CAAM 336 · DIFFERENTIAL EQUATIONS

Homework 22

Posted Wednesday 19 February 2014. Due 1pm Friday 28 February 2014.

22. [25 points]

All parts of this question should be done by hand.

(a) Let

$$\mathbf{D} = \begin{bmatrix} 4 & 1 \\ 1 & 4 \end{bmatrix}$$

and

$$\mathbf{g} = \begin{bmatrix} 2 \\ 3 \end{bmatrix}.$$

Use the spectral method to obtain the solution $\mathbf{c} \in \mathbb{R}^2$ to

$$\mathbf{D}\mathbf{c} = \mathbf{g}.$$

(b) Let

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

and

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

Use the spectral method to obtain the solution $\mathbf{x} \in \mathbb{R}^3$ to

$$\mathbf{A}\mathbf{x} = \mathbf{b}.$$