Homework 4

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1 Problem 9

1.1 Problem 9.1

Figure 1 shows the required plot. The robot location is:
$x = 803.84497$
$y = 485.52026$
$z = 517.26977$
With an error of $E = 2720.65$

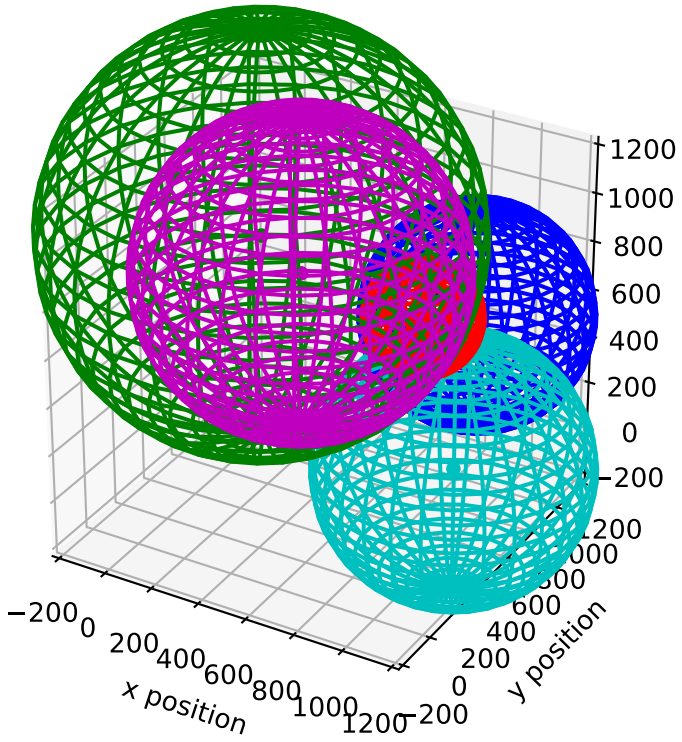

Figure 1: Problem 9.1

1.2 Problem 9.2

$\lambda = c * 10MHz$
$\lambda = 30\ meters$

Assuming phase shift $\theta = 10$ we can plug that into our formula to get

$$D' = L + \frac{\theta}{2\pi}\lambda$$

Therefore $D = \frac{D'}{2} = 0.833333333 + 15k$ where k denotes an integer interval. We make the assumption that L is arbitrarily small compared to the distance travel and is therefore set to 0. If the system has noise we will have to

identify a range for $\frac{D'}{2}$, in this case it's 0.825 *to* $0.841666667 + 15k$. In order to differentiate between 20 and 250 meters we would need a second system at a λ multiple that doesn't overlap before a distance of 250 meters.

2 Problem 10

2.1 Problem 10.1

asdf

2.2 Probelm 10.2

asdf