

Preface

This book is for the reader who wants to acquire new engineering skills related to concrete, complex solutions through the modeling of objects in 3D space. Anyone who has ever dealt with modeling, or just simple drawing, soon finds out that the straightforward examples from exercises are easily repeatable. However, there are few such examples in real-life. Therefore, we have decided to offer a better and more detailed presentation of the complex shapes and problems associated with the modeling of real objects. Based on our years of experience with a large number of people through graduate and master's study programs we have decided to opt for the gradual acquisition of knowledge, which leaves it well grounded in the student.

The extent of the material exceeds that required for regular study. However, there are a couple of universities that deal in detail with such basic knowledge, the basic language of engineers, i.e., the ability to present new products and ideas. Our cooperation with industry, various institutes, and our long experience in designing products with various complexities have resulted in a wide range of examples compared to regular monographs. We leave the readers to form their own opinions about the large number of presented examples.

We should point out that the transferring of dimensions and details to technical documentation represents the pinnacle of modeling. Of course, anybody dealing with the quality and perfection of products is aware of this. Should the readers find that the presented knowledge about detailed modeling and the special forms of technical language are both new and interesting, and that they are able to generalize and use it confidently, we will derive great satisfaction.

During the Bologna reforms, our colleagues suggested that in the first semester students should acquire new knowledge about descriptive geometry and technical drawing. In the second semester, this knowledge is upgraded with skills related to space modeling. At the end of the semester, the students are made familiar with transferring a shape to the high-quality representation of a product by means of technical documentation. Our 8 years of experience has shown that in later stages—in machine elements, energy systems, and manufacturing engineering courses—students can easily present their ideas using complex models. This was a proof of our intention to also include knowledge about the high-quality presentation of ideas in the 3D environment in a new profile of engineering competences.

Developing methods and the complexity of models for industrial design, for example, requires familiarity with free-form surfaces, which will be the next

logical step after the content of this book. We believe that the presented systematics will allow both students and their teachers to easily recognize the upgrade to their existing knowledge. This belief was also confirmed by our staff engineers, who were willing to attend special courses to upgrade these skills, mainly in 2D space.

The hand-sketching chapter was taken from the book “Engineering Graphics,” where a co-author is Prof. Milan Kljajin from Strossmayer University (Osijek, Croatia). He confirmed that we were able to use this content. We would like to express many thanks to him for this permission. Our book would be incomplete without this chapter.

A book of this size cannot be written by a single author. A substantial contribution to its final form came from a team of Ph.D. students, Damijan Zorko and Pavel Tomšič. Mateja Maffi, Simon Demšar, and Paul McGuinness took care of the translation and proofreading, and the technical editing was carried out by Janez Krek. They all deserve sincere gratitude for their tolerance and patience.

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