CAAM 336 · DIFFERENTIAL EQUATIONS

Homework 5

Posted Friday 17 January 2014. Due 1pm Friday 31 January 2014.

5. [25 points]

Let u be the solution of

$$\begin{aligned} -u''(x) &= f(x), \quad 0 < x < 1; \\ -u'(0) &= \alpha; \\ u(1) &= \beta; \end{aligned}$$

where $\alpha, \beta \in \mathbb{R}$ and

$$f(x) = 12x^2 - 24x + 4.$$

(a) Use integration and the boundary conditions to compute the solution u.

(b) Plot u in the case when $\alpha = \beta = 0$.

(c) Plot u in the case when $\alpha = -1$ and $\beta = 1$.