Technion – Israel Institute of Technology



HW3

Numerical Methods

019003

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# Question 1

## We were asked to solve the Inverse Kinematics (IK) of a serial robot for given target points

### We implemented the **fsolve** function with an equally spaced grid of initial positions over the interval of . In order to accelerate the process, we used the given knowledge about the maximum different solutions for each target. The First target had exactly four IK solutions.

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### The second target is , which we found two solutions only

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And in the last target, no solutions were found.

### We found that the minimum number of initial guesses with an equally spaced grid is while the and the number of solutions is the same as in section .

### We created a random matrix based on the . Three solutions were found for the first target and two solutions for the second concerning the section, where we used eight initial positions. However, using a random matrix may cause a local search over the interval because of the inability to predict the locations of the initial positions.