ME 115(b) Final Projects Spring 2016

Like the first quarter of ME 115, students can choose to do a final project instead of taking a written final exam. Below are some suggestions for the ME 115(b) final project. Alternatively, you can select your own project, subject to my approval. While I somewhat 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.

Suggestions:

1. **Build or simulate a DELTA Mechanism.** I'm interested in developing a DELTA mechanism with a "wrist."

2. **Build or Simulate an "Agile Eye"** parallel spherical mechanism.

3. **Build or SImulate an 2DOF Parallel "Balance Board."**

4. **Develop a software tool to find all force closure grasps of a polygon.** I.e., implement a system where the user inputs a planar polygon shape (perhaps as a set of vertices) and the system automatically determines the force closure grasp regions for 2 frictional, or 4 frictionless fingers.

5. **Simulate the 3D contact equations.** Good candidates would be an ellipse on a sphere. This would consist not only of an implementation of the rolling equations, but a graphical simulation of two bodies as well. The use of Mathematica or MATLAB is highly suggested. A particularly challenging problem is to simulate the dynamics of the "wobblestone."

Final Project Grading and Time Table

If you need your grade turned in on time to graduate, then your final project or exam is due at 5:00 pm on Friday, June 8 (so I can make sure that the grades are reported to the registrar by the Monday deadline). Otherwise, you can turn in your final project or exam by the end of the undergraduate finals period (June 15).

The guidelines for the final project submission are essentially the same as that from the first quarter. I.e., the write-up of your project should include:

- **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.