Homework #2

Problem

Use the conjugate gradient method to solve the linear system $Ax = b$, where the entries of A and b are

$$a_{i,j} = \begin{cases} 2i, & \text{when } j = i \text{ and } i = 1,2,...,40, \\ -1, & \text{when } \begin{cases} j = i+1 \text{ and } i = 1,2,...,39, \\ j = i-1 \text{ and } i = 2,4,...,40, \end{cases} \\ 0, & \text{otherwise,} \end{cases}$$

and $b_i = 1.5i - 6$, for each $i = 1,...,40$.

- (**Optional**) Use preconditioning with $C^{-1} = D^{-1/2}$.