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IM. STANISŁAWA STASZICA W KRAKOWIE

ModFEM code development 2013-2015

Target

- Working versions of the code for:
  - Welding (PlGrid – KM, AS, PC)
    - parallel with message passing (KM, KC)
      - new hybrid mesh
      - old solver with new storage
    - Navier-Stokes – heat coupling
    - free surface, mass transport - sequential
    - VOF? – parallel
    - parallel free surface, mass transport?
  - Hardening (Innolot – PC, KM, PP)
    - Navier-Stokes – heat coupling!!!
    - internal boundaries

Target

- Working versions of the code:
  - GUI (ŁR)
  - Importing files (KM)
  - Parallel versions
    - Shared memory (OpenMP, OpenCL? - KC, JB, FK)
    - Distributed memory (KM)
    - Massively multi-threaded (OpenCL, CUDA? - KC, JB, FK)
  - Exporting files (KM)
  - Visualization (PM)

Popularyzacja

- Konferencje
- Publikacje
- Koła naukowe

Doktoraty - KM

- Working version MPI-OpenMP
- Analysis OpenMP with SIMD directives
  - profiles
- KomPlasTech – SIMD
- Final redaction
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- Parallel input-output (checkpoint-restart)
- Colouring of mesh entities
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Doktoraty - PM

- Testing
  - mesh entities' ID
- Fullfilling promises
- Final redaction

Doktoraty - PC

- Testy ns_supg+heat
- Testy ns_supg+heat+ALE
- Ostateczna redakcja

Doktoraty FK

- std_lin – szacowanie błędu (ZZ) na GPU
- std_lin – projekcja (proj_sol_lev) na CPU
- infrastruktura OpenCL
  - numerical integration: CPU, GPU, PHI
  - numerical integration: prisms, tetra
- auto-tuning

Doktoraty - KC

- assembling – CRS, Ellpack(?) (CPU, GPU)
- multi-grid solver (CPU, GPU)
  - SpMV
  - GS iterations
  - ILU(0) iterations
  - projections (prolongation, restriction)
- MPI-OpenMP-OpenCL implementation

Doktoraty - JB

- numerical integration 2nd_order
  - 1-entry – 1-thread
  - tetra, prisms
  - OpenCL (CPU, GPU, PHI)
- assembling 2nd_order (CPU, GPU)
- error estimation 2nd_order (CPU, GPU)
- projections 2nd_order (CPU, GPU)
- ns_supg+heat – 2nd_order (CPU, GPU)