

# AE352 Final Project

(a.k.a. HW9 and HW10)

This project is an opportunity to do something that is of interest to you, and to work on it as hard as you like. There are five deliverables:

- (20 points) You will submit a **project proposal** by 10:59AM on Wednesday, December 2. It will be submitted as a PDF document<sup>1</sup> that is attached to a blank email that is sent to

[upload.01\\_prop.yar2oqsle4@u.box.com](mailto:upload.01_prop.yar2oqsle4@u.box.com)

The name of this PDF document will be all in lowercase and will be

`project01_firstnamelastname.pdf`

if you are working alone or

`project01_firstnamelastname_firstnamelastname.pdf`

if you are working with a partner. This PDF document will say what you propose to do, why you want to do it, and how you will evaluate the success of your own work. Please be concise.

- (20 points) You will submit an **interim report and MATLAB code** by 10:59AM on Wednesday, December 9. The report will be submitted as a PDF document that is attached to a blank email that is sent to

[upload.02\\_inte.63ojbg6j2g@u.box.com](mailto:upload.02_inte.63ojbg6j2g@u.box.com)

The name of this PDF document will be all in lowercase and will be

`project02_firstnamelastname.pdf`

if you are working alone or

`project02_firstnamelastname_firstnamelastname.pdf`

if you are working with a partner. Again, be concise. The code will be submitted as a “.m” file that is attached to a blank email that is sent to the exact same address, with the exact same naming convention, but with a “.m” extension instead of a “.pdf” extension. Both the PDF document and the MATLAB code will “indicate progress” (see below).

- (20 points) You will submit a **final report and MATLAB code** by 11:59PM on Wednesday, December 16. The report will be submitted as a PDF document that is attached to a blank email that is sent to

[upload.03\\_fina.owitdc6xqy@u.box.com](mailto:upload.03_fina.owitdc6xqy@u.box.com)

The name of this PDF document will be all in lowercase and will be

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<sup>1</sup>You are welcome to submit a handwritten document, but it must be submitted as PDF. The copier in Talbot 306A can convert a stack of paper into a PDF document and email to you as a file of relatively small size. You are encouraged to use this copier—no access code is required to scan/email. If you do not, please ensure that whatever you submit is of equivalently good quality and small size.

project03\_firstnamelastname.pdf

if you are working alone or

project03\_firstnamelastname\_firstnamelastname.pdf

if you are working with a partner. Again, be concise. The code will be submitted as a “.m” file that is attached to a blank email that is sent to the exact same address, with the exact same naming convention, but with a “.m” extension instead of a “.pdf” extension.

- (20 points) You will submit a **highlight video** by 11:59PM on Wednesday, December 16. This video will be submitted as usual, as a YouTube link in a google form to be provided on piazza. It must satisfy the following requirements:
  - The length should be  $120 \pm 5$  seconds.
  - The first and last 5 seconds should include text with a title, your name(s), and the following words somewhere in some order: AE352, Fall 2015, Department of Aerospace Engineering, and University of Illinois at Urbana-Champaign.
  - The rest should contain anything you feel best communicates what you did, why you did it, and what the results were.

Please take care not to submit anything inappropriate or offensive.

- (20 points) You will **attend a final project party** on December 17 from 1:30-4:30PM in Talbot 321A, will give a brief (maximum 30 seconds) introduction to your project video, and will accept applause. You will stay to cheer on your colleagues. The legendary vegan cupcakes are likely to make an appearance.

What sort of thing should you propose to do? One option is to model and simulate a system of your choice, a system that matters deeply to you in some way. If you take this option, you would submit the following deliverables:

- The proposal would contain a brief description of your chosen system, a photograph of this system, a link to a video of this system (both the photo and the video can be taken from the public domain), and a schematic that shows how you intend to model this system as a collection of rigid bodies (annotated with frames, lengths of things, locations of things like joints, thrusters, or points of contact with the ground, etc.).
- The interim report and code would resemble the problem statements you have been given in HW5-HW8. In particular, your code should display your chosen system, and should have the structure (e.g., with a “GetRates” function) that would allow you to implement and test your simulation.
- The final report, code, and video would resemble what you have turned in for HW5-HW8.

There are many other options you might consider for your final project. For example, you might rederive the equations of motion for a system we have already looked at (e.g., the three-link robot arm) in a completely different way (e.g., from a Lagrangian perspective). Or, you might build a hardware prototype of one of the systems we have already looked at (e.g., the walker) and compare the behavior of this prototype in experiment to what you see in simulation. Etc. I encourage you to be creative and approach me with ideas, the earlier the better.