POROMECHANICS OF POROUS AND FRACTURED RESERVOIRS
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KIGAM, Daejeon, Korea
May 15-18, 2017

1. Poromechanics – Flow Properties (Jishan Liu)

1:1 Reservoir Pressure System – How to calculate overburden stress and reservoir pressure   ***Day 1[1]***
1:2 Darcy's Law – Permeability and its changes, reservoir classification
1:3 Mass Conservation Law – flow equations
1:4 Steady-State Behaviors – Solutions of simple flow problems
1:5 Hydraulic Diffusivity – Definition, physical meaning, and its application in reservoirs
1:6 Rock Properties – Their Dependence on Stress Conditions   ***Day 1***

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2. Poromechanics – Fluid Storage Properties (Jishan Liu)

2:1 Fluid Properties – How they change and affect flow   ***Day 2***
2:2 Mechanisms of Liquid Production or Injection
2:3 Estimation of Original Hydrocarbons in Place
2:4 Estimation of Ultimate Recovery or Injection of Hydrocarbons
2:5 Flow – Deformation Coupling in Coal
2:6 Flow – Deformation Coupling in Shale   ***Day 2***

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3. Poromechanics –Modeling Porous Medium Flows (Derek Elsworth)

3:1 Single porosity flows - Finite Element Methods [2:1]   Lecture   ***Day 3***
3:2 2D Triangular Constant Gradient Elements [2:3]   Lecture
3:3 Transient Behavior - Mass Matrices [2:6]   Lecture
3:4 Transient Behavior - Integration in Time [2:7]   Lecture
3:5 Dual-Porosity-Dual-Permeability Models [6:1]   Lecture   ***Day 3***

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4. Poromechanics –Modeling Coupled Porous Medium Flow and Deformation (Derek Elsworth)

4:1 Mechanical properties – http://www.ems.psu.edu/~elsworth/courses/geoee500/GeoEE500_1.PDF   ***Day 4***
4:2 Biot consolidation – http://www.ems.psu.edu/~elsworth/courses/geoee500/GeoEE500_1.PDF
4:3 Dual-porosity poroelasticity
4:4 Mechanical deformation - 1D and 2D Elements [5:1][5:2]   Lecture
4:5 Coupled Hydro-Mechanical Models [6:2]   Lecture   ***Day 4***

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[1] *All sessions nominally1h:15m*