b) bank angle

(e) yaw angle

(d) yaw rate

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Deadline:

- Deadline for handing in the report is **17:00pm Sunday February 7th 2021**! (last day before start of Q3)
- All reports and code must be submitted through Brightspace. Submission instructions will be placed in the Assignments section of the Brightspace page for AE4301.

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Support:

- There will be a weekly walk-in question hour on Zoom for support.
- The walk-in hour is there to help with some technical problems (get the model running) and to receive some feedback when you show the things you have implemented.
- The walk-in hour is not there to give you the answers to the questions in the assignment!
- The walk-in question hours will start next week, until the submission deadline. Every Friday from 9:30-10:30.
- History shows that the last walk-in hour before the deadline is extremely busy and not everyone can be helped, so plan accordingly.
- Zoom link: https://tudelft.zoom.us/j/91798910643?pwd=VHJKOG9qbWx5MUhDeTJYK0xjT2c1Zz09
- Password: 040235

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First steps:

- Go to Brightspace AE4301 –> content –> AE4301P Assignment (will be up soon)
- Download and read the Practical Assignment document.
- Download F-16 Simulation model and documentation.
- Play around with the model and try to understand how it is constructed.
- Follow the steps in the Practical Assignment document.

AE4-301 Automatic Flight Control System Design

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