CAAM 336 · DIFFERENTIAL EQUATIONS

Recitation Example 5

Will be worked through on 7 October 2013.

5. Suppose that

$$\mathbf{A} = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}.$$

   (a) Compute by hand the eigenvalues and eigenvectors of this matrix.

   (b) Choose three eigenvectors of $\mathbf{A}$, one corresponding to each eigenvalue of $\mathbf{A}$, and verify by hand that these eigenvectors are orthogonal.

   (c) Solve the linear system $\mathbf{Ax} = \mathbf{b}$ using the spectral method, where

$$\mathbf{b} = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}.$$