

CAAM 336 · DIFFERENTIAL EQUATIONS

Homework 35

Posted Wednesday 30 October 2013. Due 5pm Wednesday 13 November 2013.

35. [25 points]

Determine whether or not each of the following mappings is a bilinear form on the real vector space \mathcal{V} .

(a) $B(\cdot, \cdot) : \mathcal{V} \times \mathcal{V} \rightarrow \mathbb{R}$ defined by $B(u, v) = \int_0^1 u(x)v'(x) dx$ where $\mathcal{V} = C^1[0, 1]$.

(b) $B(\cdot, \cdot) : \mathcal{V} \times \mathcal{V} \rightarrow \mathbb{R}$ defined by $B(u, v) = \int_0^1 |u(x)||v(x)| dx$ where $\mathcal{V} = C[0, 1]$.

(c) $B(\cdot, \cdot) : \mathcal{V} \times \mathcal{V} \rightarrow \mathbb{R}$ defined by $B(u, v) = \int_0^1 u(x)|v(x)| dx$ where $\mathcal{V} = C[0, 1]$.

(d) $B(\cdot, \cdot) : \mathcal{V} \times \mathcal{V} \rightarrow \mathbb{R}$ defined by $B(u, v) = \int_0^1 u(x) + v(x) dx$ where $\mathcal{V} = C[0, 1]$.