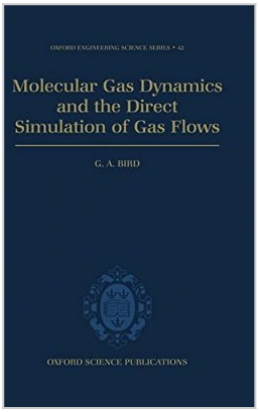

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The direct simulation Monte Carlo (DSMC) method has, in recent years, become widely used for engineering and scientific studies of gas flows that involve low densities or very small physical dimensions. The method is a direct physical simulation of the motion of representative molecules, rather than a numerical solution of the equations that provide a mathematical model of the flow. The computations are no longer expensive and the period since the original 1976 publication of this work has seen enormous improvements in the molecular models, the procedures, and the implementation strategies. This greatly expanded new version of the author's seminal *Molecular Gas Dynamics* will be considered the definitive text on the subject. It includes all the refinements and research since the earlier book. The molecular theory of gas flows is developed from first principles and is extended to cover new models and procedures. The method and typical applications are illustrated through 13 demonstration programs that are listed in FORTRAN source code on a companion website. All numerical results in the book have been obtained from these programs. The applications range from verification cases for simple homogeneous gases to complex multidimensional flows of gas mixtures and chemically reacting flows.

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Molecular Gas Dynamics and the Direct Simulation of Gas Flows (Oxford Engineering Science Series) By G. A. Bird Bibliography

- Sales Rank: #722670 in Books
- Published on: 1994-06-16
- Original language: English
- Number of items: 1
- Dimensions: 6.50" h x 1.40" w x 9.50" l, 2.00 pounds
- Binding: Hardcover
- 484 pages

Editorial Review

Review

"This book discusses fundamentals of rarefied gas dynamics, focusses on the numerical simulation of physical situations and provides applications to test cases. . .The book profits mainly from the immense practical experience of the author. . .It is recommended to people who are interested in gaining insight into practical aspects and applications in the field." --*Mathematical Reviews*

About the Author
G. A. Bird is at University of Sydney.

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