Dynamics of Robotic Systems

MAE 263B

Introduction

Contact Information

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In School

Learn a Lesson – Solve a Problem

In Life

Presented a Problem – Learn a Lesson

Advanced Robotic - MAE 263B - Introduction

Summary: 263B. Advanced Robotics. (4)
- Lecture - 4 hours per week
- Outside study – 8 hours per week

Dynamics models of serial and parallel robotic manipulators including review of spatial descriptions and transformations along with direct and inverse kinematics, linear and angular velocities, Jacobian matrix (velocity and force), velocity propagation method, force propagation method, explicit formulation of the Jacobian matrix, manipulator dynamics (Newton-Euler formulation, Lagrangian formulation), trajectory generation, introduction to parallel manipulators
Recommended preparation: courses 263A (Enforced); 255B (Recommended)

Assignments & Grading:

Project 0	**10%**
Project 1	**10%**
Project 2	**18%**
Project 3	**18%**
Project 4	**18%**
Project 5	**18%**
Participation	**8%**

Class Web Site: http://bionics.seas.ucla.edu/education/classes_index.html

MAE 263B – Timetable

Week	Class	Topic	Class Notes	Projects
1	A	Intro		**Project 0** - Literature Review & Presentation **Project 1** - Market and Industry Analysis & Qualitative Robotics System Design
	B	Trajectory Generation		**Project 2** - Trajectory Generation
2	A	Trajectory Generation		
	B	Trajectory Generation		
3	A	Linear and Angular Velocities		
	B			
4	A	Jacobian Matrix - Velocity propagation method		**Project 3** - Jacobian Matrix
	B			
5	A	Jacobian Matrix - Force propagation method		
	B			
6	A	Jacobian Matrix - Explicit formulation – Jacobian Application		
	B			
7	A	Linear and angular Acceleration (Vector and Matrix Approach)		
	B			
8	A	Manipulator dynamics (Newton-Euler formulation)		**Project 4** - Newton-Euler Equations – Dynamics
	B			
9	A	Manipulator dynamics (Langrangian formulation)		
	B			
10	A	Feedback Control in Robotics (Intro)		
	B			