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Altri autori (Persone)	AkhlaghiHassan StefanovStefan
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Nota di contenuto	Introduction to Micro and Nano Flows -- A Brief Review of Kinetic Theory -- DSMC Method and its Connection to Kinetic Theory -- Recent Advances in DSMC -- Pressure Driven Flows: Poisselle Flow -- Thermal Driven Micro/Nano Flows -- Shear Driven Flows: Couette Flow and Cavity Flow -- High-Speed Microflows: Nozzle Flow -- External Flows: Micro-Scale Flat Plate and Airfoil -- Cold to Hot Transfer at Micro-/Nano-Scales.
Sommario/riassunto	This book provides a comprehensive and in-depth presentation of recent advancements in the Direct Simulation Monte Carlo (DSMC) method, focusing on modern collision algorithms that maintain accuracy even with low particle-per-cell. Drawing from theoretical insights and computational innovations, it bridges fundamental kinetic theory with practical simulation techniques for rarefied gas flows. Structured across ten chapters, the book begins with a discussion of micro- and nanoscale fluid flows, where non-equilibrium effects and

rarefaction become dominant. It explores key phenomena in MEMS/NEMS devices, such as velocity slip, temperature jump, Knudsen minimum, and thermal polarization—essential for understanding transport in confined geometries. A strong emphasis is placed on advanced DSMC collision schemes, including the BT-family of algorithms (e.g., SBT, ISBT, GBT, SSBT, and SGBT), as well as emerging hybrid approaches such as DSMC-Fokker-Planck and Low-Variance DSMC. Applications span from pressure-driven microchannel flows, thermally induced rarefied flows, and Couette/cavity configurations, to supersonic wedge flows and nonlinear instability phenomena like Rayleigh–Bénard convection in rarefied gases. Special attention is given to semi-analytical aerodynamic models in free-molecular regimes, making the book particularly valuable for those working in aerospace applications at high altitudes or in low-density environments. With contributions from leading experts, this expanded volume serves as both a reference and a teaching guide for researchers and students in rarefied gas dynamics, microfluidics, and high-fidelity particle-based simulation methods.