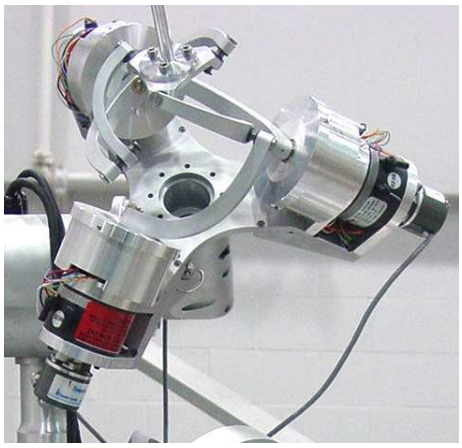
MECH541 Kinematic Synthesis

Course Announcement–Fall 2005



Whether you are designing a high-performance robotic manipulator or the steering mechanism of a state-of-the-art aircraft, you must apply the techniques of kinematic synthesis. In this course the students will learn how to integrate the analytical techniques of kinematics into the creative process of a design task. This will be done upon translating functional machine-performance requirements into algebraic models of machine kinematics. With these models, the underlying algebraic equations of synthesis will be set up. The solution of these equations calls for either a symbolic, numerical, graphic approach, or a combination thereof. Techniques for the linking of the numerical results from scientific software with CAD software will be used in order to produce renderings of the mechanisms thus synthesized. The students who so choose, will be able to test their designs on virtual prototypes, obtained from suitable software that renders animations of these mechanisms (Working Model, Pro/Engineer, or Unigraphics).

Lecturer: Jorge Angeles (Queries are welcome at `angeles@cim.mcgill.ca`).

Lectures: Thursdays from 8:35 to 9:55, in Room ENGMC12.

Marking: Three projects will be assigned during the term, totalling 75% of the final mark; a class quiz in the last lecture will carry a weight of the balance 25%. **Projects and their reports are individual**, and must comply with the format posted on the course Web site.

Prerequisites: Although no formal prerequisites are enforced, it is highly recommended that students have taken MECH314 Dynamics of Mechanisms, and that they either have taken or take concurrently MECH309 Numerical Methods in Mechanical Engineering.

Reading: No textbook is required. Some lecture notes will be posted on the course Web site. Additional readings will be assigned from various papers that will be handed out and explained during the lectures.

Further details on the course will be avialble at URLs

`www.mcgill.ca/cden`
and/or
`http://www.cim.mcgill.ca/~rmsl/Angeles_html/courses/courses.html`