



International Workshop on Flow in Deformable Porous Media: Numerics and Benchmarks

4–6 December 2017 Hamburg

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CONTENT

Numerical modelling of coupled mechanical deformation and fluid flow in porous media is of importance in several branches of technology. Reliable and efficient approximation schemes for such problems have recently attracted researchers' interest. This workshop focuses on design of benchmark problems for flow in deformable porous media, that allow future comparative studies of models, discretizations and solvers in the field of poroelasticity to improve the efficiency and reliability of mathematical models and numerical techniques.

CONFERENCE VENUE

How to reach the AMERON Hotel Speicherstadt , Am Sandtorkai 4, 20457 Hamburg with public transport:

From the airport

Please take the city train, line S1 in the direction "Ohlsdorf", in Ohlsdorf the name of the direction will change to "Wedel", please stay in the train. At the station "Berliner Tor" please change to the metro (known as the Hamburg U-Bahn), line U4, in the direction "HafenCity Universität". Exit at "Überseequartier". From the metro station the hotel is in a walking distance of approx. 300 metres.

From the central station

Please take the metro (known as the Hamburg U-Bahn), line U4, in the direction "HafenCity Universität". Exit at "Überseequartier". From the metro station the hotel is in a walking distance of approx. 300 metres.

For more information

https://www.ameronhotels.com/en/hotel-speicherstadt-hamburg/discover-thehotel/location-contacts

PROGRAM Flow in Deformable Porous Media: Numerics and Benchmarks

Monday – 4 December

19:00 Dinner and Get-Together

Tuesday – 5 December

- 08:45-09:00 Registration
- 09:00-09:15 Opening of the workshop

09:15-10:50 Benchmarks for Flow and Related Problems

- 09:15-10:10 Stefan Turek Numerical Benchmarking for Flow Problems: Lessons learned & future Suggestions
- 10:10-10:30 Holger Class Experiences from the 2008/09 Benchmark study on geological CO2 storage
- 10:30-10:50 Inga Berre Benchmarking and comparison of numerical methods: overall considerations and a recent study of methods for flow in fractured porous media
- 10:50-11:20 Coffee Break

11:20-13:00 Fractured Porous Media and Complex Flows

- 11:20-11:40 Thomas Wick Benchmark-type simulations in porous media, Mandel's problem, and pressurized fractured porous media, Sneddon's tests and extensions
- 11:40-12:00 Oliver Sander XFEM-Discretization of a fractured poroelastic material
- 12:00-12:20 Nicola Castelletto Preconditioning strategies for coupled multiphase flow and geomechanics
- 12:20-12:40 Anna Scotti Numerical simulation of compaction in sedimentary basins
- 12:40-13:00 Brainstorming

13:00-14:00 Lunch

14:00-15:00 Discretizations

- 14:00-14:20 Mary F. Wheeler A posteriori error estimates for a discretized poro-elastic system solved by a fixed-stress algorithm
- 14:20-14:40 Guido Kanschat Conservative finite element discretization of linear poroelasticity
- 14:40-15:00 Gerhard Starke Flux and stress approximation for Biot's consolidation problem

15:00-15:15 Break

15:15-16:15 Solver Technology

- 15:15-15:35 Carmen Rodrigo, Francisco J. Gaspar Stable discretizations and fast solvers based on multigrid methods on semi-structured grids
- 15:35-15:55 Johannes Kraus, Shaun Lymbery Conservative and parameterrobust discretizations of Biot systems: Part I. Mass conservation and parameter robust stability for single-phase flow; Part II. A suggested benchmark problem for dynamic two-phase flow in heterogeneous poroelastic media
- 15:55-16:15 Martin Beck Comparison of sequential and fully-coupled approaches for flow and geomechanics

16:15-16:45 Coffee Break

16:45-17:45 Applications

16:45-17:05	Xavier Raynaud – Formation parting in polymer flooding
17:05-17:25	Vegard Vinje – The brain as a poroelastic medium - Simulating pulsatile motion and flow
17:25-17:45	Shubhangi Gupta – A thermo-chemo-hydro-geomechanical model for marine gas hydrates
17:45-18:00	Brainstorming

19:00 Dinner

Wednesday - 6 December

09:00-10:00 Benchmarks & Discretizations

- 09:00-09:20 Florin A. Radu, Jakub Both, Eirik Keilegavlen, Inga Berre Iterative methods for coupled flow and geomechanics in unsaturated porous media
- 09:20-09:40 Michael Breuer, Jens N. Wood First DIC measurements towards the definition of a poroelastic benchmark case
- 09:40-10:00 Markus Bause, Uwe Köcher Space-time finite element approximation of poroelasticity: Towards the dynamic case
- 10:00-10:30 Coffee Break

10:30-11:00 Discussion

- Proposal of benchmark problems
- > Quantities for comparison
- Reference values

11:00-12:00 Ellaboration of a working plan

- Person of contact
- Deadlines for
 - o Specific configuration of the benchmark problems
 - o Implementation
 - o Results and their evaluation

12:00 End of workshop



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