

# Should I take 127?

Did you enjoy the module on Least squares or SVD and PCA?

To solve least squares, you solved an optimization problem:

Find  $x$  such that  $|Ax - b|$  is as small as possible

This is an example of a much larger family of problems... just like least squares applies to all kinds of prediction problems (planet orbits, stock market, system identification...)

PCA is another example of an optimization problem — you want to find the component that explains *most* of your data

These are just two examples of optimization problems

- Equips you with solution techniques of a large set of different types of optimization problems
- More linear algebra techniques
- Applications in operations research, machine learning, control, communications...
- A lens through which you can view any set of problems...

# Expected prerequisites

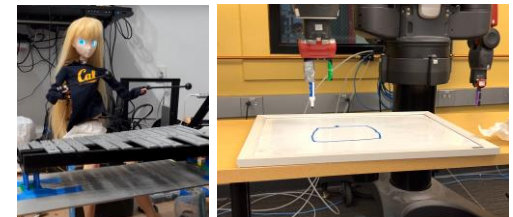
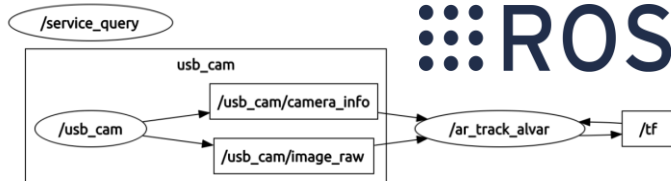
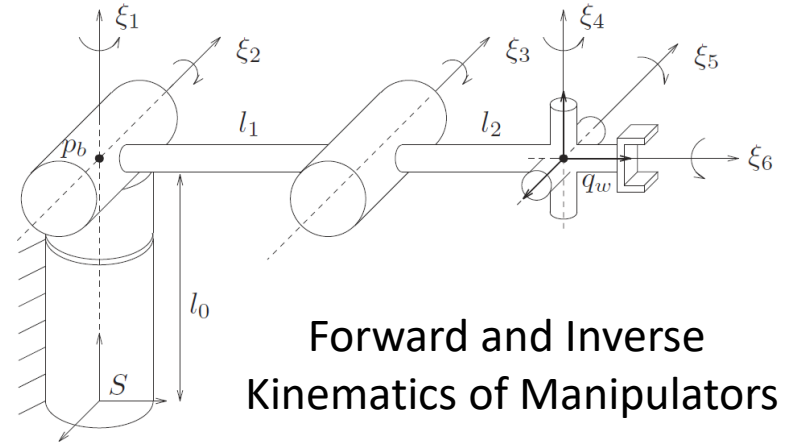
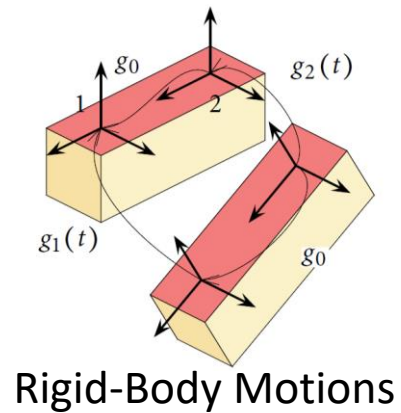
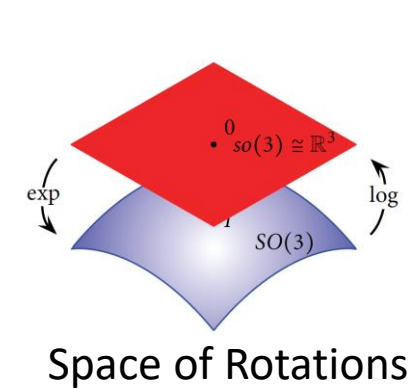
EECS 16A

EECS 16B

CS 70

# 106a: Intro to Robotics

Profs. Shankar Sastry / Koushil Sreenath





# SAE J3016™ LEVELS OF DRIVING AUTOMATION™

Learn more here: [sae.org/standards/content/j3016\\_202104](https://www.sae.org/standards/content/j3016_202104)

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What does the human in the driver's seat have to do?

## SAE LEVEL 0™

You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering

You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety

## SAE LEVEL 1™

## SAE LEVEL 2™

## SAE LEVEL 3™

When the feature requests,  
you must drive

## SAE LEVEL 4™

These automated driving features will not require you to take over driving

## SAE LEVEL 5™

You are not driving when these automated driving features are engaged – even if you are seated in “the driver's seat”

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### These are driver support features

These features are limited to providing warnings and momentary assistance

These features provide steering  
**OR** brake/acceleration support to the driver

These features provide steering  
**AND** brake/acceleration support to the driver

### These are automated driving features

These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met

This feature can drive the vehicle under all conditions

What do these features do?

Example Features

- automatic emergency braking
- blind spot warning
- lane departure warning

- lane centering  
**OR**
- adaptive cruise control

- lane centering  
**AND**
- adaptive cruise control at the same time

- traffic jam chauffeur

- local driverless taxi
- pedals/steering wheel may or may not be installed

- same as level 4, but feature can drive everywhere in all conditions

