ME 115(b) Final Projects

(Spring 2006)

Like last quarter, 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 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.

Suggestions:

- 1. Simulate the 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 is highly suggested.
- 2. Simulate a redundancy resolution scheme. In a previous homework, you simulated the simplest pseudo-inverse redundancy resolution scheme. Try simulating a more complicated scheme which includes a null space projection term. Candidate criteria for null space projection criteria are obstacle avoidance and/or manipulability optimization.
- 3. Develop a method to find the singularities of a Stewart Platform Mechanism.

Final Project Grading and Time Table

I am leaving for Thailand on the afternoon of June 1. If you need your grade turned in on time to graduate, then your final project or final exam is due at 5:00 pm on Wednesday, May 31 (so I can grade them on Thursday morning, and turn in your grades). If you turn in your final project or exam after that time, and before the end of the finals period, then I will grade it and turn in your grade after I return on June 9.

The guidelines for the final project submission are 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.

Students planning to undertake a final project should submit a 1-page proposal to me by 5:00 p.m. on Monday, May 22. This proposal should state the subject of the project, how you plan to solve the proposed problem, the scope of the project, and the actual product to be delivered for evaluation.