

NMA – homework from week 9

Consider Dirichlet problem for Poisson equation

$$-\Delta u(x, y) = 2x + y^2 \quad \text{on } \Omega, \quad u(x, y) = y \quad \text{on } \partial\Omega,$$

where Ω is a quadrilateral domain given by its vertices
[-1 ; 0], [0.75 ; 0], [0 ; 1.5], [-1 ; 1.5].

- a) Sketch the domain Ω and a mesh with step-size $h = 0.5$ with [0 ; 1] being one of the nodes of the mesh. Mark regular and non-regular nodes of the mesh.
- b) Use finite differences (choose the scheme of second-order accuracy) and assemble the system of discretized equations.