

Lab 03 - Solving the Poisson Problem (step-3)

Deal.II Users and Developers Training

SMR2909 - MHPC P2.5

Timo Heister heister@clemson.edu and Luca Heltai luca.heltai@sissa.it

1. See documentation of step-3 at https://www.dealii.org/8.4.0/doxygen/deal.II/step_3.html
2. Copy and run step-3.
3. Switch to vtk output and visualize in paraview. Figure out how to warp the solution by the solution variable.
4. Follow the instructions in “Modify the type of boundary condition” in the description of the tutorial.
5. Now also do “A slight variation of the last point” but use the value -0.5 for the boundary with indicator 1.
6. Change the setup to have $f = 0$.
7. Switch to an L-shaped domain and experiment with a combination of Dirichlet and Neumann boundary conditions. By experimentation, identify the faces adjacent to the re-entrant corner and apply Dirichlet conditions only there.
8. Bonus: Do “Convergence of the mean”. Can you see the order h^2 ? Increase the polynomial order (you need to increase all orders of the quadratures in the program!) and check the convergence of the mean now.