Homework # 1, due Wed, Jan 26th.

1. Generate a plot of the function $\cos$ on the interval $[-1, 1]$ with an appropriate title. Turn in the figure along with the commands you used to generate it.

2. Create a MATLAB function $\text{ssolve}$ that accepts three parameters, $a$, $b$ and $n$, in that order, and returns the solution to the following $n \times n$ system:

$$
\begin{bmatrix}
1 & a & \cdots & 0 & 0 \\
0 & 1 & \cdots & 0 & 0 \\
\vdots & \vdots & \ddots & \vdots & \vdots \\
0 & 0 & \cdots & 1 & 0 \\
 b & b & \cdots & b & 1 \\
\end{bmatrix}
\begin{bmatrix}
x_1 \\
x_2 \\
\vdots \\
x_{n-1} \\
x_n \\
\end{bmatrix}
= 
\begin{bmatrix}
1 \\
2 \\
\vdots \\
n-1 \\
n \\
\end{bmatrix}.
$$

Turn in a printout of the function.

3. Plot the vectors $\text{ssolve}(10, 0.1, 30)$ and $\text{ssolve}(4, -0.5, 50)$. Turn in the code that generated these figures.

4. Create a MATLAB function that inverts the Hilbert matrix of order $n$. The Hilbert matrix has elements $\{1/(i + j - 1)\}_{i,j=1}^n$. 