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

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

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

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