Ph.D. Readings & Research Course: Topics in Articulated Robots

January 19, 2010

Syllabus

This course will focus on the study of articulated robots: robots composed of rigid links connected at movable joints.

There will be weekly readings selected from the research literature. Both classic seminal papers as well as recent papers of interest will be included. At least one conference paper, journal paper, or book chapter will be read per week. The student will present the paper(s) to the professor in at least a 1h weekly meeting, giving a verbal summary of the content of the paper, and also discussing any questions about the paper.

Topics to be covered include

- kinematics, including forward and inverse kinematic control
- dynamics, including impedance and admittance
- sensing, including proprioception
- electric drive actuators
- walking locomotion
- modeling of robot and terrain, including statistical models of uncertainty
- compliance and passive dynamics
- visual sensing and map-making.

There will also be a writing component, where the student will compose a conference-style research paper on a topic motivated by the readings. This could be
• a review paper on a specific sub-area of current interest
• a report on the implementation by the student of an existing work
• a description of a new contribution developed by the student.

The paper will be due by the end of finals period.

**Grading**

70% of the student’s grade will be based on attendance and performance at weekly meetings. A meeting will be considered satisfactory (full credit) if the student demonstrates understanding or asks questions on the content of all assigned reading.

The remaining 30% of the grade will be assigned based on performance on the writing requirement.