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Discretization; 4.3 Flow Equation for Boundary Gridblocks; 4.4 Treatment of Boundary Conditions; 4.5 Calculation of Transmissibilities 4.6 Symmetry and Its Use in Solving Practical Problems 4.7 Summary; 4.8 Exercises; Chapter 5. Simulation with a Point-Distributed Grid; 5.1 Introduction; 5.2 Reservoir Discretization; 5.3 Flow Equation for Boundary Gridpoints; 5.4 Treatment of Boundary Conditions; 5.5 Calculation of Transmissibilities; 5.6 Symmetry and Its Use in Solving Practical Problems; 5.7 Summary; 5.8 Exercises; Chapter 6. Well Representation in Simulators; 6.1 Introduction; 6.2 Single-Block Wells; 6.3 Multiblock Wells; 6.4 Practical Considerations Dealing with Modeling Well Operating Conditions; 6.5 Summary 6.6 Exercises Chapter 7. Single-Phase Flow Equation for Various Fluids; 7.1 Introduction; 7.2 Pressure Dependence of Fluid and Rock Properties; 7.3 General Single-Phase Flow Equation in Multi Dimensions; 7.4 Summary; 7.5 Exercises; Chapter 8. Linearization of Flow Equations; 8.1 Introduction; 8.2 Nonlinear Terms in Flow Equations; 8.3 Nonlinearity of Flow Equations For Various Fluids; 8.4 Linearization of Nonlinear Terms; 8.5 Linearized Flow Equations in Time; 8.6 Summary; 8.7 Exercises; Chapter 9. Methods of Solution of Linear Equations; 9.1 Introduction; 9.2 Direct Solution Methods 9.3 Iterative Solution Methods 9.4 Summary; 9.5 Exercises; Chapter 10. Introduction to Modeling Multiphase Flow in Petroleum Reservoirs; 10.1 Introduction; 10.2 Reservoir Engineering Concepts in Multiphase Flow; 10.3 Multiphase Flow Models; 10.4 Solution of Multiphase Flow Equations; 10.5 Material Balance Checks; 10.6 Advancing Solution in Time; 10.7 Summary; 10.8 Exercises; Appendix A: User's Manual for Single-Phase Simulator; A.1 Introduction; A.2 Data File Preparation; A.3 Description of Variables Used in Preparing a Data File; A.4 Instructions to Run Simulator A.5 Limitations Imposed on the Compiled Version

## Sommario/riassunto

In this highly anticipated volume, the world-renowned authors take a basic approach to present the principles of petroleum reservoir simulation in an easy-to-use and accessible format. Applicable to any oil and gas recovery method, this book uses a block-centered grid and a point-distributed grid. It treats various boundary conditions as fictitious wells, gives algebraic equations for their flow rates and presents an elaborate treatment of radial grid for single-well simulation to analyze well test results and to create well pseudo-functions necessary in conducting a practical re