

Preface

Innovations are continually shaping the evolution of engineering disciplines, step-by-step fostering a new era of efficiency, automation, and intelligent design. This special edition highlights significant topics in engineering, offering research results on machine design, mechatronics, and digital signal and image processing. The articles included in this edition present new concepts, emerging trends, and practical applications essential for researchers, practitioners, and students in these fields.

Chapter 1, "Research and Design of Machines and Equipment", analyses research results on the functionality of some machines and equipment and methodologies involved in the development of mechanical systems. Here, innovative techniques for optimising working performance and reliability, ensuring the practical application of theoretical concepts, are also explored.

Chapter 2, "Mechatronics", bridges the gap between mechanical, electronic, and computer engineering, providing an integrated approach to modern automation and control systems. It covers the fundamental aspects of sensors, actuators, microcontrollers, and intelligent systems, with real-world applications in robotics, industrial automation, and smart technologies. This chapter highlights the synergy between mechanical components and digital control, demonstrating how interdisciplinary collaboration is shaping the future of engineering.

Chapter 3, "Digital Signal and Image Processing", presents key concepts in the processing and analysis of signals and digital images. It introduces essential techniques such as filtering, transformation, and decomposition, which are pivotal in a range of applications, from medical imaging to artificial intelligence. The discussion also includes advancements in machine learning and neural networks, which have significantly enhanced the field of digital processing.

This edition aims to provide practical information to students, engineers, and researchers and offers a well-rounded perspective on the modern challenges and innovative solutions in engineering by integrating theory with real-world applications.