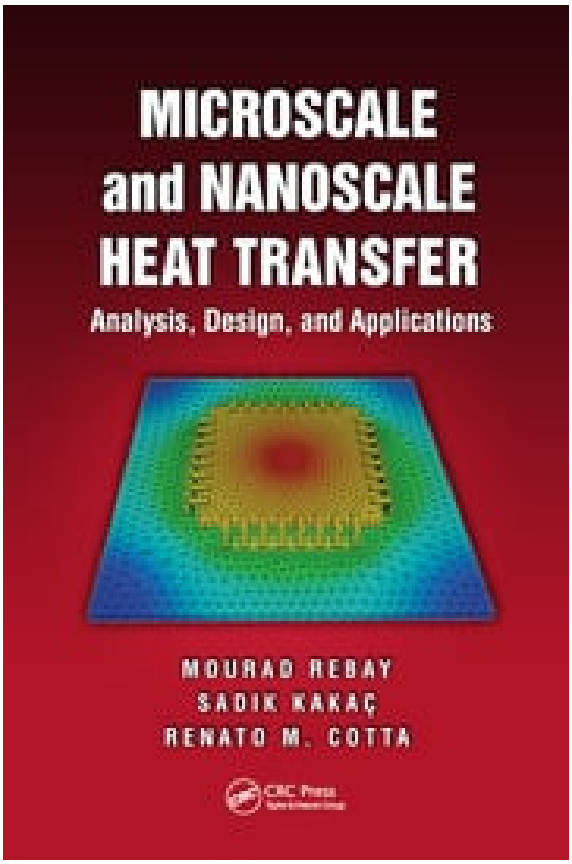
# Convective Heat Transfer Sadik Kakac Pdf Free

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computational fluid dynamics, and heat transfer in porous media. The last few years have seen considerable activity on moving from the old-fashioned model of finite-difference grid-based CFD to modern high-performance, high-fidelity, and low-cost models, such as unstructured grids (UG), hybrid unstructured grids (HUG), unstructured finite volumes (UFV), unstructured finite volume methods (UFVM), and hybrid unstructured finite volumes (HUFVM). This book addresses the reader who has not had a formal training in CFD, and addresses the reader who is new to CFD. In the book the reader will discover that CFD is a wide and open field of current research and future development, and it is the responsibility of the reader to be an active member of the community to increase the breadth and depth of the field. The book takes an historical approach, beginning with the concept of moving from grid-based to non-grid-based discretization, and explains why the non-grid-based discretization was historically difficult and had some limitations. The next chapter discusses the reasons for the different modeling approaches that were developed, including grid-based, finite element, and finite volume. The following chapters discuss different discretization approaches, covering both traditional finite-element discretizations and hybrid finite volume methods. Discretization of diffusion and advection is covered in Chapters 6 and 7, respectively. Numerical stabilization techniques are discussed in Chapters 8--12. The following chapters are devoted to different types of grid-based discretizations, including monolithic, staggered, and hybrid finite element methods, and unstructured grids. The book concludes with the last chapter where a number of current and future developments are discussed. 1 Introduction {#s1} ========== In recent years, CFD has grown into an important and fast-growing field of research and development. The field was born in the beginning of the 1980s when inflow simulations were the main focus, and the focus was on modeling turbulent flows and turbulent combustion. However, in the 1980s, grid-based discretization, finite difference, and finite volume methods were developed for solving the Navier--Stokes equations, and new research directions were opened. The success of CFD is due to its wide range of applications in science and engineering. In science, CFD was found to be a very useful tool in fluid mechanics, 82157476af