

# 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

$$-u''(x) = f(x), \quad 0 < x < 1;$$

$$u'(0) = \alpha;$$

$$u(1) = \beta;$$

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  $\beta = 1$ .