Lab 3 ICP Algorithm

We will go through the ICP algorithm in this exercise. We will try to minimize the amount of calculations we need.

Given two pointsets:

$$S = \{ (-4, 4, 3), (16, 4, 3)\}$$

$$R = \{ (-1, 11, 3), (13,-3,3), (256,7,204), (-503,211,905)\}$$

What are the closest points to S in R? Set up the correspondence.

i	s_i	r_i
1	(-4, 4, 3)	
2	(16, 4, 3)	

What are the two centroids of s_i's and r_i's?

Centroid of S = _____

Centroid of R = _____

What are the two pointsets after translating their centroids to origin?

i	s_i	r_i
1		
2		

Compute the matrices we need

$S_1 = \begin{pmatrix} \\ \end{pmatrix}$	$\bar{R}_1^T = \begin{pmatrix} \\ \end{pmatrix}$
$S_2 = \begin{pmatrix} \\ \end{pmatrix}$	$\bar{R}_2^T = \begin{pmatrix} \\ \end{pmatrix}$

Compute

$\bar{R}_1^T S_1 = \begin{pmatrix} \\ \end{pmatrix}$	$\bar{R}_2^T S_2 = \begin{pmatrix} \\ \end{pmatrix}$

The matrix C will be the addition of them

$$\bar{R}_1^T S_1 + \bar{R}_2^T S_2 = \begin{pmatrix} \\ \end{pmatrix}$$

Computing the Eigenvectors, the one with largest Eigenvalue should be approximately

$$(\cos(22.5) , 0, 0, \sin(22.5))$$

What is the rotational axis and what is the angle rotated?