ReadMe

Compilation

scons -j <numProcessors> [visu=0/1 vtk=0/1 heat=0/1]

visu   : enables live visulization
vtk   : enables vtk outpu
heat   : enables heat coupling

Example: scons -j 8 visu=1 vtk=0 heat=1

Note: OpenCL includes (also the c++ wraper CL/cl.hpp) and libs are expected to be available for the compiler to use. The code was developed for OpenCL 1.2 and tested on the vgpu2 and kepler machines.

Running

./build/NumSim [<parameter file> <geometry file> <ocl device number>]

parameter file   : specify a parameter file to load parameters from
geometry file   : specify a geometry file to load geometry data from
ocl device number   : specify the device id to initialize OpenCL on (default: 0)

Note: The program always selects the first OpenCL platform it can find.

Examples

Driven Cavity:

scons -j 4 visu=1 vtk=0 heat=0; ./build/NumSim

Driven Cavity with dirichlet temperature at the bottom:

scons -j 4 visu=1 vtk=0 heat=1; ./build/NumSim

Temperature driven cavity:

scons -j 4 visu=1 vtk=0 heat=1; ./build/NumSim parameter.txt geom_heat.txt

Parameter file

The parameter file contains all parameters in a fixed order:

Reynolds Number
Omega
Alpha
dt (max timestep size)
T_end
Epsilon
Tau
Max. SOR Iterations
Prandtl Number
Beta
Temperature (bottom dirichlet boundary value)
Q (temperature source value; useless since it's constant for the whole domain)
Gamma

Geometry file

The geometry file contains geometry data in a fixed order:

Horizontal dirichlet velocity at the top boundary
Vertical dirichlet velocity at the top boundary
Initial Pressure
Number of cells in x direction
Number of cells in y direction
Domain length in x direction
Domain length in y direction

Note: The initial temperature is always initialized to zero.