18.085 Homework 3 MATLAB problem

For the matrices of MATLAB 1, using 3 first differences for \(-du'' + u'\), find the eigenvalues of all three for \(h = 1/11\). Then do the same with \(d = 1/25\) reduced to \(d = .01\). You can reduce \(d\) more if you want. I am expecting bad/good to be somehow identified by the eigenvalues—and maybe by the eigenvectors too! You could use \([V,E]=\text{eig}( )\) and find the the singular values of \(V\) to see how far the eigenvectors are from orthogonal. The singular values are \(\text{sqrt(eig(V'*V))}\) and the ratio of largest to smallest is the condition number of \(V\).