CAAM 336 · DIFFERENTIAL EQUATIONS

Homework 5

Posted Friday 30 August 2013. Due 5pm Wednesday 11 September 2013.

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 $\beta = 1$.