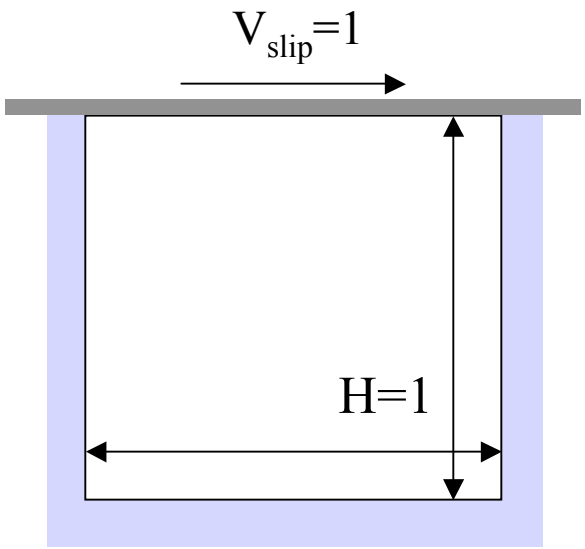
Homework #3

Due May 25, 2007

Incompressible, laminar, steady flow within a driven cavity

Part 1: Generate a sequence of grids using the transformation introduced in the Homework #2. Assume that the transformation is only active for r < 0.25. Use two different values of θ: 0,30 and four different resolution for each θ corresponding to 20x20, 40x40, 80x80 and 160x160 (a total of 8 grids)



Part 2: Perform simulations of the driven cavity at Re=1000 for all the grids

Part 3: Assess grid convergence by comparing the solutions in terms of velocity components at the vertical centerline and compute the errors assuming that the finest grid (160x160 with θ=0) is the exact solution

Clarifications

The transformation used in Homework #2 defines a computational domain of size 4x4. You can generate the desired computational domain (1x1) by using the `grid→scale` command

The User Defined Function provided only defines the UDS scalar in the cell centers. The boundary values are not modified and are left to the default values (=0). You can compare the internal values and estimate the convergence rate.

The `plot→write-file` command saves an ASCII file (instead of plotting) that can be used to evaluate the L_2 of the error