Book Review

Reviewed by J. Paulo Davim

E-mail: pdavim@ua.pt

Advanced Modelling and Optimisation of Manufacturing Processes
by: R. Venkata Rao
Published 2011
by Springer, 380p
ISBN: 978-0-85729-014-4 (Hardcover)

Nowadays, manufacturing presents an important role in economic development of many countries with special emphasis to counties with emergent economies. Manufacturing is recognised as an important subject of research and development with directly application in modern industry. The selection of optimum process parameters it is very important, namely, to ensure quality of product and to reduce the manufacturing cost.

Advanced Modelling and Optimisation of Manufacturing Processes: International Research and Development presents a comprehensive review on the latest research and development trends at international level for modelling and optimisation of various manufacturing processes, particularly the machining processes which are the most frequently analysed manufacturing processes. The book forms part of the Springer Series in Advanced Manufacturing and has been written by Venkata Rao, who is a Professor in the Department of Mechanical Engineering at the SV National Institute of Technology, Surat, India. The book consists of six chapters. In Chapter 1, the author describes the need for modelling and optimisation of manufacturing processes and presents an overview of various advanced modelling and optimisation techniques. Chapter 2 describes the modelling and optimisation aspects of conventional machining processes such as milling, grinding, turning, drilling and some finishing processes. Chapter 3 describes the modelling and optimisation aspects of modern machining processes such as AJM, USM, wire EDM, ECM, LBM, ECDG, micro-milling and micro-drilling. Chapter 4 describes the modelling and optimisation aspects of nano-finishing processes such as AFM, MAF, MR-AFF and ELID. Chapter 5 describes the modelling and optimisation aspects of rapid prototyping processes. In all these chapters, the author has presented the applications of various advanced optimisation techniques such as GA, SA, PSO, ABC, HS, SFL, etc. Chapter 6 describes the environmental aspects of the manufacturing processes including dry machining, cryogenic machining, solid lubricant assisted machining, minimal quantity lubrication machining, etc. In isolation, all these chapters would also be deemed good pieces of academic work. They are well laid out with good contemporary referencing.

Throughout the book, using examples of various processes, the author has demonstrated the possibilities for process modelling and optimisation with advanced techniques. The book presents thorough literature review on each of the manufacturing processes considered, various mathematical models, traditional and advanced

optimisation techniques, results of applications of the proposed techniques and highlights the best optimisation strategies to achieve the best process performance. The algorithms and computer codes for the advanced optimisation techniques included in the Appendix of the book will be very useful to the readers. The author has presented the techniques to a correct level and readers of this book will easily be able to follow and implement the techniques on comparable problems. The structure of the book is clear and easy to follow. The book is intended for designers, manufacturing engineers, institutes involved in design and manufacturing-related projects, applied researchers, academics, and graduate students in mechanical, industrial and manufacturing engineering.