

Introduction

MEAM 620

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Introduction

Goals

1. Theory, techniques and tools for multi-robot coordination

- Control and planning
- Dynamics
- Sensing and estimation
- Communication



decreasing emphasis

2. Original project work

- Conference quality paper
- Topics are ordered/organized to facilitate project work



Introduction

Pre-Requisites

Mathematics

- Graduate standing or ODEs + [linear algebra or ability to think abstractly]

Dynamics

- 3-D rigid body transformations, rotation matrices; position and velocity analysis; ability to derive equations of motion

Linear control theory

- Basics of PID control; ideas of stability and convergence.

Computation

- Proficiency in Matlab or C
- Linux



Introduction

Topics

- Kinematics (transformations, displacements, Lie theory)
- Control (mobile robots and multi-robot control)
- Planning (discrete, path-planning with constraints)
- Open-loop control or planning (continuous, with constraints)
- Estimation and filtering (pose-estimation)
- Dynamics (manipulation and contact tasks)



Introduction

Grading

- Homework
- Project work
- In-Class presentations
- Final Project

