

# Homework3

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## Problem 1

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If there are 100 lines in the grating, what is the smallest detectable change in motor-shaft angle?

$$\frac{360}{100} = 3.6$$

## Problem 2

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Explain how to determine the rotation directions if the following encoders are used.

We can check which channel produce the rising edged .

List two concerns while choosing an encoder.

Resolution and Number of channels

## Problem 3

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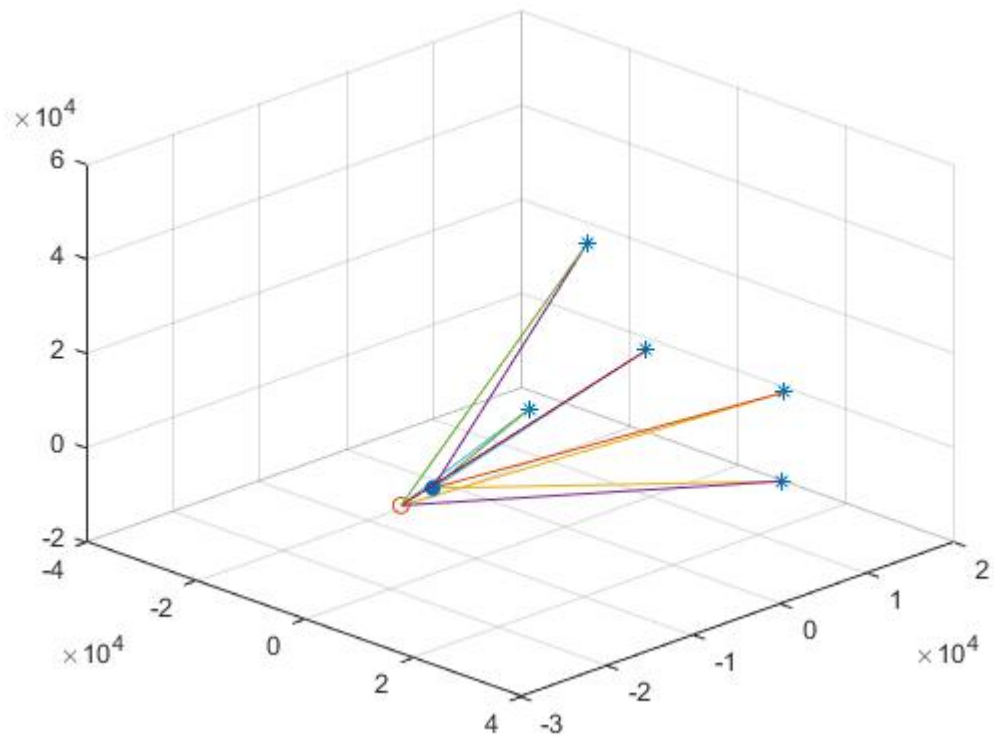
- synchronized  
3 satellites
- unsynchronized

4 satellites. (Assume that the all satellites are in synchronization)

Reason: In addition to x,y,z, there is a synchronization time error to be calculated. So four equations are required.

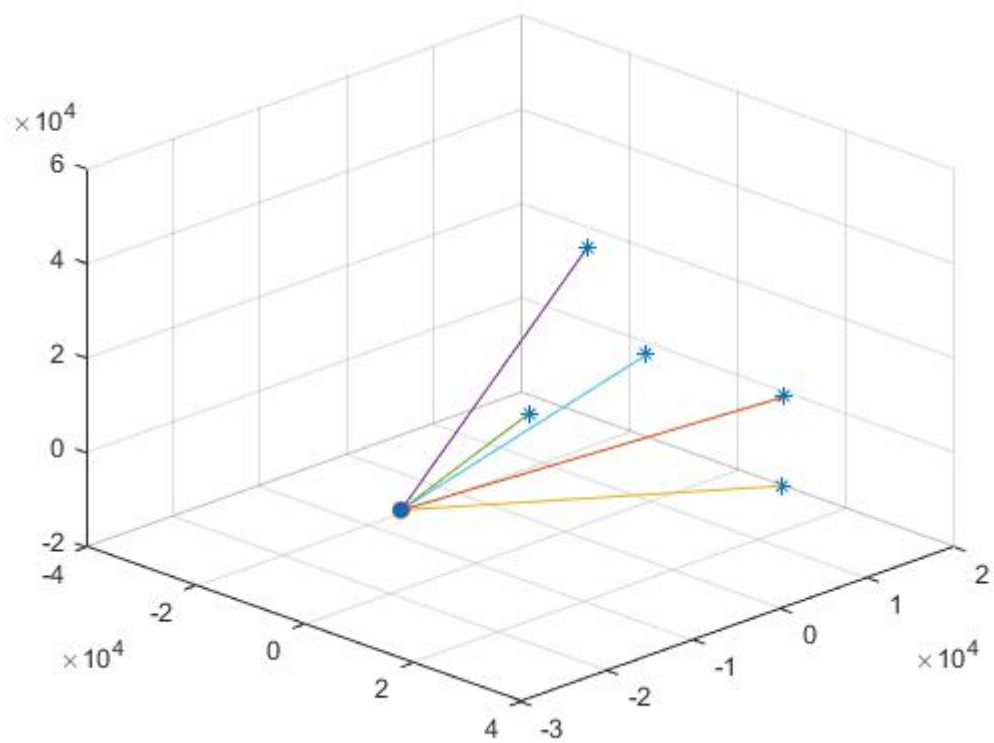
Do not consider the synchronization error:

The red circle line is real position and the filled blue circle is calculated position



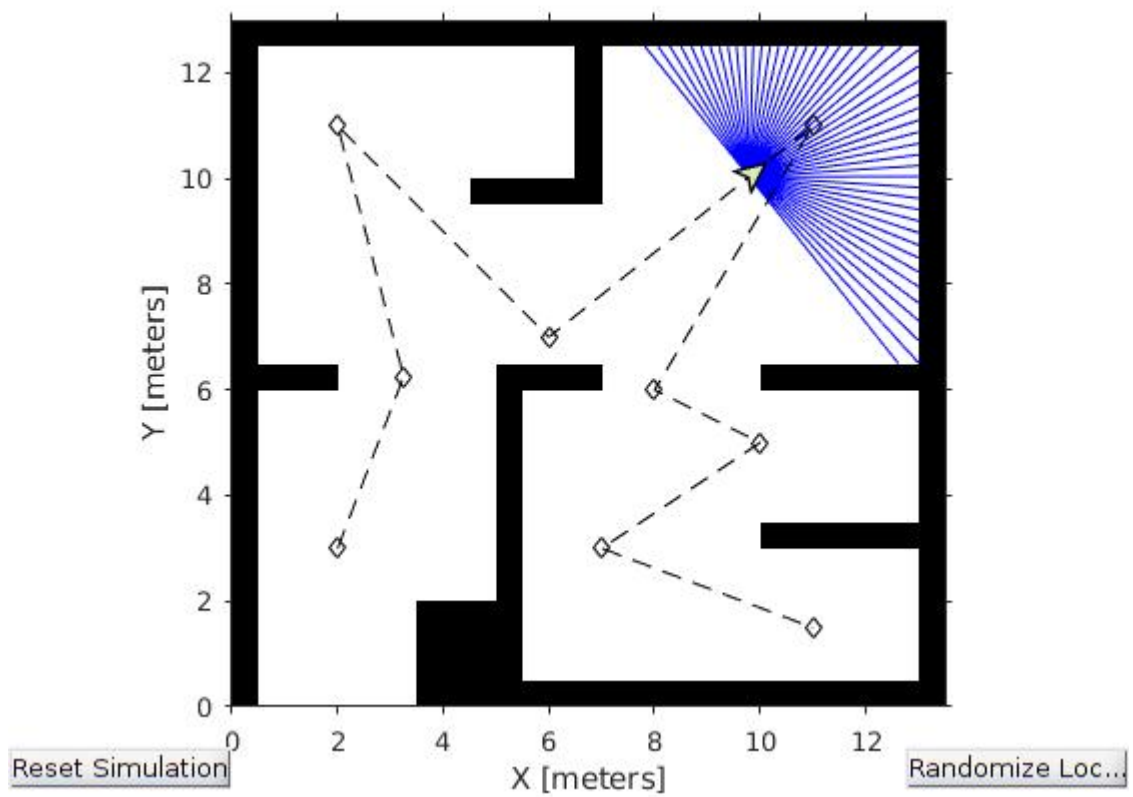
Consider the synchronization

The calculated result is the same as the original position.



## Problem 4

### Scanning Process



### Final Result

