Dynamics and Control of Flexible Aircraft (DCFA)

2019-2020 edition

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Preferred interaction method (questions, discussions, document exchange): Beep's Blog & Forum

Preferred direct contact method: email (write “DCFA” in the subject!)

Blog:
• Announcements, links to additional material

Forum:
• Discussion on lectures, exercises and laboratories
• Errors in the teaching material
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Class organization:

- Tuesdays: lesson – B8.07 (316 seats)
- Wednesdays: lesson – L.01 (270 seats)
- Thursdays: lesson – B8.12 (316 seats)
- Fridays: exercises – L.09 (152 seats) / BL27.14 (103 seats)

The Friday exercises are in 2 teams, based on family name initial:
- **A-K**: L.09 (152 seats)
- **N-Z**: BL27.14 (103 seats)

Seating might be critical during Fridays; please respect the partitioning
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Telematic class organization:

- You have received instructions, correct? ;-) **We will use MS Teams**
- Lectures will be recorded (please remind me, in case)
- We all need to practice and learn; *please be patient, and bear with me*
- Chat:
  - I might **not be able to answer** (or even read) questions online
  - As a general rule, **I will not interrupt the flow to answer the chat**
  - Every now and then, **I will stop and ask for questions**
  - I’ll dedicate a small amount of time to **answer questions online**
  - I’ll read all questions and try to **answer them later using Beep’s Forum**
- Beep:
  - Documents shared on my desktop will be **loaded on Beep in advance**
  - During exercises, **Beep’s Forum will be attended all time**
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[NOTE: only in case we revert to physical classrooms]

Schedule:

• There will be a **break** from April 25\textsuperscript{th} to May 4\textsuperscript{st} (with “lauree” on April 29\textsuperscript{th}, and only April 28-30\textsuperscript{th} in between, so we will cancel those lectures); there will be (optional) **home assignments**

• There will be another **break** from May 16\textsuperscript{th} to May 25\textsuperscript{th} (because I am attending a conference); there will be further **home assignments**

• **Updates** of the schedule (due to unforeseen events) will be communicated using **Beep**
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Teaching material:

- Several recommended documents (papers, books, reports)
- DCFA (dcfa.pdf)
- Other documents (e.g. exercises) passed during the classes

DCFA might be (a)periodically updated as the course progresses (error fixes, clarifications, additional exercises)

Exercises for self-assessment will be notified on Beep, either referring to DCFA or as separate documents

There might be (optional) home assignments

Reference to books, journal papers, reports will be made. *As a general rule, reading from multiple sources and comparing them is a good way to learn and challenge one’s understanding of a topic*
Exam:

- The exam consists of a written test, followed by a colloquium
- The written test takes 3 hours
- It usually consists of 3 (relatively open) questions
- Examples from several past years are available on Beep
- Immediately after the test there might be a brief explanation (time permitting)
- The colloquium will start with the correction of the written test
  - No correction will be made in advance
- There will be a little bit of freedom in choosing the colloquium date

Rules of conduit:
- Students must register to be admitted to the test; no late registration!
- No special dates! Tests will only take place in official dates
  - Please, do not even ask for extraordinary tests in unofficial dates
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2017-2018 throughput:


Of them, 147 (41.53%) passed the exam, with an average mark of 24.35 (21 with either 30 or 30 cum laude, 14.29% of those who passed the exam; the distribution of marks is relatively uniform).

It is worth noticing that only a fraction of the enrolled students actually tried the test. In fact, out of 354 students, only 217 (61%) registered for at least one test; only 173 (49%) actually showed up at at least one test. This means that the ratio of passing the exam with respect to at least registering is 67.74%, and the ratio of passing the exam with respect to showing up is 84.97%!

The (obvious) conclusion is that if you don't show up, you won't pass the exam. Those who showed up had 85% chances of passing (of course it depends on how well they prepared the exam).
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2018-2019 throughput:


Of them, 160 (35.24%) passed the exam, with an average mark of 24.14 (19 with either 30 or 30 cum laude. 11.88% of those who passed the exam; the distribution of marks is relatively uniform).

It is worth noticing that only a fraction of the enrolled students actually tried the test. In fact, out of 454 students, only 284 (63%) registered for at least one test; only 236 (52%) actually showed up at at least one test. This means that the ratio of passing the exam with respect to at least registering is 56.34%, and the ratio of passing the exam with respect to showing up is 67.80%!

The (obvious) conclusion is that if you don't show up, you won't pass the exam. Those who showed up had nearly 70% chances of passing (of course it depends on how well they prepared the exam).
A project will be proposed as an optional home assignment during the two breaks: develop an aeroelastic model of:

- a swept wing
- a foldable wing tip

(The two problems can be merged)

The bottomline will be:
- a detailed structural dynamics, simplified aerodynamics model
- suitable for flutter investigation / optimization for loads alleviation

Details will be defined later
Further additional activities:

1) **WeirdoNamics Contest:**
   - Create your own dynamics exercise (see appendix C of DCFA)
   - Make it as strange, complex, difficult (weird) as you like
   - Make sure you can provide a solution
     The *weirdest* wins

Format it in LaTeX following DCFA’s style and we’ll include it (with credits)

2) **YouTest:**
   - Propose an (original) exercise you would like to see in the written test
   - Make sure you are able to provide a correct solution
   - The “best” one - with cosmetic adjustments - *will be in the June test*!

3) **Tweet It!**
   - Summarize one of the course’s concepts in a tweet (140 chars)
   - Be substantially *complete*, but formally *synthetic!*