

Introduction to Robot Planning

Academic Year: (2022 / 2023)

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Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: GONZALEZ VICTORES, JUAN CARLOS

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Industrial Robotics.

Any signature related with computer programming.

OBJECTIVES

To analyse and to understand the problematic ones associated with the specification of the movement associated with the programming of a task or application for any class of robot, already be industrial or of service.

To check and to familiarize itself with the classic technologies of planning, centring on the planning before static environments, and the classic algorithms.

Provide the student of the sufficient knowledge and interest to be able to approach this type of problems.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Review of the programming task and movements.
2. Models of robots and environment
3. Classic approaches of path-planning:
 - 3.1. Configuration space
 - 3.2. Potentials Fields
 - 3.3. Roadmaps
 - 3.4. Cell Decomposition and probabilistical methods
 - 3.5. Modification of the dynamic control
4. Case studies
5. Specialized seminars

LEARNING ACTIVITIES AND METHODOLOGY

After an lecture of problematic and classic technologies, a work of analysis and implementation of a classic technology is proposed to the student.

The evaluation is based on of the exhibition and memory presented.

ASSESSMENT SYSTEM

% end-of-term-examination/test:	40
% of continuous assessment (assignments, laboratory, practicals...):	60

Class presentation of workout and written reports (oral presentation, written report and programming exercise).
Review of the classmates work.

% end-of-term-examination 40

% of continuous assessment (assignments, laboratory, practicals...) 60

BASIC BIBLIOGRAPHY

- Hean-Laude Latombe Robot Motion Planning, Kluwer Academic Publishers, 1991
- Howie M. Choset ET AL. Principles of Robot Motion: Theory, Algorithms, and Implementation., MIT Press., 2005
- Steven M. LaValle. Planning algorithms, <http://planning.cs.uiuc.edu/>, 2006