Differential Geometry Of Curves And Surfaces

Differential Geometry of Curves and SurfacesDifferential Geometry of Curves and SurfacesDifferential GeometryGeometry of Curves and Surfaces with MAPLEDifferential Geometry of Curves and SurfacesModern Differential Geometry of Curves and Surfaces with MathematicaDifferential Geometry of Curves and SurfacesDifferential Geometry of Curves and SurfacesModern Differential Geometry of Curves and SurfacesGeometry of Algebraic CurvesA Treatise on the Differential Geometry of Curves and SurfacesIntroduction to Differential Geometry of Space Curves and SurfacesDifferential Geometry of Curves and SurfacesDifferential Geometry of Curves and SurfacesA Treatise on the Differential Geometry of Curves and SurfacesProjective Differential Geometry of Curves and SurfacesDifferential Geometry of Curves and Surfaces (Paperback)(Paperback)Differential Geometry of Curves and SurfacesIntroduction to Differential Geometry of Space Curves and SurfacesA Treatise on the Differential Geometry of Curves and Surfaces (1909) Manfredo P. do Carmo Victor Andreevich Toponogov Wolfgang Kühnel Vladimir Rovenski Manfredo Perdigão do Carmo Elsa Abbena Thomas F. Banchoff Thomas F. Banchoff Alfred Gray Enrico Arbarello Luther Pfahler Eisenhart Taha Sochi Masaaki Umehara Victor A. Toponogov Luther Pfahler Eisenhart Ernest Preston Lane Do Carmo Shoshichi Kobayashi Taha Sochi Luther Pfahler Eisenhart

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one of the most widely used texts in its field this volume s clear well written exposition is enhanced by many examples and exercises some with hints and answers 1976 edition

central topics covered include curves surfaces geodesics intrinsic geometry and the alexandrov global angle comparision theorem many nontrivial and original problems some with hints and solutions standard theoretical material is combined with more difficult theorems and complex problems while maintaining a clear distinction between the two

levels

our first knowledge of differential geometry usually comes from the study of the curves and surfaces in i r 3 that arise in calculus here we learn about line and surface integrals divergence and curl and the various forms of stokes theorem if we are fortunate we may encounter curvature and such things as the serret frenet formulas with just the basic tools from multivariable calculus plus a little knowledge of linear algebra it is possible to begin a much richer and rewarding study of differential geometry which is what is presented in this book it starts with an introduction to the classical differential geometry of curves and surfaces in euclidean space then leads to an introduction to the riemannian geometry of more general manifolds including a look at einstein spaces an important bridge from the low dimensional theory to the general case is provided by a chapter on the intrinsic geometry of surfaces the first half of the book covering the geometry of curves and surfaces would be suitable for a one semester undergraduate course the local and global theories of curves and surfaces are presented including detailed discussions of surfaces of rotation ruled surfaces and minimal surfaces the second half of the book which could be used for a more advanced course begins with an introduction to differentiable manifolds riemannian structures and the curvature tensor two special topics are treated in detail spaces of constant curvature and einstein spaces the main goal of the book is to get started in a fairly elementary way then to guide the reader toward more sophisticated concepts and more advanced topics there are many examples and exercises to help along the way numerous figures help the reader visualize key concepts and examples especially in lower dimensions for the second edition a number of errors were corrected and some text and a number of figures have been added

this concise text on geometry with computer modeling presents some elementary methods for analytical modeling and visualization of curves and surfaces the author systematically examines such powerful tools as 2 d and 3 d animation of geometric images transformations shadows and colors and then further studies more complex problems in differential geometry well illustrated with more than 350 figures reproducible using maple programs in the book the work is devoted to three main areas curves surfaces and polyhedra pedagogical benefits can be found in the large number of maple programs some of which are analogous to c programs including those for splines and fractals to avoid tedious typing readers will be able to download many of the programs from the birkhauser web site aimed at a broad audience of students instructors of mathematics computer scientists and engineers who have knowledge of analytical geometry i e method of coordinates this text will be an excellent classroom resource or self study reference with over 100 stimulating exercises problems and solutions it geometry of curves and surfaces with maple will integrate traditional differential and non euclidean geometries with more current computer algebra systems in a practical and user friendly format

this volume covers local as well as global differential geometry of curves and surfaces

presenting theory while using mathematica in a complementary way modern differential geometry of curves and surfaces with mathematica the third edition of alfred gray s famous textbook covers how to define and compute standard geometric functions using mathematica for constructing new curves and surfaces from existing ones since gray s death authors abbena and salamon have stepped in to bring the book up to date while maintaining gray s intuitive approach they reorganized the material to provide a clearer

division between the text and the mathematica code and added a mathematica notebook as an appendix to each chapter they also address important new topics such as quaternions the approach of this book is at times more computational than is usual for a book on the subject for example brioshi s formula for the gaussian curvature in terms of the first fundamental form can be too complicated for use in hand calculations but mathematica handles it easily either through computations or through graphing curvature another part of mathematica that can be used effectively in differential geometry is its special function library where nonstandard spaces of constant curvature can be defined in terms of elliptic functions and then plotted using the techniques described in this book readers will understand concepts geometrically plotting curves and surfaces on a monitor and then printing them containing more than 300 illustrations the book demonstrates how to use mathematica to plot many interesting curves and surfaces including as many topics of the classical differential geometry and surfaces as possible it highlights important theorems with many examples it includes 300 miniprograms for computing and plotting various geometric objects alleviating the drudgery of computing things such as the curvature and torsion of a curve in space

through two previous editions the third edition of this popular and intriguing text takes both an analytical theoretical approach and a visual intuitive approach to the local and global properties of curves and surfaces requiring only multivariable calculus and linear algebra it develops students geometric intuition through interactive graphics applets applets are presented in maple workbook format which readers can access using the free maple player the book explains the reasons for various definitions while the interactive applets offer motivation for definitions allowing students to explore examples further and give a visual explanation of complicated theorems the ability to change parametric curves and parametrized surfaces in an applet lets students probe the concepts far beyond what static text permits investigative project ideas promote student research at users of the previous editions request this third edition offers a broader list of exercises more elementary exercises are added and some challenging problems are moved later in exercise sets to assure more graduated progress the authors also add hints to motivate students grappling with the more difficult exercises this student friendly and readable approach offers additional examples well placed to assist student comprehension in the presentation of the gauss bonnet theorem the authors provide more intuition and stepping stones to help students grasp phenomena behind it also the concept of a homeomorphism is new to students even though it is a key theoretical component of the definition of a regular surface providing more examples show students how to prove certain functions are homeomorphisms

differential geometry of curves and surfaces second edition takes both an analytical theoretical approach and a visual intuitive approach to the local and global properties of curves and surfaces requiring only multivariable calculus and linear algebra it develops students geometric intuition through interactive computer graphics applets suppor

modern differential geometry of curves and surfaces is the first advanced text reference to explain the mathematics of curves and surfaces and describe how to draw the pictures illustrating them using mathematica you learn not only the classical concepts ideas and methods of differential geometry but also how to define construct and compute standard functions you also learn how to create new curves and surfaces from old ones the book is superb for classroom use and self study material is presented clearly using over 150

exercises 175 mathematica programs and 225 geometric figures to thoroughly develop the topics presented a brief tutorial explaining how to use mathematica in differential geometry is included as well this text reference is excellent for all mathematicians scientists and engineers who use differential geometric methods and investigate geometrical structures

the second volume of the geometry of algebraic curves is devoted to the foundations of the theory of moduli of algebraic curves its authors are research mathematicians who have actively participated in the development of the geometry of algebraic curves the subject is an extremely fertile and active one both within the mathematical community and at the interface with the theoretical physics community the approach is unique in its blending of algebro geometric complex analytic and topological combinatorial methods it treats important topics such as teichmüller theory the cellular decomposition of moduli and its consequences and the witten conjecture the careful and comprehensive presentation of the material is of value to students who wish to learn the subject and to experts as a reference source the first volume appeared 1985 as vol 267 of the same series

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this book is about differential geometry of space curves and surfaces the formulation and presentation are largely based on a tensor calculus approach it can be used as part of a course on tensor calculus as well as a textbook or a reference for an intermediate level course on differential geometry of curves and surfaces the book is furnished with an index extensive sets of exercises and many cross references which are hyperlinked for the ebook users to facilitate linking related concepts and sections the book also contains a considerable number of 2d and 3d graphic illustrations to help the readers and users to visualize the ideas and understand the abstract concepts we also provided an introductory chapter where the main concepts and techniques needed to understand the offered materials of differential geometry are outlined to make the book fairly self contained and reduce the need for external references

this engrossing volume on curve and surface theories is the result of many years of experience the authors have had with teaching the most essential aspects of this subject the first half of the text is suitable for a university level course without the need for referencing other texts as it is completely self contained more advanced material in the second half of the book including appendices also serves more experienced students well furthermore this text is also suitable for a seminar for graduate students and for self study it is written in a robust style that gives the student the opportunity to continue his study at a higher level beyond what a course would usually offer further material is included for example closed curves enveloping curves curves of constant width the fundamental theorem of surface theory constant mean curvature surfaces and existence of curvature

line coordinates surface theory from the viewpoint of manifolds theory is explained and encompasses higher level material that is useful for the more advanced student this includes but is not limited to indices of umbilics properties of cycloids existence of conformal coordinates and characterizing conditions for singularities in summary this textbook succeeds in elucidating detailed explanations of fundamental material where the most essential basic notions stand out clearly but does not shy away from the more advanced topics needed for research in this field it provides a large collection of mathematically rich supporting topics thus it is an ideal first textbook in this field

excerpt from a treatise on the differential geometry of curves and surfaces this book is a development from courses which i have given in princeton for a number of years during this time i have come to feel that more would be accomplished by my students if they had an introductory treatise written in english and otherwise adapted to the use of men beginning their graduate work chapter i is devoted to the theory of twisted curves the method in general being that which is usually followed in discussions of this subject but in addition i have introduced the idea of moving axes and have derived the formulas pertaining thereto from the previously obtained frenet serret formulas in this way the student is made familiar with a method which is similar to that used by darboux in the first volume of his leçons and to that of cesaro in his geometria intrinseca this method is not only of great advantage in the treatment of certain topics and in the solution of problems but it is valuable in developing geometrical thinking the remainder of the book may be divided into three parts the first consisting of chapters ii vi deals with the geometry of a surface in the neighborhood of a point and the developments therefrom such as curves and systems of curves defined by differential equations to a large extent the method is that of gauss by which the properties of a surface are derived from the discussion of two quadratic differential forms however little or no space is given to the algebraic treatment of differential forms and their invariants in addition the method of moving axes as defined in the first chapter has been extended so as to be applicable to an investigation of the properties of surfaces and groups of surfaces the extent of the theory concerning ordinary points is so great that no attempt has been made to consider the exceptional problems for a discussion of such questions as the existence of integrals of differential equations and boundary conditions the reader must consult the treatises which deal particularly with these subjects in chapters vii and viii the theory previously developed is applied to several groups of surfaces such as the quadrics ruled surfaces minimal surfaces surfaces of constant total curvature and surfaces with plane and spherical lines of curvature about the publisher forgotten books publishes hundreds of thousands of rare and classic books find more at forgottenbooks com this book is a reproduction of an important historical work forgotten books uses state of the art technology to digitally reconstruct the work preserving the original format whilst repairing imperfections present in the aged copy in rare cases an imperfection in the original such as a blemish or missing page may be replicated in our edition we do however repair the vast majority of imperfections successfully any imperfections that remain are intentionally left to preserve the state of such historical works

this book is a posthumous publication of a classic by prof shoshichi kobayashi who taught at u c berkeley for 50 years recently translated by eriko shinozaki nagumo and makiko sumi tanaka there are five chapters 1 plane curves and space curves 2 local theory of surfaces in space 3 geometry of surfaces 4 gauss bonnet theorem and 5 minimal surfaces chapter 1 discusses local and global properties of planar curves and curves in space

chapter 2 deals with local properties of surfaces in 3 dimensional euclidean space two types of curvatures the gaussian curvature k and the mean curvature h are introduced the method of the moving frames a standard technique in differential geometry is introduced in the context of a surface in 3 dimensional euclidean space in chapter 3 the riemannian metric on a surface is introduced and properties determined only by the first fundamental form are discussed the concept of a geodesic introduced in chapter 2 is extensively discussed and several examples of geodesics are presented with illustrations chapter 4 starts with a simple and elegant proof of stokes theorem for a domain then the gauss bonnet theorem the major topic of this book is discussed at great length the theorem is a most beautiful and deep result in differential geometry it yields a relation between the integral of the gaussian curvature over a given oriented closed surface s and the topology of s in terms of its euler number s here again many illustrations are provided to facilitate the reader s understanding chapter 5 minimal surfaces requires some elementary knowledge of complex analysis however the author retained the introductory nature of this book and focused on detailed explanations of the examples of minimal surfaces given in chapter 2

this book which consists of 260 pages is about differential geometry of space curves and surfaces the formulation and presentation are largely based on a tensor calculus approach it can be used as part of a course on tensor calculus as well as a textbook or a reference for an intermediate level course on differential geometry of curves and surfaces the book is furnished with an index extensive sets of exercises and many cross references which are hyperlinked for the ebook users to facilitate linking related concepts and sections the book also contains a considerable number of 2d and 3d graphic illustrations to help the readers and users to visualize the ideas and understand the abstract concepts we also provided an introductory chapter where the main concepts and techniques needed to understand the offered materials of differential geometry are outlined to make the book fairly self contained and reduce the need for external references this is the balck and white version of the book

this is a new release of the original 1909 edition

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