Numerical Analysis II

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Contents

0   The Poisson equation

Problem. Solve

$$\nabla^2 u = f \quad x \in \Omega$$
$$u = \phi \quad x \in \partial\Omega$$

here

$$\nabla^2 u = \left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) u$$

is the Laplace operator. The method is to impose on Ω a rectangular grid Ω_h with the spacing h, and replace $\text{grad}^2 u$ by a difference scheme. We'll look for approximate $u|_{\Omega_h}$.