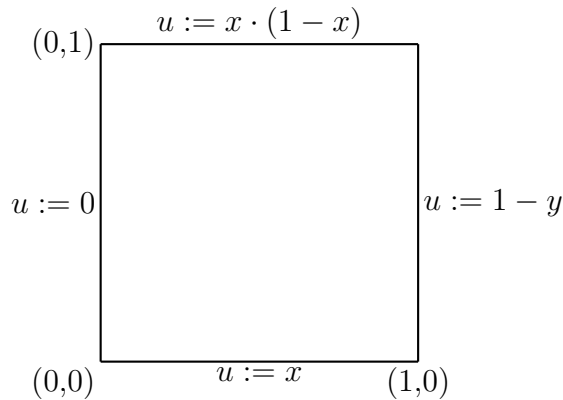


## PA06 “SCHELLBACH”: minimal surface

Investigate the problem of a minimal surface which has been considered by Schellbach in 1852. Use the domain sketched below.



**Literature** Schellbach: Probleme der Variationsrechnung, Bilder im Journal der Mathematik, Bd. 41, Heft 4, S. 293–301, S. 347–350, 1852

### Tasks:

- Derive the mathematical model. If possible use symmetries or reduction in the dimension
- Give the variational formulation
- Analysis: discuss existence and uniqueness of solutions
- Discretize the domain  $\Omega$
- Numerical analysis: provide an error estimate
- Choose a solver for the system of equations you obtain
- Implementation
- Visualize the results and (if possible) compare them to analytical solutions

- 1 Mathematical model
- 2 Variational formulation
- 3 Analysis
- 4 Discretization
- 5 Solver
- 6 Numerical analysis
- 7 Implementation
- 8 Numerical results