

IG.3501 – Robotics

General information

Title: Robotics
Module ID: IG.3501
Module leader: Nicole DOUMIT
ECTS: 5
Average amount of work per student: 120 hours, including 24 hours of classes and 24 hours of supervised project
Teamwork: yes
Keywords: medical robotics, dynamical systems, kinematics.

Presentation

In the near future, medical robots will be conventionally used in surgery. In this course, you will study the design and control of these robots, as well as associated technologies for medical applications, with a focus on surgery and interventional radiology. No medical knowledge is required to attend this course.

Educational objectives

- Identify the main advantages and disadvantages associated with the use of robotic technology for medical use depending on the application;
- Identify the main technical challenges in deploying robotic technology for a given medical application;
- Analyze, in the state of the technical state, the relevance of a given technical proposal to a real medical application (technical point of view).

Prerequisite

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Content/Program

This module provides a solid foundation for the study of dynamical systems that will be modeled by MATLAB, C, and C++ programs. Students will become familiar with feedback control design and linear systems. The aim of this module is to strengthen the skill of "solving technological problems" in the context of modeling medical robots.

Concepts

- Medical Robotics and Robotics for Healthcare
- Kinematics of medical robots
- Robot Dynamics and Simulation
- Guided medical robot imaging
- Surgical Tracking and Navigation

Tools used

- Dynamic Systems
- Feedback Control
- Matlab / C / C++.

Pedagogical methods

Learning methods

8 sessions of 3 hours of lessons, 8 sessions of 3 hours of supervised project sessions.

Evaluation methods

The evaluation of this module is based on group activities of 2 to 4 students (graded project) and individual exams in continuous assessment after each class.

- Individual continuous assessment: $8 * 2 \text{ pts} = 16 \text{ pts} / 20$
- Collective evaluation of the project: 6 pts / 20 (demo, deliverable 4 pts, defense 2 pts)

Language of work

Module entirely taught in English, student productions in English or French, as desired."

Bibliography, Webography, Other sources

- The poly associated with the course, as well as the documents available on the module page on Moodle.
- Also, other materials related to the content of this module can be found at:
 - <http://web.stanford.edu/class/me328/>
 - http://www.isir.upmc.fr/?op=view_profil&lang=fr&id=23&pageid=1263

Commenté [MM1]: 8 evaluations in continuous assessment, isn't that excessive?