CE 8 – Robot Automation: Intelligence through Feedback Control

Course Syllabus

Instructor
Prof. Bill Dunbar, E2 325, xt. 9-1031, dunbar@soe.ucsc.edu
Location/Time: BE 101, T H 8-9:45 AM
Office hours: T 10-12:00 PM

URLs

- Course web site: http://www.soe.ucsc.edu/classes/cmpe008/Fall09/.
- We will make extensive use of web forum: http://forums.soe.ucsc.edu/ for class assignments and discussions. Click on CMPE 8 for our course. Click on “Register” at the top right of the page to set up an account.

Course Description
Introduction to dynamical systems, feedback control, and robotics. Fundamental concepts in dynamical systems, modeling, stability analysis, robustness to uncertainty, feedback as it occurs naturally, and the design of feedback-control laws to engineer desirable static and dynamic response. Course includes an introduction to Matlab and programming in Matlab. Students will also learn about a robotic platform, its sensors, and eventually how to design and implement a feedback controller to make the robot autonomously follow a curved path.

Prerequisites
Enrollment is unrestricted. NOTE: This course is intended for first-year undergrads.

Grading
Homework: 10%, Participation: 5%, Labs: 10% (5% attendance and 5% reports), Quizes: 40%, Midterm: 15%, Final: 20%

Teams of 3 students will be responsible for group assignments (part of each homework set), and all members of the group will receive a common grade. Participation is very important in this class (that’s why it’s 5% of your grade). The best way to ensure you get all 5% is to: 1) come to class on time and be prepared by having completed all assignments to that point, 2) volunteer for in-class exercises when they arise, and 3) play an active and cooperative role on your team.

Homework Policy
Generally due every other Thursday - due dates will be posted on the web page.
Collaborations are encouraged and feel free to consult anyone, particularly me and those in your team. However, all solutions handed in for credit must reflect your own understanding of the material. **If you do collaborate or receive help from anyone, you must credit them by placing their name(s) at the top of your paper.**

**Text**

We use a reader, co-authored by me. All course material will be made freely available on the course web site in the form of PDF documents and Matlab m-files.

**Exams**

In-class quizzes, a midterm and a final exam will be given.

**Assign Roles for Group HW Assignments** for each teams of 3 students:

1. **Leader/Presenter:** Coordinates team meetings to work on HW/projects, presents group results in class when appropriate.
2. **Secretary:** Does writing, assembles group HW/ project reports.
3. **Programmer:** Responsible for code in HW and onboard robot.

These roles can and should change over the course of the quarter.

**Labs**

The sections introduce you to a robot platform, and how to interface and program the robot. The sections cover separate material that is related to the course. The lab work is also part of your overall course grade.

**Course Outline**

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