

Math 243A, Homework, Due 10/18/2012

1. Determine the eigenvalues of the Jacobi iteration matrix when applied to the “diagonal” five-point scheme given by

$$\frac{1}{h^2}(v_{m-1,l-1} + v_{m-1,l+1} + v_{m+1,l-1} + v_{m+1,l+1} - 4v_{ml}) = f_{ml}$$

on a uniform grid with $\Delta x = \Delta y = h$.

Hint: The eigenvectors are the same as the ones for the usual Jacobi method.