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Titolo	Numerical Solutions Applied to Heat Transfer with the SPH Method : A Verification of Approximations for Speed and Accuracy // by Luciano Pereira da Silva, Messias Meneguette Junior, Carlos Henrique Marchi
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Soggetti	Mathematics - Data processing Thermodynamics Heat engineering Heat - Transmission Mass transfer Differential equations Mathematics Computational Mathematics and Numerical Analysis Engineering Thermodynamics, Heat and Mass Transfer Differential Equations Applications of Mathematics Transmissió de la calor Models matemàtics Llibres electrònics
Lingua di pubblicazione	Inglese
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Nota di contenuto	Introduction -- Numerical Modeling of Heat Diffusion -- Numerical error analysis and heat diffusion models -- SPH applied to computational heat transfer problems -- Conclusion.
Sommario/riassunto	This book offers an in-depth verification of numerical solutions for differential equations modeling heat transfer phenomena, where the smoothed particle hydrodynamics (SPH) method is used to discretize the mathematical models. Techniques described in this book aim to

speed up the convergence of numerical solutions and increase their accuracy by significantly reducing the discretization error. In their quest, the authors shed light on new sources of numerical error that are specific to the SPH method and, through them, they identify the characteristics of the solutions influenced by such errors. The accuracy of numerical solutions is also improved with the application of advanced tools like the repeated Richardson extrapolation (RRE) in quadruple precision, which was adapted to consider fixed or moving particles. The book finishes with the conclusion that the qualitative and quantitative verification of numerical solutions through coherence tests and metrics are currently a methodology of excellence to treat computational heat transfer problems. Mathematicians in applied fields and engineers modelling and solving real physical phenomena can greatly benefit from this work, as well as any reader interested in numerical methods for differential equations.
