AGENDA

April 25 ~ 29, 2022

Energy Geosciences Division
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Instructors
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*Times are Pacific time, with potential to be adjusted based on the major of the participants region.

Monday, April 25, 2022

7:00 am *Welcome, Introduction, Safety*

7:15 am *Introduction*

- Modeling and Course objectives
- TOUGH history and applications

7:45 am *Computer Setup & Coffee Break*

8:00 am *Review of Multiphase Flow*

- Phases, components, phase transitions, governing equations, fluid and porous-medium properties, equation of state, non-isothermal and other processes

9:00 am *Break*

9:10 am *Continue: Review of Multiphase Flow*

10:00 am *Numerical Methods in TOUGH*

- Integral finite difference method, space and time discretization, Newton-Raphson iterations, linear equation solvers, weighting schemes

11:00 am *Adjourn*

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Tuesday, April 26, 2022

7:00 am *TOUGH Overview*

- Capabilities, code architecture, basic input and output concepts

7:30 am *Building a TOUGH Model (coffee break between)*

- Material properties (Problem 1a)
- Mesh generation (Problem 1b)
- *TOUGH I/O web application*
- Initial and boundary conditions (Problem 1c)

11:00 am *Adjourn*

Wednesday, April 27, 2022

7:00 am *Continue – Building a TOUGH Model*

- Computational parameters (Problem 1d)
- Explore (e.g., Problem_OneElement, EOS 9 for problem 1, and comparison with EOS3)
- *Q/A*

9:00 am *Fractured Rocks*

9:30 am *Break*

9:45 am *TOUGH3 features*

10:00 am *Phase Change in a Non-isothermal Two-Phase, Two-Component System*

- Hands-on computer exercise (Problem PC)
- Primary variables, initialization, variable switching

11:00 am *Adjourn*

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Thursday, April 28, 2022

7:00 am *Injection of CO_2 in a Saline Aquifer*

- Introduction to CO_2 sequestration related EOS
- Introduction to ECO2N
- Hands-on computer exercise (Problem ECO2N)
- Non-isothermal simulation
- Variable injection rate
- Permeability reduction due to salt precipitation
- Post-injection period: pressure recovery and phase redistribution
- Effect of relative permeability functions
- Introduction to hysteresis
- Hands-on computer exercises, including quick-and-dirty plotting with Excel

(Coffee break between)

11:00 am *Adjourn*

Friday, April 29, 2022

7:00 am *Model Tracer Tests in a Geothermal Reservoir*

- Introduction to EOS1 for modeling geothermal reservoir
- Hands-on computer exercise
- Problem variation

(Coffee break between)

10:00 am *Q/A*

12:00 pm *Adjourn*

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