PetroSkills

Streamlines: Applications to Reservoir Simulation, Characterization and Management - SRS

COURSE

About the Course

The use of streamline technology is becoming common for reservoir flow visualization, dynamic reservoir characterization, and optimal flood management. The power of the streamlines can be exploited using both finite-difference and streamline simulators. This course is designed to cover introductory and advanced concepts in streamline technology and its applications for reservoir characterization, reservoir management/optimization and field development strategy.

This course is not limited to streamline simulation but exposes the power of streamlines in general. The course will involve a combination of theoretical discussion, practical applications, and computer exercises to provide hands-on training on the methods that can later be applied using any commercial streamline simulation software. A copy of the SPE textbook Streamline Simulation: Theory and Practice by Akhil Datta-Gupta and Michael J. King along with streamline simulation software will be provided to each course participant.

This course covers conventional reservoirs.

Target Audience

Practicing geoscientists and engineers. No formal training in reservoir simulation is required other than knowledge of basic mathematics.

You Will Learn

Participants will learn how to:

- Apply the fundamentals of streamlines and streamline simulation, and analyze the advantages and limitations over conventional simulation
- Simulate flow and visualize results at the geologic model scale
- Calculate swept areas and drainage volumes
- Optimize infill wells
- Perform reservoir surveillance and flood optimization using streamlines
- Integrate streamlines with finite-difference simulators
- Validate upscaled and upgridded geologic models
- Perform streamline assisted history matching of reservoir models
- Apply streamline simulation for complex reservoir geometries and flow processes

Course Content

- Streamlines: fundamentals
- Streamlines: overview, strengths, and limitations
- Basic governing equations
- Line source and sink solutions
- Streamfunctions and streamtubes
- Tracing streamlines in 3D
- The streamline time of flight and its significance
- Use of streamlines with finite-difference models
- Computer Exercises
- Streamline simulation: state of the art
- Flow simulation through geologic models
- Streamline vs. finite difference
- Analytical/numerical solutions along streamlines
- Modeling gravity and cross-streamline mechanisms
- Compressibility effects
- Mapping and material balance errors
- Practical considerations and limitations
- Computer exercises
- Streamlines: applications
- Flow visualization
- Primary recovery and drainage volume calculations
- Swept volume calculations and optimizing infill wells pattern balancing/rate allocations
- Improved waterflood management
- Waterflood field tracer interpretation
- Hybrid methods: sector models and streamtubes
- Miscible flood modeling and predictions
- Model ranking and uncertainty assessment dynamic
- Reservoir characterization upscaling/upgridding
- Computer exercises
- Streamline-based history matching
- Why streamlines
- History matching: workflows
- Assisted history matching of finite-difference models
- Streamline-based sensitivity computations production
- Data integration: overview of methods
- Field case studies
- Computer exercises
- Advanced topics discussion and wrap-up
- Fractured reservoir modeling and applications
- Corner point geometry and faults
- Compositional modeling
- Time step and stability considerations
- Front tracking methods

- Streamline vs. finite difference: advantages and limitations

Product Details

Categories: Upstream

Disciplines: Reservoir Engineering

Levels: Specialized

Product Type: Course

Formats Available: In-Classroom

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