

Streamline Simulation: Theory and Practice

0.8 CEUs (Continuing Education Units) awarded for this 1-day course.

Instructor

Akhil Datta-Gupta, Texas A&M University

Intended Audience

This course is intended for engineers, geologists and geophysicists interested in rapid fluid flow simulation techniques, screening of geologic models, reservoir characterization, data integration and/or history matching. Some background in reservoir engineering/numerical simulation will be helpful but not required.

Description

This course covers introductory and advanced concepts in streamline simulation and its applications. The theory of streamlines/streamtubes in multidimensions is reviewed. Applications include swept volume calculations, rate allocation/pattern balancing, field-scale simulation of tracer response, waterflooding, solvent flooding, ranking geostatistical realizations, history matching and data integration. Strengths and limitations of streamline modeling compared with finite difference simulation are discussed. PC-Windows based computer programs are used to illustrate the concepts.

Topics Covered

- Fundamentals: Streamfunctions, Streamtubes and Streamlines
- Line Source and Sink Methods
- Tracing Streamlines in 2-D: Steady and Unsteady States
- The Streamtube Approach
- Hybrid Modeling and Field Applications
- Tracing Streamlines in 3-D: The Time-of-Flight Approach
- Saturation Computations
- Applications
 - Pattern Balancing
 - Tracer Response and Swept Volume Calculations
 - Waterflooding
 - Solvent Flooding
 - Compositional Simulation
 - Upgridding
 - Pseudoization
 - Ranking Reservoir Models
- Data Integration/History Matching Using Streamlines
- Streamline vs. Finite Difference: Advantages/Disadvantages

About the Instructor

Akhil Datta-Gupta is Professor and holder of LeSuer endowed chair in Petroleum Engineering at Texas A&M U. in College Station, Texas. He holds a Ph.D. degree from the University of Texas at Austin and worked for BP Exploration/Research and the Lawrence Berkeley National Laboratory. He is the recipient of the 2003 SPE Lester C. Uren award for significant technical contributions in petroleum reservoir characterization and streamline-based flow simulation. He is an SPE Distinguished Member (2001), Distinguished Lecturer (1999-2000), Distinguished Author (2000), and was selected as an outstanding Technical Editor (1996). He also received the SPE Cedrick K. Ferguson Certificate (2000 and 2006) and the AIME Rossitter W. Raymond Award (1992).