Some Time Measurements for DUNE Sample Code

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P1 Conforming Finite Elements

Sample application with confoming P1 finite elements implemented in `dune/disc/groundwater`. Compilation was with `gcc` version 3.4.4, `-O3` and no debugging options where possible. Times given in seconds on Pentium IV with 2.4 GHz.

The following times were measured:

- Assemble: Setting up and assembling the stiffness matrix.

- Solve: Solution of the linear system with CG and SSOR preconditioner from `ISTL`.

- Estimate: Computation of the cell-wise error indicators.

- Refine: Marking elements, refining the grid and interpolating the finite element function. Time is for the grid refinement that yields the finest level.

- GridAdapt: Only grid refinement, i.e. `grid.adapt()`.

Globally Refined Grid

Level 0 was a unit cube discretized with either one hexahedron or six tetrahedra. The grid was refined uniformly to 35937 nodes (level 5).

Grid	Assemble	Solve	Estimate	Refine	GridAdapt
SGrid	5.16	0.86	3.04	0.77	0.00
YaspGrid	1.52	0.86	0.93	0.19	0.00
UGGrid cube	1.51	1.39	1.23	1.39	1.16
UGGrid simplex	2.33	1.23	3.68	3.53	3.25
AlbertaGrid	2.63	0.76	4.99	4.36	2.63
ALUGrid cube	1.40	1.18	1.62	3.26	2.49
ALUGrid simplex	3.22	1.29	7.20	13.01	10.58

To do: Test scalability with respect to h.

Locally Refined Grid

to be done :-)