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

Numerical Solution of PDEs Using the Finite Element Method

MHPC P2.13_seed

Martin Kronbichler kronbichler@lnm.mw.tum.de and **Luca Heltai** luca.heltai@sissa.it

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1. See documentation of step-3 at https://www.dealii.org/8.5.0/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.