

Preface

Measuring Technology and Mechatronics Automation are the combination of Mechanical engineering, Electronic engineering, Detecting Techniques, Computer engineering, Software engineering, Control engineering, and Systems Design engineering in order to design, and manufacture useful products. Mechatronics is a multidisciplinary field of engineering, that is to say it rejects splitting engineering into separate disciplines. Originally, mechatronics just included the combination between mechanics and electronics. On the other hand, electrical engineering is a field of engineering that generally deals with the study and application of electricity, electronics and electromagnetism. The field first became an identifiable occupation in the late nineteenth century after commercialization of the electric telegraph and electrical power supply. It now covers a range of subtopics including power, electronics, control systems, signal processing and telecommunications.

This book focus on the research of measuring technology and mechatronics automation in electrical engineering field. In modern technology, the products of automobile, aerotechnics, medicine, robotic and other innovative manufacture reflect increasingly the feasibility and potential of mechatronics automation in electrical engineering. A mechatronics engineer unites the principles of mechanics, electronics, and computing to generate a simpler, more economical and reliable system. Mechatronics is centered on mechanics, electronics, computing, control engineering, molecular engineering, and optical engineering, which, combined, make possible the generation of simpler, more economical, reliable and versatile systems.

Firstly, this book discusses the mechatronics engineering cybernetics which deals with the question of control engineering of mechatronic systems. It is used to control or regulate such a system (see control theory). Through collaboration, the mechatronic modules perform the production goals and inherit flexible and agile manufacturing properties in the production scheme. Modern production equipment consists of mechatronic modules that are integrated according to a control architecture. The most known architectures involve hierarchy, polyarchy, heterarchy, and hybrid. The methods for achieving a technical effect are described by control algorithms, which might or might not utilize formal methods in their design.

Hybrid systems important to mechatronics include production systems, synergy drives, planetary exploration rovers, automotive subsystems such as anti-lock braking systems and spin-assist, and every-day equipment such as autofocus cameras, video, hard disks, and CD players.

In addition, the book is also concerned the intelligent systems, which entered the video game industry as a one-man team, named toru narihiro, who was hired by nintendo to port over famicom disk software into the standard rom-cartridge format that was being used by the nes outside japan. the team soon became an auxiliary program unit for nintendo (like hal laboratory originally) that provided system tools and hired people to program, fix, or port nintendo-developed software. thus much of the team's original discography contains minuscule contributions to several big nintendo r&d1 and nintendo ead titles.

Beside, as the third part of this book, power electronic converters can be found wherever there is a need to modify a form of electrical energy (i.e. change its voltage, current or frequency). The power range of these converters is from some milliwatts (as in a mobile phone) to hundreds of megawatts (e.g. in a HVDC transmission system). With "classical" electronics, electrical currents and voltage are used to carry information, whereas with power electronics, they carry power. Thus, the main metric of power electronics becomes the efficiency. The first very high power electronic devices were mercury arc valves. In modern systems the conversion is performed with semiconductor switching devices such as diodes, thyristors and transistors. In contrast to electronic systems concerned with transmission and processing of signals and data, in power electronics substantial amounts of electrical energy are processed. An AC/DC converter (rectifier) is the most typical power electronics device found in many consumer electronic devices, e.g. television sets, personal computers, battery chargers, etc. The power range is typically from tens of watts to several hundred watts. In industry the most common application is the variable speed drive (VSD) that is used to control an induction motor. The power range of VSDs start from a few hundred watts and end at tens of megawatts.

Moreover, as an important component of this book, computer software, or just software, is a collection of computer programs and related data that provide the instructions for telling a computer what to do and how to do it. In other words, software is a conceptual entity which is a set of computer programs, procedures, and associated documentation concerned with the operation of a data processing system. We can also say software refers to one or more computer programs and data held in the storage of the computer for some purposes. In other words software is a set of programs, procedures, algorithms and its documentation. Program software performs the function of the program it implements, either by directly providing instructions to the computer hardware or by serving as input to another piece of software. The term was coined to contrast to the old term hardware (meaning physical devices). In contrast to hardware, software is intangible, meaning it "cannot be touched"[1]. Software is also sometimes used in a more narrow sense, meaning application software only. Sometimes the term includes

data that has not traditionally been associated with computers, such as film, tapes, and records.

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