Parallel Computing II: Homework IV

4. Dezember 2014

This will be your fourth homework in the exercise parallel computing. Send your solution to Matthias.huy@daimonas.de and to t.grahs@tu-braunschweig.de until December 17th 08.00am. Prepare a pdf file for your written text and attach the source code of your program to the mail.

Task I (15 points)

Usage of CUSP

1. Implement a FD-Solver for the Poisson equation using CUSP
2. Test your code for the different combinations of
   a) Solvers (GMRES, CG, BiCG-stab)
   b) Preconditioners (Nothing, diagonal, smoothed aggreg.)
   c) Memory spaces (host, device)

To do so, first download the framework from the website. Have a look through the code and modify the marked parts. You will only need code for: the solver, the preconditioner, monitor, memory space and your timing routine.

Task II (15 points)

Sparse matrix vector multiplication with CSR and ELL

1. Implement two different kernels for two different sparse matrix storage patterns on the basis of the
   a) Compressed sparse row (CSR) format
   b) ELLPACK (ELL) format

Use the provided framework from the website and add your code at the marked section.

Document your tasks **properly**!!!