
Preface

This book is an encyclopedic edition on analytic and differential geometry of regular analytical surfaces, which has found application in some parts of mathematics or in different branches of techniques and building. The encyclopedia was formed along the same principle as the scientific edition *Encyclopedia of Analytical Surfaces*, Krivoschapko S.N., Ivanov V.N., Publishing House LIBROCOM, 2010, 560 pp. However, the present book is a supplemented and recasted edition.

The main demand for this book lies in its most complete account of materials on the geometry of each surface in one or two pages. A bibliography from several titles is presented at the end of each paper. These references may help to find information for an extended study of problems connected with the geometry of a presented surface, with strength analysis of a shell in the form of this surface and their application. At the beginning or at the end of most of the book parts, a one- or two-page list of the literature on geometry, application, and strength analysis of shells with middle surfaces in the form of corresponded surfaces is given.

Only the surfaces that can be pictured by means of descriptive geometry and computer graphics have been included in the encyclopedia.

The material of the book is grouped into 38 classes of surfaces. The indications of forms of generatrix and directrix lines and the laws of their location concerning the base planes and lines are taken as the principle of classification. The order of equations of surfaces, total curvature, and kinematics of generation of surfaces are also taken into consideration. Before the description of surfaces belonging to the same class, a one- or two-page general characteristic of surfaces of this class is given.

The encyclopedia contains both classical surfaces known to geometers for several centuries and surfaces known only to a narrow range of specialists. The surfaces discovered and investigated by the authors are also included in the book.

Thin-walled smooth structures are the most economical structures. From the geometrical point of view, shells are described by the form of their middle surface. However, traditionally a limited circle of these structures, such as spherical, cylindrical, conical, shallow translation shells, and some shells of revolution, constitute a small percentage in comparison to those consisting a variety of geometrical forms presented by geometers but unknown to architects and civil and mechanical engineers.

The main aim of the encyclopedia is to help in exposure and decision of scientific and technical problems connected with the theory of forming of thin-walled structures on the basis of geometrical investigation of the middle surfaces of shells.

The generation of nontraditional effective constructive forms of large-span space for achieving the maximum level of manufacturing resourcefulness shall favor the fulfillment of complex fundamental and applied problems raised for science in architectural and -building spheres. The availability of a wide choice of different forms and surfaces gives an opportunity to solve some problems in machine-building sphere too.

The authors consider that they kept off the reiteration of some mistakes passing from one edition to another and eliminated wrong variant readings in the definition of some surfaces. The chapter with the most formulas presented in the book was tested by the authors.

The authors tried not to include in the book questionable formulas or formulas giving rise to doubts.

The materials in the encyclopedia will be interesting and useful to mathematicians, engineers, architects, postgraduate students, lecturers, and specialists dealing with geometry of surfaces, and for specialists working in other fields of knowledge but using geometrical images in their work.

The encyclopedia also contains a dictionary of geometrical terms in Russian, English, French, and German languages.

There is an Index at the end of the edition.

Pages 152–155, 156–158 were written by Ph.D. Ya.S. Pul’pinskiy; pp. 145–148, 331–337 were written by Ph.D. V.A. Nikityuk, pp. 606–612 were written by Ph.D. G.S. Rachkovskaya; D.Sc. Professor V.N. Ivanov prepared pp. 19, 88, 97–98, 190–195, 197–202, 201–203, 210–211, 240–252, 266–278, 281–290, 307–314, 339–340, 344–357, 356–357, 364–372, 376–378, 222–223, 385–386, 394–395, 400–407, 412–413, 425–426, 434–435, 441–442, 443–444, 463–469, 492–496, 501–502, 515–518, 522–526, 532–533, 541–542, 547–550, 558–559, 563, 564–565, 569–570, 570–581, 634–635, 642–646, 662. All the rest were written by D.Sc. Professor S.N. Krivoschapko.

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