ME 115(a): Final Project Guidelines

Overview

Instead of taking a written final exam, which will be a 5 hour open notes take home exam, students can optionally do a final project. Below are some suggestions for the ME 115(a) final project. Alternatively, you can select your own project, subject to my approval. While I would prefer individual projects, group projects are allowed with my consent. The quality of the group projects should be proportional to the number of students involved.

Note that the same option of doing a final project or taking a written final exam will be offered in ME 115(b). Thus, some students may wish to choose a project that can be continued into the next quarter.

The final project might take one of the following forms:

- Analysis of a mechanism or linkage.
- Construction of a mechanism or linkage.
- Geometric/Kinematic simulation of a linkage.
- Development of kinematic software.

Listed below are some suggestions for projects. This is by no means an exhaustive list.

Mechanism Analysis Projects

- Develop some notion of the inverse kinematics for the "Armatron" manipulators model. This is only a 5 degree-of-freedom mechanism, and therefore one needs to be clever about how to define its inverse kinematics.

Simulation Projects

- Develop a graphical simulation of the elbow manipulator using Mathematica. That is, given trajectories for the joints angles, graphically display the movement of a simple physical model of an elbow manipulator.

Kinematic software

- Previous students have successfully developed software that will symbolically derive the forward kinematic equations given the Denavit-Hartenberg parameters.

Final Project Grading

Since the possibilities for the final project are quite varied, the details of how I grade your project will vary with the style of the project. However, the write-up of each completed project should consist

- **A summary** that details the nature of the project, the motivation for the project, the scope of the project, and the approach taken to solve the project.
- **The details** of how the project was solved. This might consist of analytical derivations, software flow charts, etc.
- **The "output"** of the project. This will consist of a piece of hardware, a simulation (which is captured by images and code), or an equation.
- **A conclusion** that summarizes shortcomings of the project and future possible improvements.

Final Project Time Table

1. **Project Preproposal:** If you will undertake a project of your own choice, then you must turn in a project preproposal on Thursday March 7. The preproposal consists of an approximately 1 page summary of what project you chose to do, how you plan to solve the problem, and the intended scope of your project.
2. **Due date:** Last day of finals week (5:00 p.m.)