Course Unit Description - (ESTAP)

(Applied Estimation)

(Mestrado em Engenharia Electrotécnica e de Computadores)

Academic year: 2008/2009

Subject group: Automação e Robótica

	Semestral	**Optional**		
Mode of study	Diurno	**Hours / Week**	**T-**Teórica	2
			PL-Prática-Laboratorial	2
Year	1º		**OT-**Orientação Tutorial	1
Semester	2º			

ECTS 3

Objectives

This course intends to provide the theoretical and practical background for the usage, selection, application or development of advanced estimators for autonomous systems. Linear and non-linear Kalman Filters as well as probabilistic filters, will be projected and applied to estimation and data fusion problems.

Course Contents

Introduction to Estimation in Autonomous Systems
Estimation with Bayes Theorem
Linear Kalman Filters
Non-Linear Kalman Filters
Probabilistic Filters (Sequential Monte Carlo)
Project and implementation of Advanced Estimators

Recommended reading

[1] Mohinder S. Grewal, Angus P. Andrews, “Kalman Filtering: Theory and Practice Using MATLAB”, Second Edition, John Wiley & Sons, 2001
[2] M. Gelb, “Applied Optimal Estimation”. MIT press, 1974.
[3] Sebastian Thrun, Wolfram Burgard and Dieter Fox, “Probabilistic Robotics”, The MIT Press, 2005
[4] P.S. Maybeck. “Stochastic Models, Estimaton and Control, Vol. I”, Academic Press, 1979.
[5] A. Papoulis, “Probability, Random Variables, and Stochastic Processes”, Third Edition. McGraw-Hill, 1991.

Teaching Methods

Theory concepts presentation with consolidating practical examples and exercises done in the lab classes, and research and implementation works to be done extra classes.

Assessment methods

The final grade is composed by the assessment of following components:
Practical exercises resolution in classes, and one research work and one implementation work, both composed by a written report, an oral presentation and defence.

	Name
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Lecturer:	José Miguel Soares de Almeida (JSA) José Manuel Andrade de Matos (JMA)