Institut für Analysis und Numerik
Universität Magdeburg
Thomas Richter

08.04.2025

thomas.richter@ovgu.de

Exercise 1 for the lecture Fluid-structure Interactions
Summer 2025

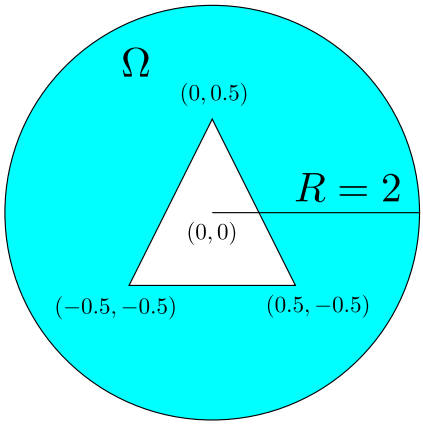
Task 1

We will use the software `NGSolve` (https://ngsolve.org) for practical demonstrations and exerciese.

- Install the Python-Package: https://ngsolve.org/downloads
- Have a look at the webpage and in particular on the extensive documentation
- Read and understand the first steps *1. Getting started*, in particular *1.1 - 1.3.* https://docu.ngsolve.org/latest/. Also have a look at *4. Geometric modeling and mesh generation*, most likely, *4.1.1* will be enough.
- Solve the Laplace-Problem

  $$-\Delta u = 1$$

  on a disc with radius $R = 2$, where a triangle isE cut out of the middle:



  On the triangle use the Dirichlet-Boundary condition

  $$u(x, y) = 2y$$

  and on the outer boundary use a) the Dirichlet condition $u = 0$ and b) the Neumann condition $\partial_n u = 0$.

  Make plots of both solutions.

The tasks will be discussed on Tuesday, 15/04/25.