ELEN4000/4011 CONTROL RESEARCH GROUP MEETING MINUTES

The following are always in attendance unless specified in 'Changes to Attending'.

Students:

Jacob Riba (1442672)
Sidwell Nkosi (1497963)
Chizeba Maulu (900986)
Tyson Cross (1239448)
Sean Janse Van Rensburg (1073682)
Darrion Singh (1056673)
Haroon Rehman (1438756)
Daniel de Barros (1036613)
Malebo Maboko (672871)
Lloyd Patsika (1041888)
Thapelo Makhalanyane (875691)
Sello Molele (0604606x)
Nkululeko Sikhosana (1135124)

Lecturers:

Prof. Anton Van Wyk

The following document contains the minutes of all meetings for the ELEN4000/4011 Control Research Group for 2019.

Date: 17 Sep. 2019
Start Time: 9 AM
End Time: 10:30 AM
Venue: CM5, Chamber of Mines Building
Chair: Daniel De Barros
Secretary: Darrion Singh
Approval of Minutes: Daniel De Barros
Changes to Attending:
Prof. Anton Van Wyk (Absent)
Thapelo Makhalanyane (Absent)
Nkululeko Sikhosana (Absent)
Sello Molele (Absent)

Proceedings

1. Physical appearance of plane with assumed variables.
2. Clarification of the dynamics we are modelling?
3. What constitutes fixed wing?
4. We should choose a standard system and any extra common final model preliminary final scope by next monday.

Key Notes

1. Bring questions to Prof. Van Wyk regarding proceedings of meeting.
2. Specifications are required in more detail.
3. D. Barros has offered to put together a preliminary project plan for the next meeting.
4. Group Google Drive has been set up by T. Cross.
5. Online meeting documentation set up by D. Singh.

Announcements

1. The next meeting will take place at Seminar Room, EIE Reception, 18 September 2019

Date: 18 Sep. 2019
Start Time: 8 AM
End Time: 9:30 AM
Venue: Seminar Room, EIE Reception, Chamber of Mines Building
Chair: Daniel De Barros
Secretary: Darrion Singh
Approval of Minutes: Daniel De Barros
Changes to Attending:
Sello Molele (Absent)
Malebo Maboko (Absent)

Proceedings

General:

1. ELO 7A/B noted as commonly unvisited sections in report, but regarded as important by external examiners.
2. Purpose of Design II is to bridge the gap between University and Industry.

3. Design process should start from high-level understanding of important processes, followed by a specific design choices that meets the problem criteria.
4. Design complexity should increase with time. Primary objective is to create a model that meets reasonable assumptions, and better design entails removing assumptions and catering to them.
5. Focus on how changes in one subsystem affects another subsystem i.e. cross-coupling of systems.
6. Prof. Van Wyk to confirm that Sello Molele is still part of Control Research Group.
7. D. Singh volunteers to be secretary for remnant of project.
8. T. Cross and S. Nkosi to facilitate meetings.
9. T. Cross proposes that D. Barros as lead of group; D. Barros accepts role.

Regarding previous meeting:

1. Choose the simplest possible variables when designing.
2. Quote regulations as motivation for design choices.
3. Minimum specifications of design as per the email from Prof. Van Wyk titled "Design Project 2019 - Control Group", 16 Sep. 2019.
4. Advised to scale down model as far as possible as to be viable in the timeframe given.
5. Acceptable to split group that subdivides workload into a single model per group.
6. Solutions **should not** be the same for more than one student.
7. Even if the results are the same, there must be distinct differences in the critical analysis.
8. Airframe ~ 6 degrees of freedom, propulsion system should be catered to various issues such as loss of remote control, weight distribution of frame is critical.
9. Be aware of research on propulsion; we may decide to simplify this as necessary.

Current Meeting:

1. Start drafting the outline as soon as possible. The outline provides context to project scope as well as helps in removing ambiguity.
2. Think of short non-technical report should address the concerns of the layman, and meaningfully explain the aspects of the project.
3. Review "Communications for the Engineer" if possible regarding the non-technical report.
4. Format can be informative, for marketing (e.g. press release), educational.
5. Consider the environment, sustainability, economic factors and their associated processes, not just the end outcome.

Key Notes

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1. Common model to be confirmed by Monday 23 Sep.
2. Simple modelling to take place before complex decisions.
3. Sub-divide groups by Monday 23 Sep after everyone has researched the entire system.

Announcements

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1. The next meeting will take place at Seminar Room, EIE Reception, 23 September 2019 at 8 AM.

Date: 23 Sep. 2019
Start Time: 11:30 AM
End Time: 12:10 AM
Venue: Control Lab, Chamber of Mines Building
Chair: Daniel De Barros
Secretary: Tyson Cross
Approval of Minutes: Daniel De Barros
Changes to Attending:
None

Proceedings

1. MATLAB model of airframe and equations of motion:
    a. Simulink toolbox good base for project
2. Report Structure
3. High level approach to project

Key Notes

1. Use of MATLAB toolbox discussed and approved
2. Report needs clear explanation, cannot rely entirely on the MATLAB drone-simulink "black box"
3. Report must demonstrate understanding
4. Report Structure: 15 pages technical report @ 11pt: ~3000 words with figures/tables/plots
5. Project must demonstrate experimentation and "tinkering" as evidence of engineering
6. High level approach:
   "In front of you is an impossible task…"
    a. make reasonable compromises and find appropriate scope
7. Find MATLAB alternatives to be rigorous
    a. Aerospace industry standards?
8. Appropriate avoidance of unnecessary over-complexity
    a. (not new physics research i.e. turbulence)
9. Modelling Propulsion
    a. No thermodynamics expert in our group
    b. justification for constant mass and avoiding complexity of propeller/turbulence
    c. Abstract t simple representative sub-system
10. Energy Source
    a. time of flight/weight
    b. avoid hybrid system due to added complexity
11. Assumption of steady trimmed flight acceptable
12. Non-technical report: worth writing a preliminary draft already, before implementation inevitably focuses each individual engineer' attention on specific areas of the project.

Announcements

2. The next meeting will take place at Seminar Room, EIE Reception, 30 September 2019
3. Prof. van Wyk will be away from October 4th to the 16th. His attendance to meetings during this time will be via Skype.
4. Future meetings to be made as calendar invites by T. Cross