Assignment 2
Finite Element Methods
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1. *Assigment 1*

Start with

$$(1.1) \qquad -\int_\Omega \left[\nabla \cdot (\kappa \nabla u) \right] v \; \mathrm{d}\vec{x} = \int_\Omega fv \; \mathrm{d}\vec{x}$$

And then use Green's Theorem (specifically, equation 4.3 from the book) to find:

$$(1.2) \qquad \int_\Omega \kappa \nabla u \cdot \nabla v \; \mathrm{d}\vec{x} - \int_{\partial\Omega} \vec{n} \cdot (\kappa \nabla u) \, v \; \mathrm{d}s = \int_\Omega fv \; \mathrm{d}\vec{x}$$

$$\int_\Omega \kappa \nabla u \cdot \nabla v \; \mathrm{d}\vec{x} - \int_{\partial\Omega} \gamma \, (g - u) \, v \; \mathrm{d}s = \int_\Omega fv \; \mathrm{d}\vec{x}$$

$$\int_\Omega \kappa \nabla u \cdot \nabla v \; \mathrm{d}\vec{x} + \int_{\partial\Omega} \gamma uv \; \mathrm{d}s = \int_\Omega fv \; \mathrm{d}\vec{x} + \int_{\partial\Omega} \gamma gv \; \mathrm{d}s$$