
Book review

John J. Craig, *Introduction to Robotics: Mechanics and Control*, 3rd edn, Pearson Education, Harlow, 2004, 575 pp., £39.99.

This is the long-awaited third edition of a well-regarded textbook last published in 1989. The popularity of the book is indicated by its frequent citation on university robotics websites, particularly in North America. Although one might ask why more regular updating has not occurred in a high-profile subject, it must be remembered that industrial robotics, the main concern of the text, is a mature technology in many respects. While advances in vision systems, artificial intelligence and virtual reality programming techniques have advanced greatly since 1989, industrial robot structures and key concepts for motion control have changed but little.

The third edition has been given a useful preface to summarise the text, all of which follows the same chapter arrangement of the second edition but with MATLAB exercises included at the ends of chapters. The strength of the author's treatment of the subject lies in its practicality. Many robotics texts and many lecture courses feature an holistic introduction covering aspects of history, applications and general background prior to the delivery of co-ordinate transformations etc. Craig's text moves rapidly into the principles of automation, covering major definitions, before introducing co-ordinate systems in Chapter 2. Although described by the author as 'Mechanical Engineering and Mathematics', Chapters 1 to 8 do not contain concepts unfamiliar to the electrical engineer. The treatment is orthodox, Chapter 3 covering manipulator kinematics, Chapter 4 inverse kinematics, Chapters 5 and 6 dynamic matters and Chapter 7 the generation of trajectories. Robot configurations are left to Chapter 8 and it seems unusual for these to be considered after kinematics. The remaining chapters are devoted to joint control (Chapters 9–11) and programming (Chapters 12 and 13). Although the control material is relevant, many degree programmes will treat this as a separate, generic module and it would have been useful to have illustrations of what the latest commercial robot programming software suites can do.

In summary, this new edition is very welcome and will no doubt prove a popular text, in view of its clarity, uncluttered treatment and sensible conventions. However, in the reviewer's opinion, the chapters on control would have benefited from greater review; kinematics of mobile robots should have been introduced in relation to established techniques; and photographic illustrations, many of which date from the 1980s, should have reflected the latest product lines. The material nevertheless remains relevant and the text will continue to be a valuable aid to robotics education.

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