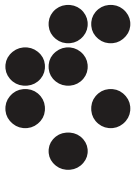

"Jožef Stefan" Institute
Department of Communication Systems

WP: 2.2 Develop an enriched formulation for treating cracks by a meshless approach

LATEST RESULTS AND PROGRESS UPDATE

presenter: Jure Slak, jure.slak@ijs.si

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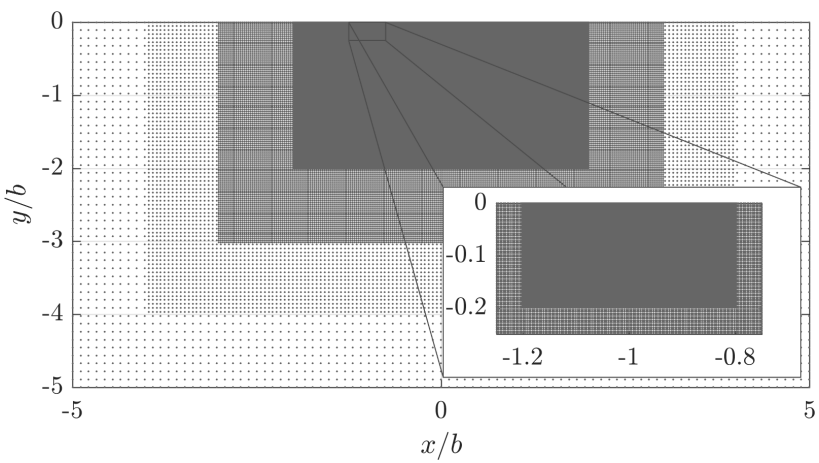
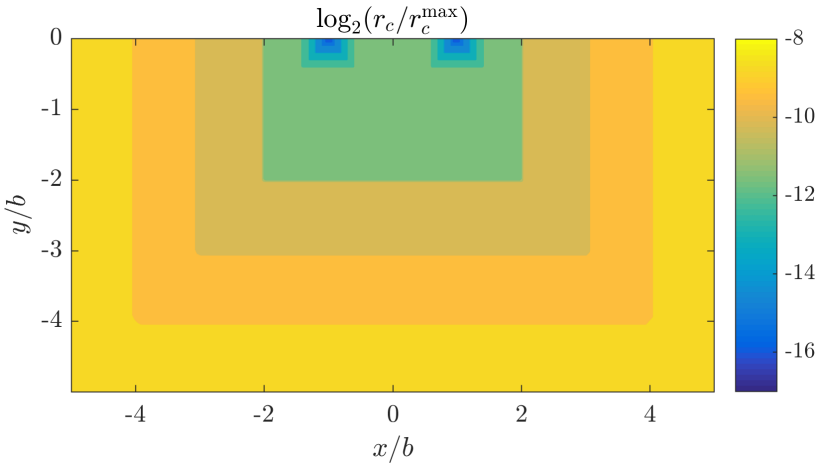
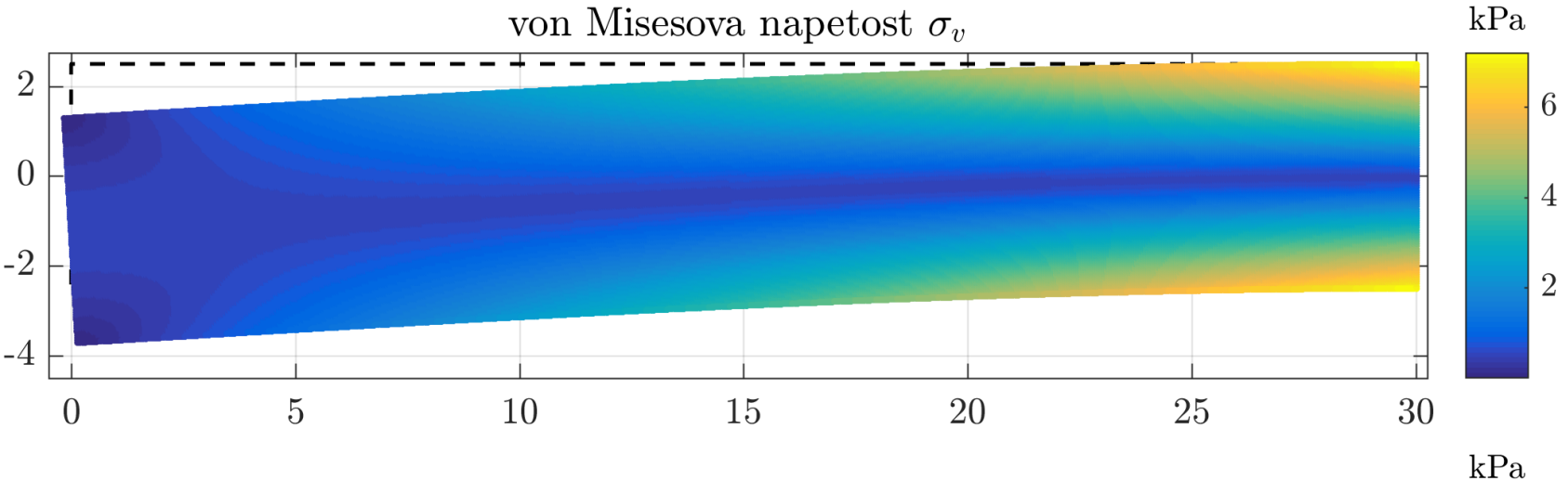
Ghent, 12. 10. 2017

- Extensive refinement, internodal distances differ by a factor of 2^{17}

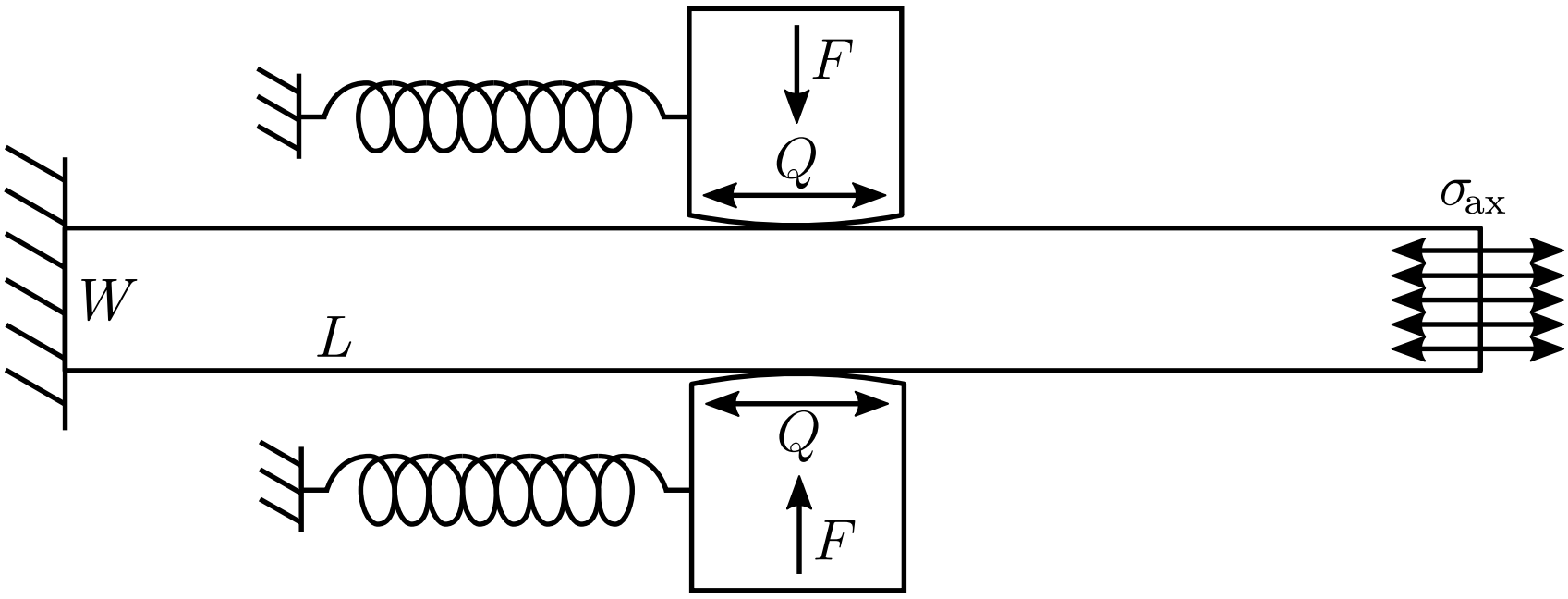




- Better operators for PDE discretization and BCs allowing more general domains

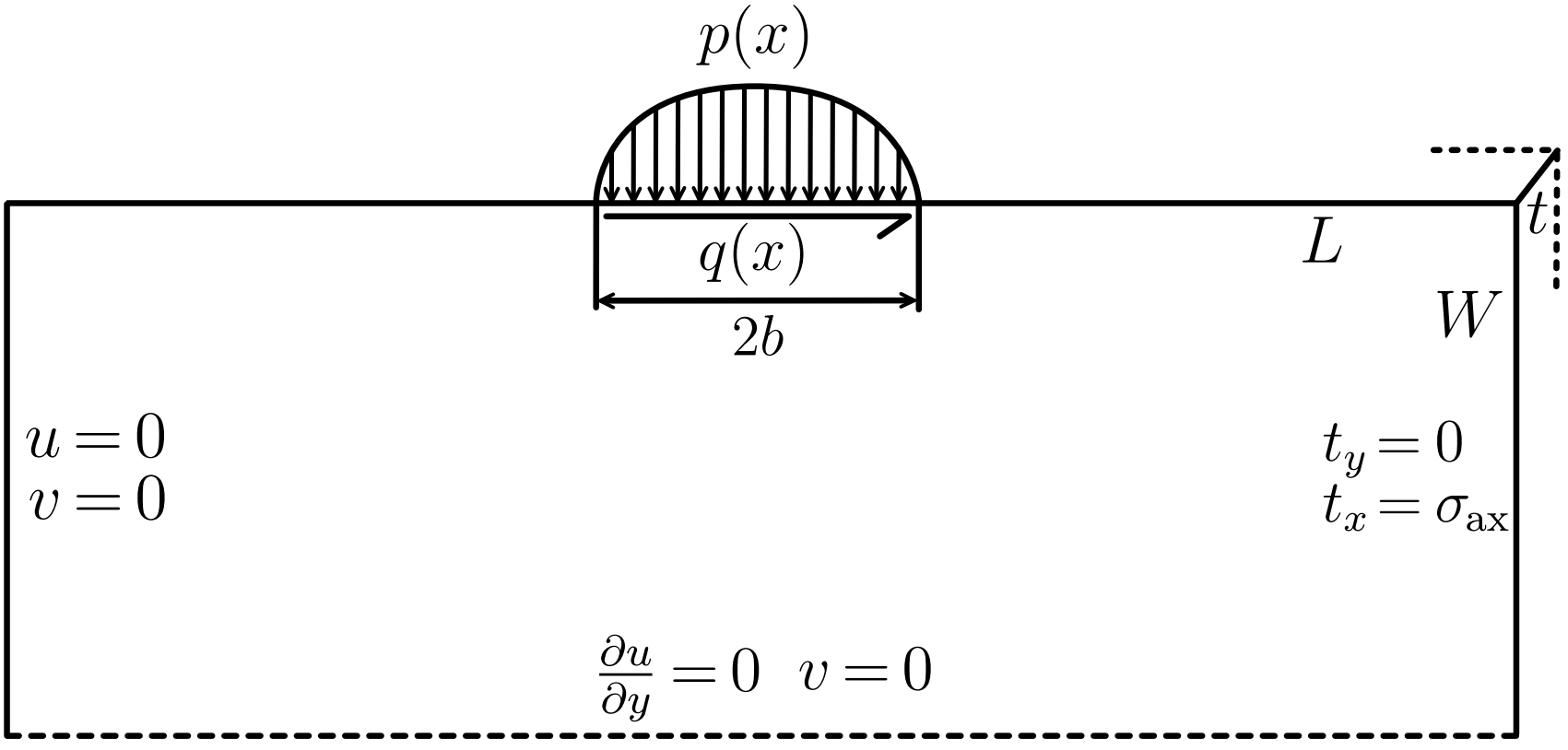


Experimental setup



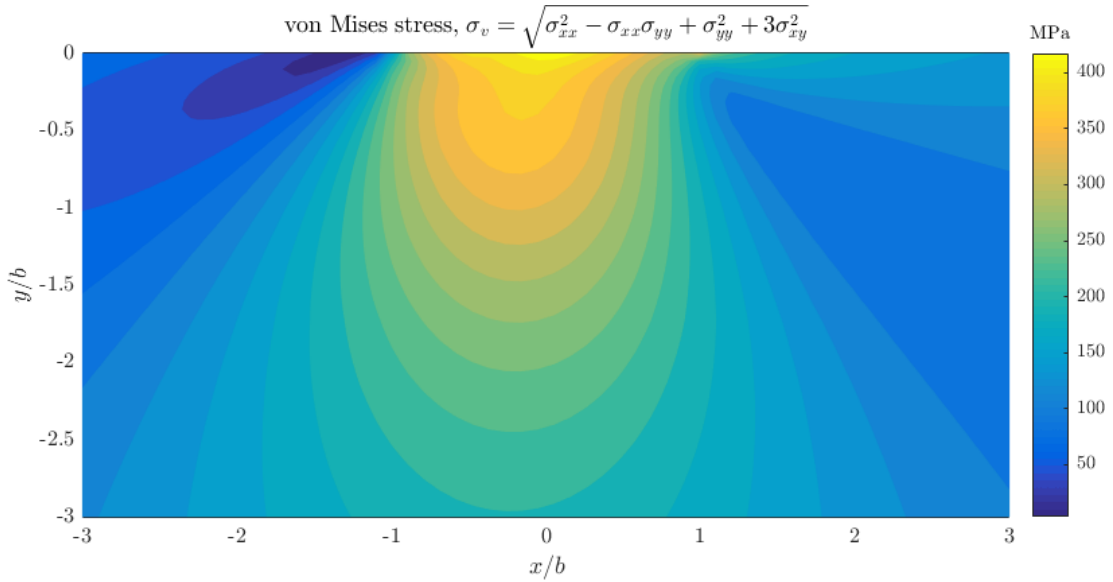
Numerical problem

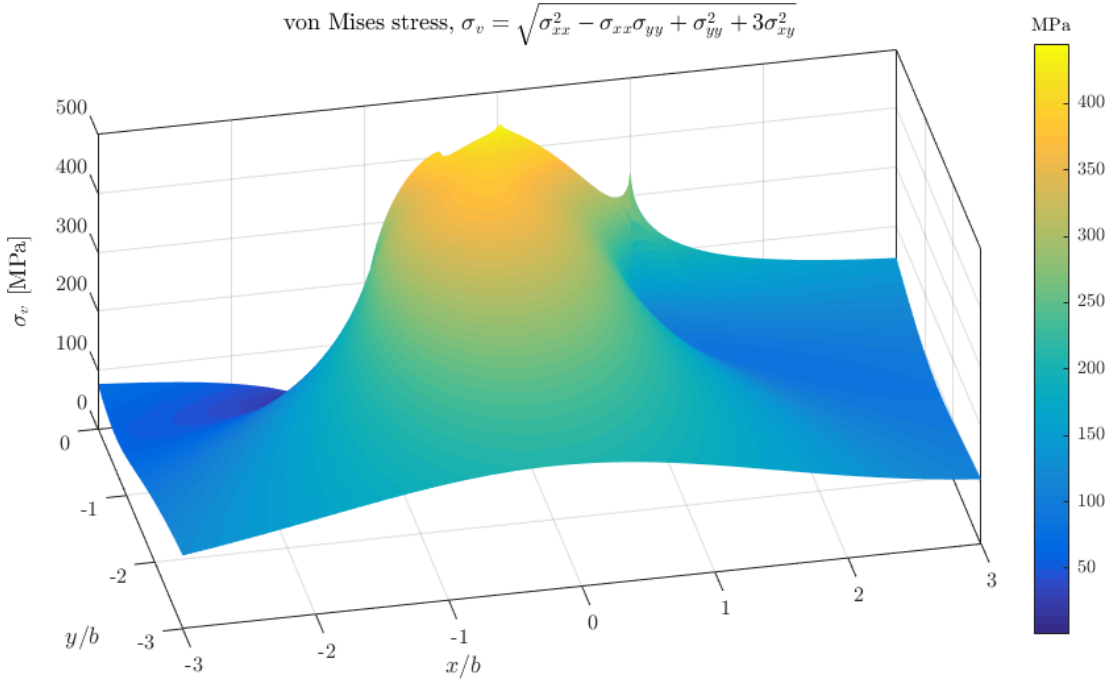
- $t \ll 1 \quad \Longrightarrow \quad$ plane stress
- take advantage of symmetry
- analytical BCs



Case parameters:

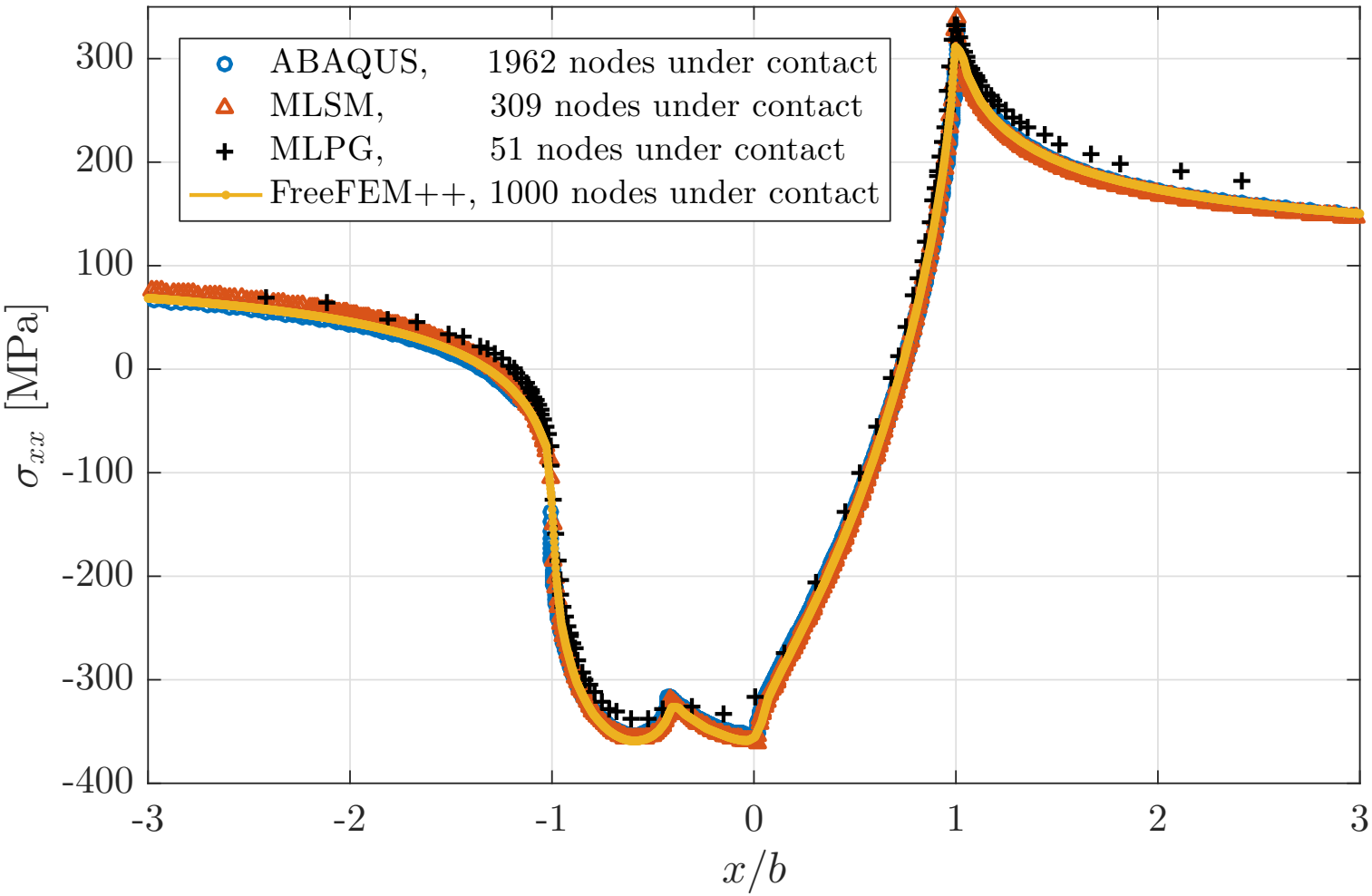
$$E = 72.1\,\text{GPa}$$
$$\nu = 0.33$$
$$L = 40\,\text{mm}$$
$$W = 10\,\text{mm}$$
$$t = 4\,\text{mm}$$
$$\sigma_{ax} = 100\,\text{MPa}$$
$$F = 543\,\text{N}$$
$$Q = 155\,\text{N}$$
$$R = 10\,\text{mm}$$
$$\mu = 0.3$$



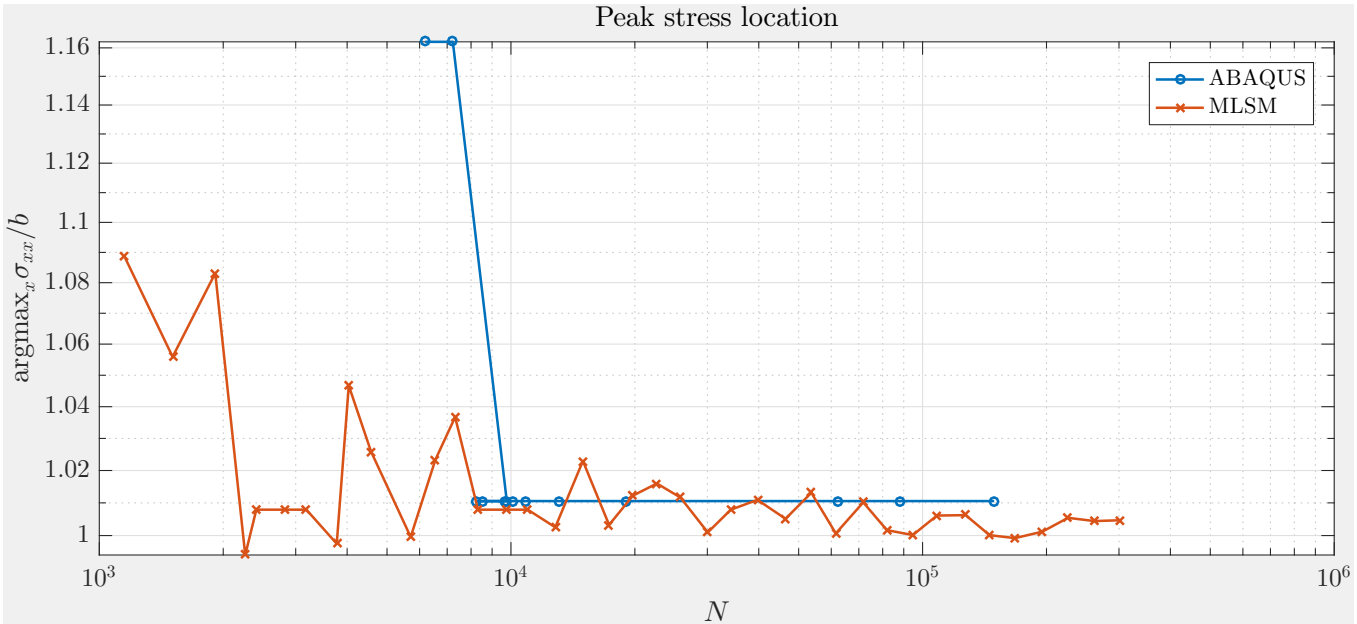


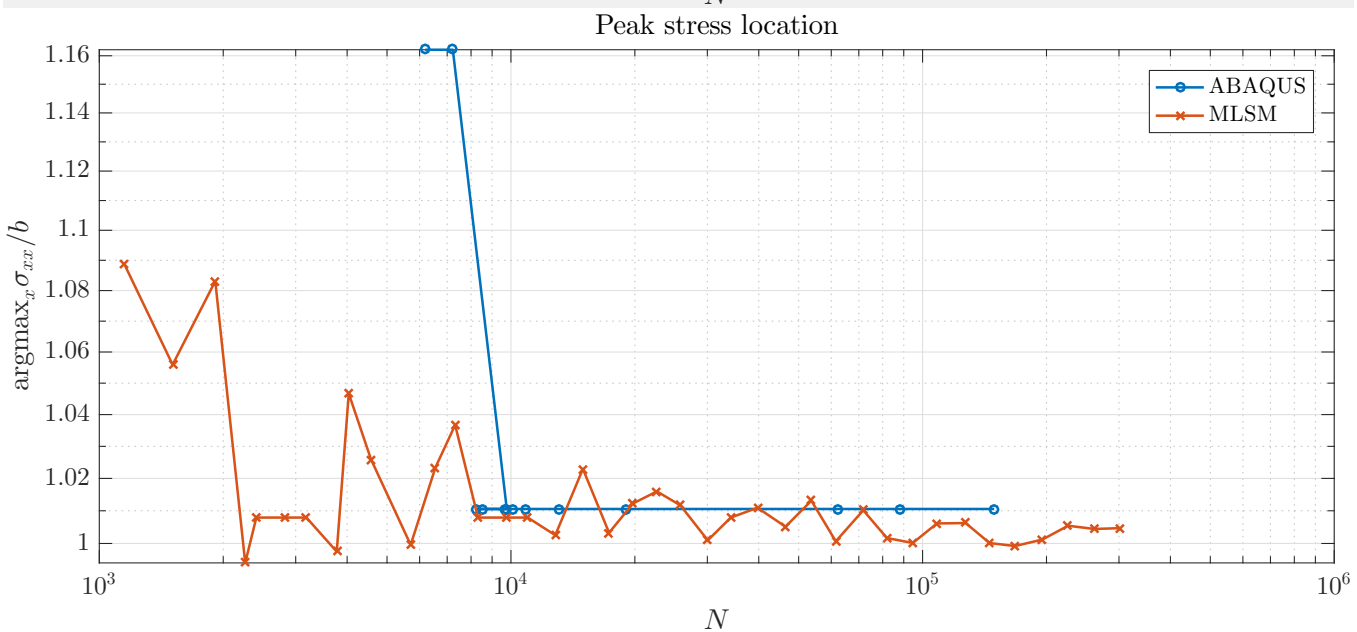
Stress profile on surface

- Solutions using 4 different methods provided by UGhent and JSI match well

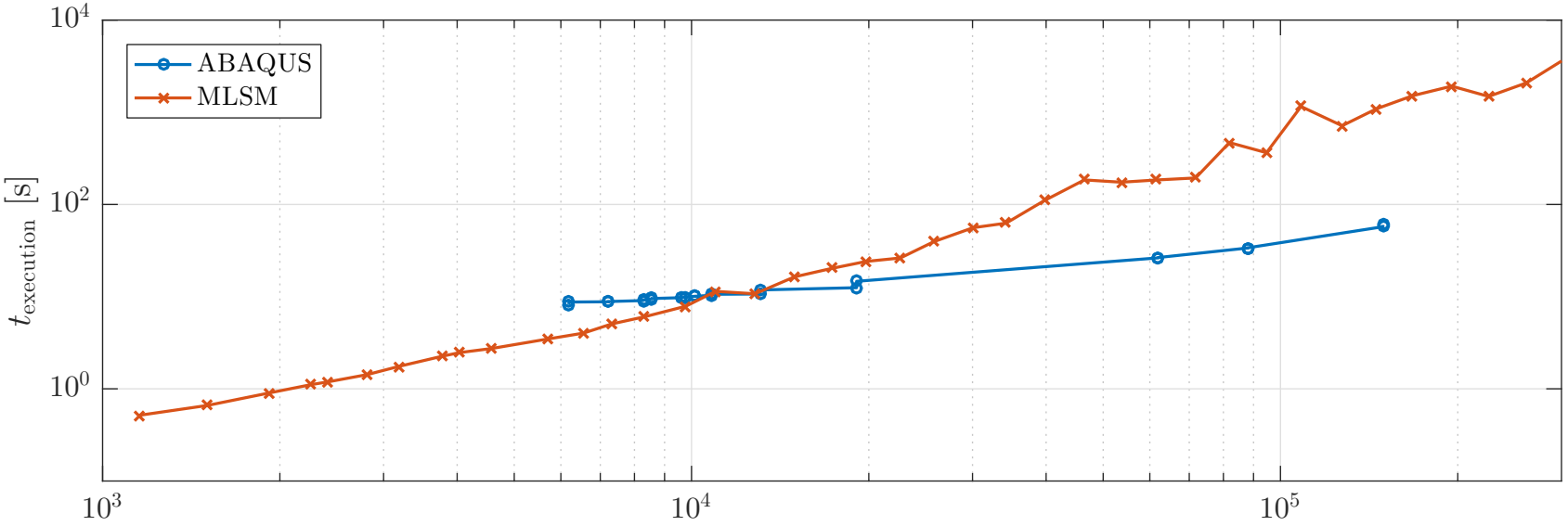


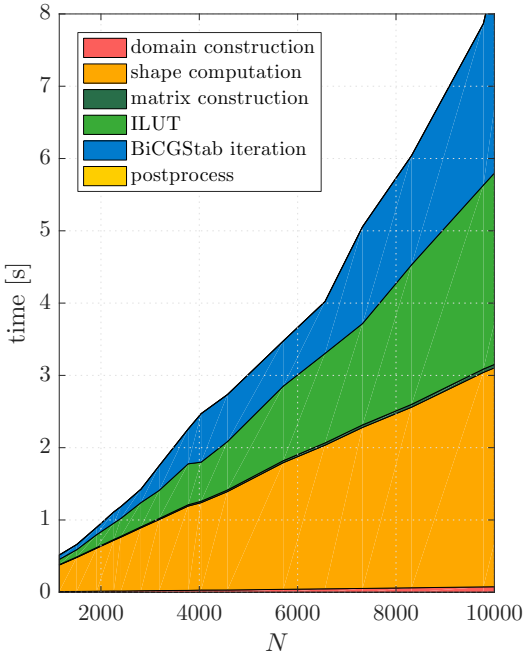
Convergence

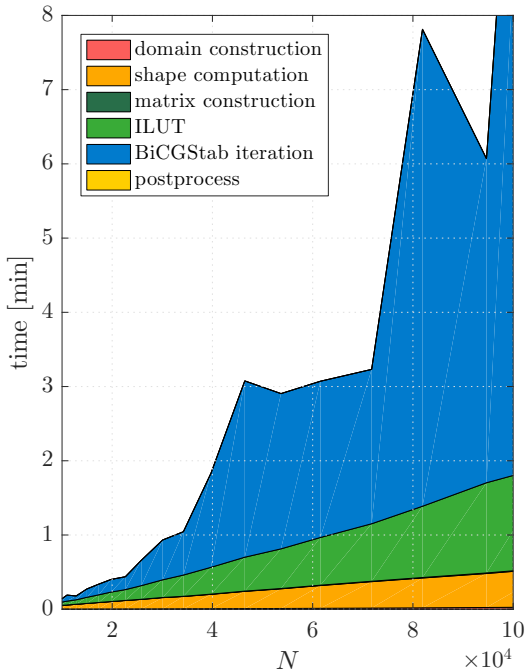


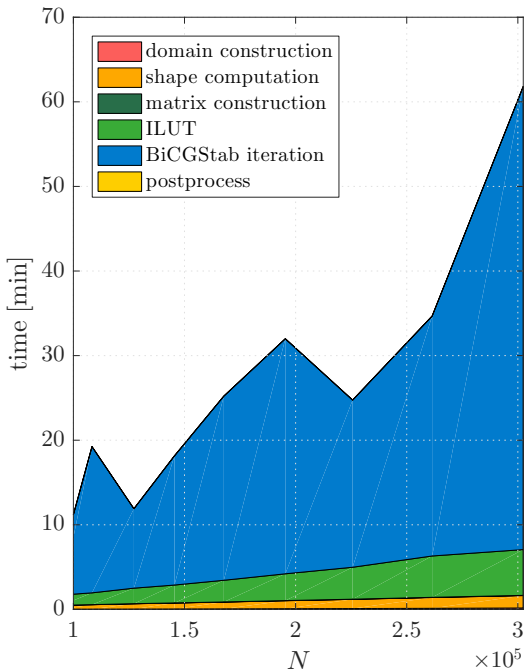


Execution time and profile



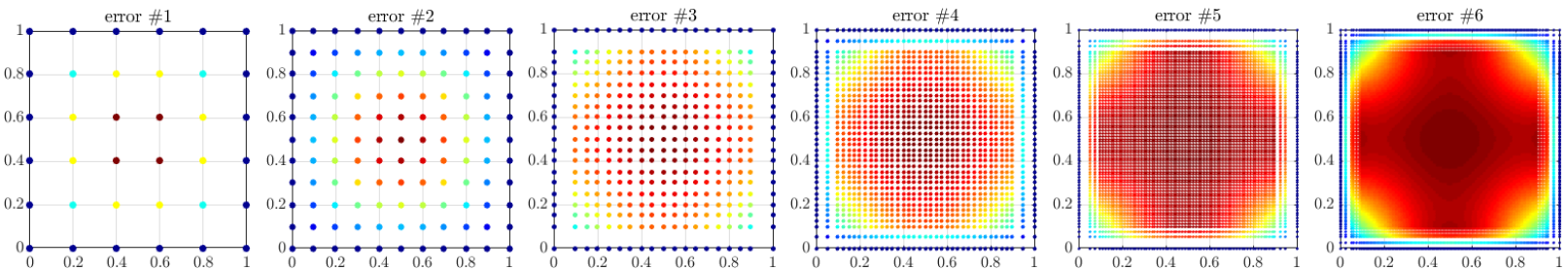


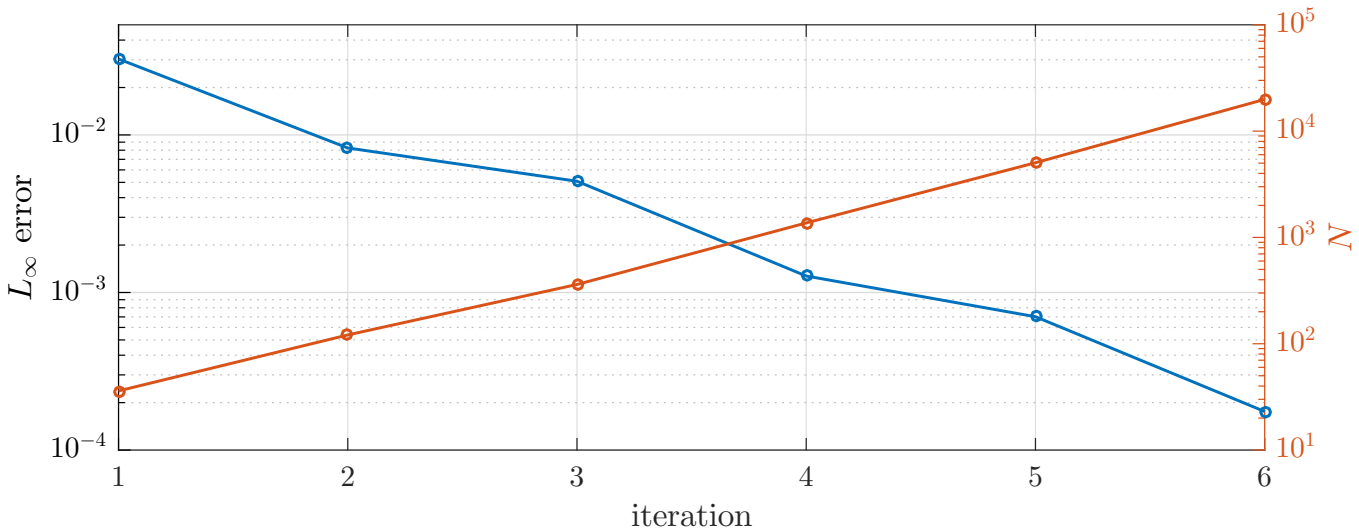




Adaptive mesh refinement and posterior error estimation

- Visit from University of Luxembourg last week
- Implementation of an environment allowing for arbitrary error estimators and refinement criteria
- Basic environment test with FDM:





All results, method formulations and discussions can be found at:
`http://www-e6.ijs.si/ParallelAndDistributedSystems/MeshlessMachine/wiki/`

Code is available at:

- all meshless tools (public repository)
  `https://gitlab.com/e62Lab/e62numcodes`
- project related code (private repository)
  `https://gitlab.com/e62Lab/FWO`

Documentation: `http://www-e6.ijs.si/ParallelAndDistributedSystems/MeshlessMachine/technical_docs/`

Thank you for your attention!