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Autore	Gotoh Hitoshi
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Sommario/riassunto	This book provides an in-depth, comprehensive, and comprehensible description of the theoretical background and numerical methodologies corresponding to advanced particle methods formulated in classical

Newtonian mechanics for simulation of fluids, structures, and their interactions. Particle methods are regarded as new-generation computational technology with a broad range of applications in engineering and science. Advanced particle methods refer to the latest developed particle methods with high stability, accuracy, conservation, and convergence properties. Distinctively, the described advanced particle methods are characterized by a clear, consistent mathematical–physical background, the absence of artificial numerical stabilizers that often require parameter tuning, rigorous satisfaction of boundary conditions, and excellent numerical results that have been extensively and scrupulously verified with respect to reliable analytical and experimental reference solutions. This book presents a unified description for both smoothed particle hydrodynamics (SPH) and moving particle semi-implicit (MPS) methods through a coherent presentation of fundamental equations, and numerical algorithms and schemes. Special attention is devoted to meticulous and coherent explanation of the advanced particle methods such that even undergraduate students can follow the derivation process and thoroughly understand the concepts and equations. The state-of-the-art particle method technology is also portrayed with the presentation of developed multi-physics, multi-scale particle methods corresponding to multi-phase flows, and hydroelastic fluid–structure interactions with rigorous treatment of interfacial moving boundaries.