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18.085 Computational Science and Engineering I
Fall 2008

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Problem 1(3)

Matrix corresponding to Centered difference method

$$A = \begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ -1 & 0 & 1 & 0 & 0 \\ 0 & -1 & 0 & 1 & 0 \\ 0 & 0 & -1 & 0 & 1 \\ 0 & 0 & 0 & -1 & 0 \end{pmatrix}$$

$$C = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 2 \end{pmatrix}$$

$$K = \frac{1}{h^2} \begin{pmatrix} 1 & 0 & -1 & 0 & 0 \\ 0 & 3 & 0 & -2 & 0 \\ -1 & 0 & 3 & 0 & -2 \\ 0 & -2 & 0 & 4 & 0 \\ 0 & 0 & -2 & 0 & 2 \end{pmatrix}$$

vector F is the same as before.