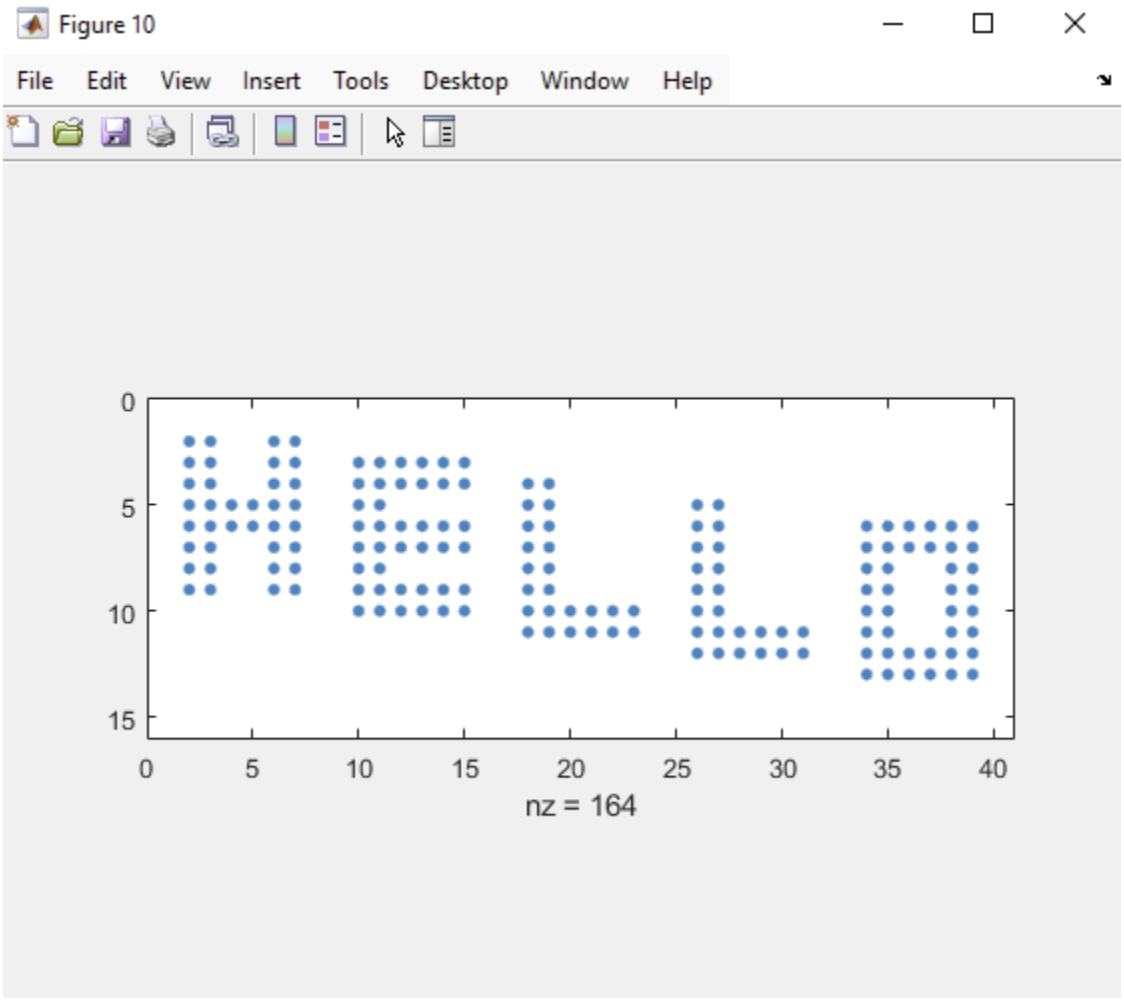
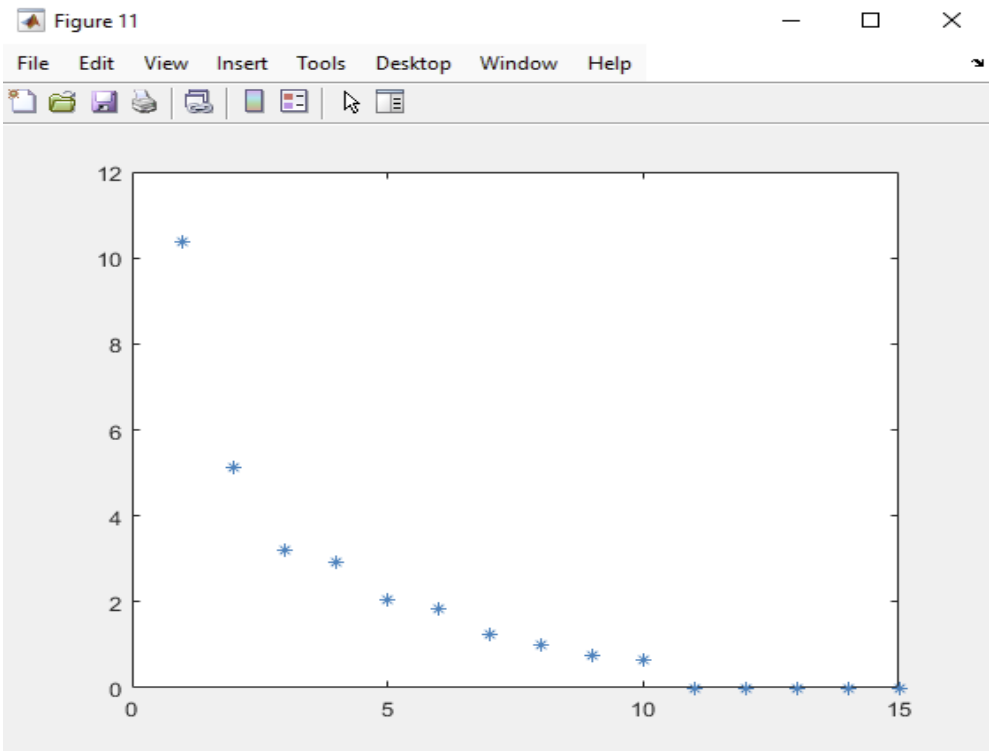
The following figure is the WolframAlpha multiplication for Problem 1: x = R^{-1}*Q^T*b

$$\begin{pmatrix} \frac{1}{\text{sqrt}(3)} & -\frac{1}{\text{sqrt}(3)} & \text{sqrt}\left(\frac{3}{2}\right) \\ 0 & \frac{1}{\text{sqrt}(3)} & -\text{sqrt}\left(\frac{2}{3}\right) \\ 0 & 0 & \frac{1}{\text{sqrt}(6)} \end{pmatrix} \begin{pmatrix} \frac{1}{\text{sqrt}(3)} & \frac{1}{\text{sqrt}(3)} & \frac{1}{\text{sqrt}(3)} & 0 \\ -\frac{1}{\text{sqrt}(3)} & \frac{1}{\text{sqrt}(3)} & 0 & \frac{1}{\text{sqrt}(3)} \\ \frac{1}{\text{sqrt}(6)} & \frac{1}{\text{sqrt}(6)} & -\text{sqrt}\left(\frac{2}{3}\right) & 0 \end{pmatrix} * \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}$$

The following figure shows spy(hello) for my code of the matrix in Problem 3.



The following figure is the regular plot of the singular values:



The following figure is the semiology plot of the singular values:

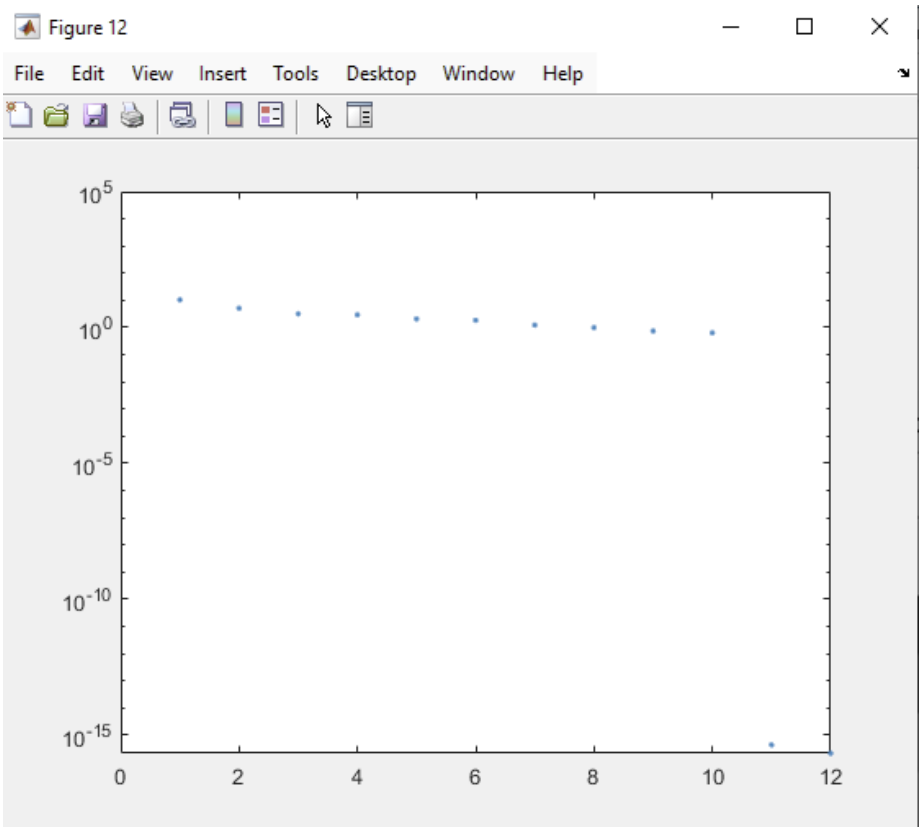


Figure 1

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