

MTH 622/Peszynska/Winter 2012, Assignment 4

Please show all your work. Use proper mathematical notation.

1. Find the Riesz representer for $\delta_{1/2}$ in $V = H_0^1(0, 1)$ with the inner product $(u, v)_V := \int_0^1 u'v' + \int_0^1 uv$.
2. Discuss properties of the forms

$$a(u, v) = \int_0^1 (x^2 + 2)u'v' + (x + 1)uv$$

on $H^1(0, 1)$ and $H_0^1(0, 1)$ (identify the appropriate constants).

3. Find the variational formulation of

$$-u'' = f, \tag{0.1}$$

$$u(0) = u'(1) = 0 \tag{0.2}$$

Discuss the conditions that make this problem well-posed.