Preface

The word "robot" does not originate from a science or engineering vocabulary. It was first used in the Czech drama R.U.R. (Rossum's Universal Robots) written by Karel Čapek and was first played in Prague in 1921 (the word itself was invented by his brother Josef). In the drama the "robot" is an artificial human being which is a brilliant worker, deprived of all unnecessary qualities: feelings, creativity and capacity for feeling pain. In the prologue of the drama the following "definition" of robots is given: *Robots are not people (Roboti nejsou lidé). They are mechanically more perfect than we are, they have an astounding intellectual capacity, but they have no soul. The creation of an engineer is technically more refined than the product of nature.*

The textbook "Robotics" evolved through more than 10 years of teaching robotics at the Faculty of Electrical Engineering, of the University of Ljubljana, Slovenia. The way of presenting the rather demanding subject was successfully tested with several generations of undergraduate students.

The major feature of the book is its simplicity. The basic characteristics of industrial robot mechanisms are presented in the introduction. The position, orientation and displacement of an object are described by homogenous transformation matrices. These matrices, which are the basis for any analysis of robot mechanisms, are introduced through simple geometrical reasoning. Geometrical models of the robot mechanism are explained with the help of an original and friendly vector description. Robot kinematics and dynamics are introduced via a mechanism with only two rotational degrees of freedom, which is however an important part of the most popular industrial SCARA and anthropomorphic robot structures. The presentation of robot dynamics is based on only the knowledge of Newton's law. The robot workspace plays an important role in selecting an appropriate robot for the task planned. Robot sensors and robot trajectory planning are presented. Basic control schemes, resulting in either the desired end-effector trajectory or in the force between the robot and its environment, are also explained. Robot grippers and feeding devices are described together with the planning of robot assembly. The chapter on standardization and measurement of accuracy and repeatability is of interest

for users of industrial robots. The textbook is supplemented with a short English–German–French robotic vocabulary.

The book requires minimal advance knowledge of mathematics and physics. Therefore it is appropriate for students of engineering schools (electrical, mechanical, computer, civil) or first-level students according to the two-level Bologna program. It could be of interest also for engineers who did not study robotics, but encounter robots in their working environment and wish to acquire some basic knowledge in a simple and fast manner.

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