

**ECE 5397/6397: Intro to Robotics**

**Class Worksheet – Lecture 9** Inverse kinematics

Given a homogenous transformation:

Find the solution of:

Why is inverse kinematics hard?

1. May or may not have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Even if solution exists, may or may not \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Because forward kinematics is generally \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, solutions can be hard to obtain even if they exist

Why close form?

1. Much \_\_\_\_\_\_\_\_\_\_\_
2. Iterative search \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Kinematics has \_\_\_\_\_\_\_\_\_\_\_

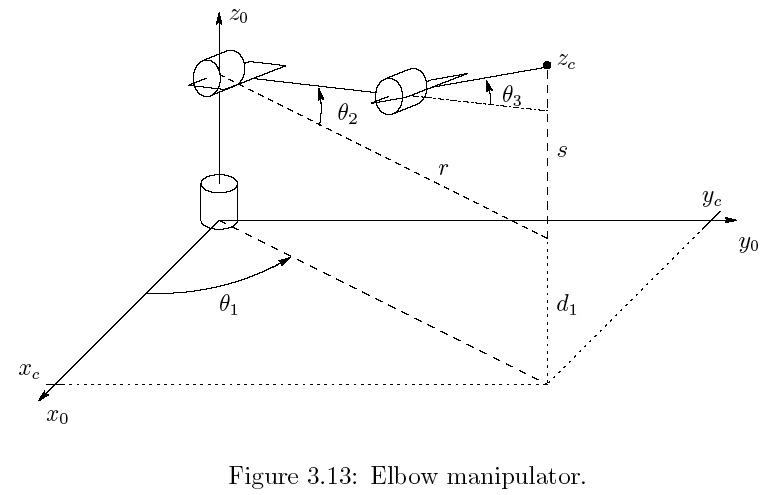
, **solve for**

**solve**

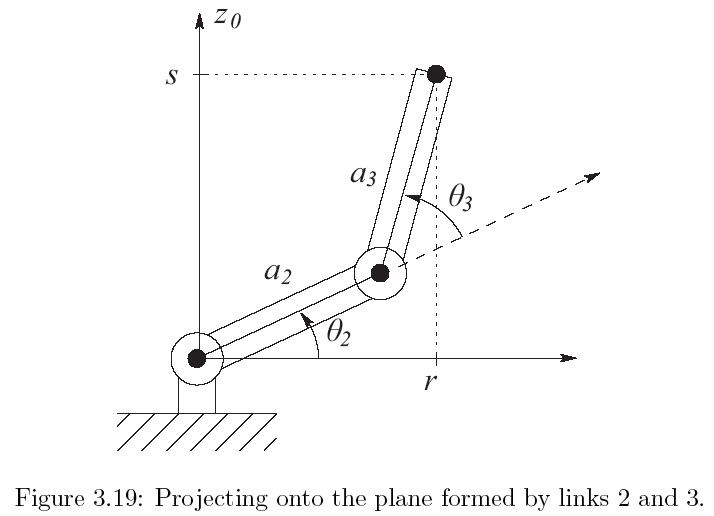
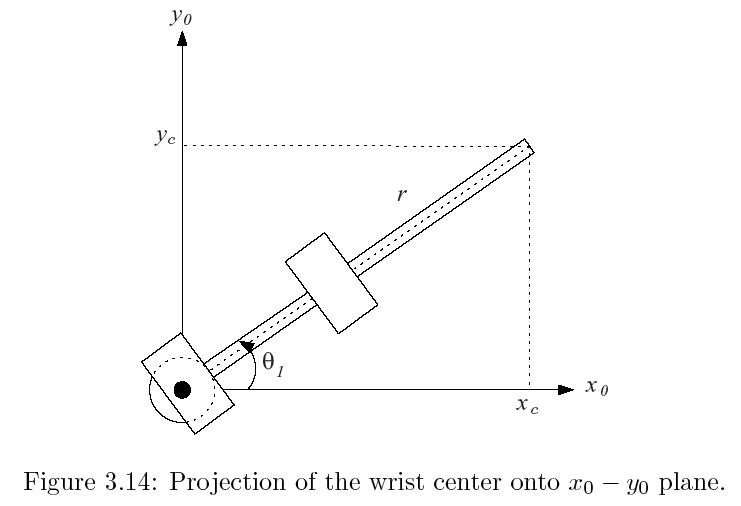
If , **Solve**

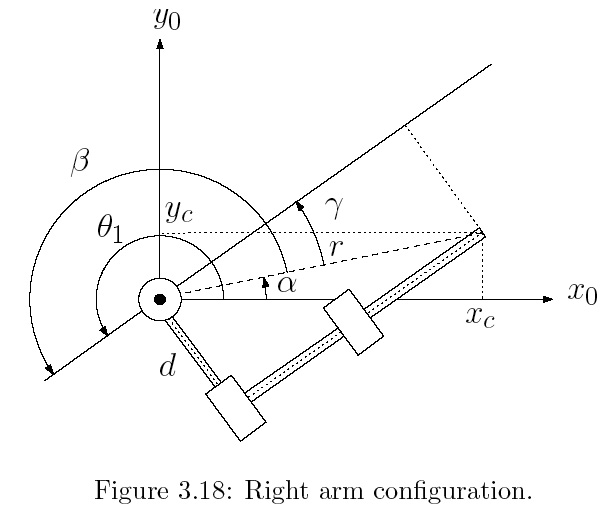
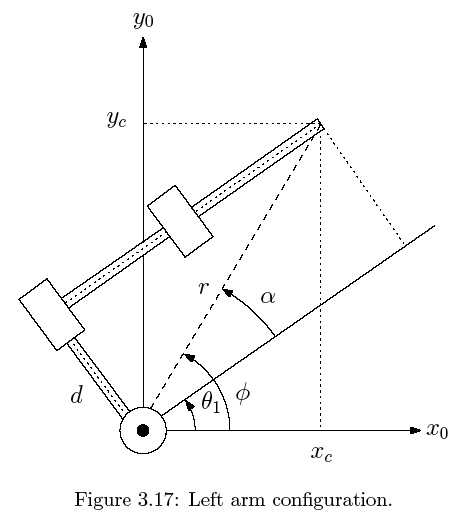
**General idea to solve for :**

1. Project manipulator onto\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Solve a ‘simple’ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_





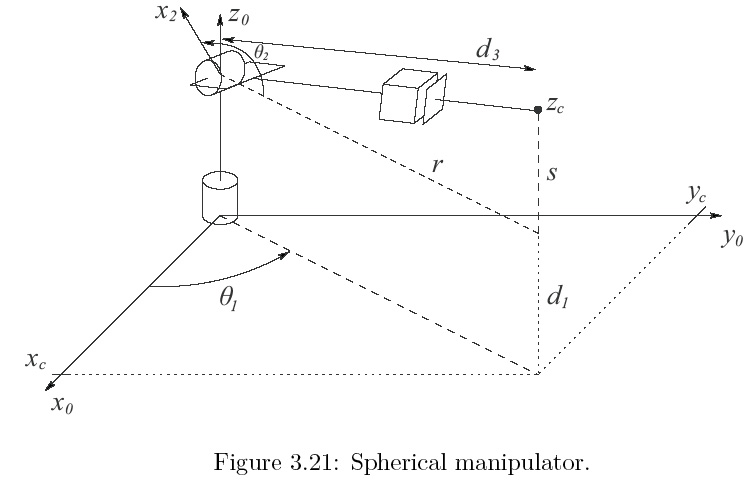






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**Class Worksheet – Preparation for Lecture 10**

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1. **Solve** for the following quantities. Draw them on the image above

Alternate solution,

1. **Implement forward kinematics** on your MeARM robots. Try to pick something up. Take a video – (or image) and post it to #controlSwarm. If you can’t get twitter, upload to YouTube

Sign when completed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_