Physically-based Simulation
Exercise 2

Alexander Lelidis (14-907-562),
Andreas Emch (08-631-384),
Uroš Tešić (17-950-346)

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1 Convergence of the solution

To find the accuracy of our implementation with compute the error between the numerical solution and the analytic solution.

$$v_{err} = |sol_n - sol_a| \tag{1}$$

Afterwards we use the compute vector and the stiffness matrix K to get the natural norm.

$$|err| = \sqrt{v_{err}^t \cdot K \cdot v_{err}} \tag{2}$$

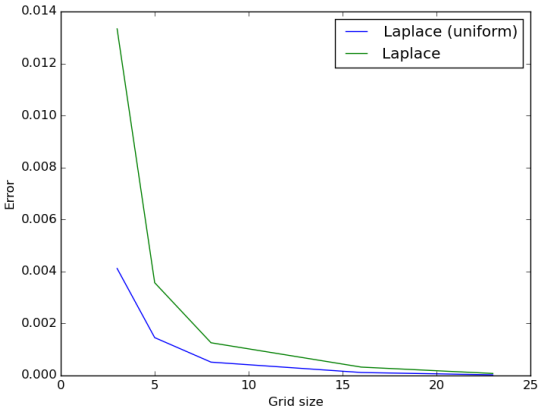
This error we compute for different grid resolutions (N=3,5,8,16,32) using a graded mesh, or a regular mesh.

1.1 Laplace problem

In this section we showing the errors for the Laplace problem.

$$-\Delta u(x, y) = 0 \tag{3}$$

Figure 1: Plot of the Laplace error



1.2 Poisson problem

In this section we showing the errors for the Poisson problem.

$$-\Delta u(x, y) = f(x, y) \tag{4}$$

Figure 2: Plot of the Poisson error