

SYMBOLIC COMPUTATION

Product Data Interfaces in CAD/CAM Applications

Design, Implementation and Experiences

Edited by

J. Encarnação R. Schuster E. Vöge



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Product Data Interfaces In Cad Cam Applications Design Implementation And Experiences

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Product Data Interfaces In Cad Cam Applications Design Implementation And Experiences:

Product Data Interfaces in CAD/CAM Applications J. Encarnacao, R. Schuster, E. Vöge, 2012-12-06 Interest in product data exchange and interfaces in the CAD CAM area is steadily growing. The rapidly increasing graphics applications in engineering and science has led to a great variety of heterogeneous hardware and software products. This has become a major obstacle in the progress of systems integration. To improve this situation CAD CAM users have called for specification and implementation of standardized product data interfaces. These needs resulted in the definition of preliminary standards in this area. Since 1975 activities have been concentrated on developing standards for three major areas: computer graphics, sculptured surfaces and data exchange for engineering drawings. The Graphical Kernel System GKS has been accepted as an international standard for graphics programming in 1984. Y14 26M IGES was adopted as an American Standard in 1981 and the VDA Surface Interface VDAFS has been accepted by the German National Standardization Institute DIN NAM 96 4. Although considerable progress has been achieved, the complexity of the subject and the dynamics of the CAD CAM development still calls for more generality and compatibility of the interfaces. This has resulted in an international discussion on further improvements of the standards. The major goal of this book is to bring together the different views and experiences in industry and university in the area of Product Data Interfaces, thereby contributing to the ongoing work in improving the state of the art.

Product Data Interfaces in CAD/CAM Applications. Design, Implementation and Experiences.

Papers Presented in a Seminar, Technical University of Darmstadt 1984-1985. Arranged by Zentrum Für

Graphische Datenverarbeitung, ZGDV, 1986 *Modeling of Curves and Surfaces in CAD/CAM* Mamoru

Hosaka, 2012-12-06 1 Aims and Features of This Book The contents of this book were originally planned to be included in a book entitled Geometric Modeling and CAD CAM to be written by M Hosaka and F Kimura but since the draft of my part of the book was finished much earlier than Kimura's we decided to publish this part separately at first. In it geometrically oriented basic methods and tools used for analysis and synthesis of curves and surfaces used in CAD CAM various expressions and manipulations of free form surface patches and their connection interference as well as their quality evaluation are treated. They are important elements and procedures of geometric models. And construction and utilization of geometric models which include free form surfaces are explained in the application examples in which the methods and the techniques described in this book were used. In the succeeding book which Kimura is to write advanced topics such as data structures of geometric models, non manifold models, geometric inference as well as tolerance problems and product models, process planning and so on are to be included. Consequently the title of this book is changed to Modeling of Curves and Surfaces in CAD CAM. Features of this book are the following. Though there are excellent text books in the same field such as G Farin's Curves and Surfaces for CAD CAM I and C M

The International Journal, Advanced Manufacturing

Technology, 1990 *Applied Mechanics Reviews, 1985* **Computer Aided Design** Jose L. Encarnacao, Rolf

Lindner, Ernst G. Schlechtendahl, 2012-12-06 2 e This book describes principles methods and tools that are common to computer applications for design tasks CAD is considered in this book as a discipline that provides the required know how in computer hardware and software in systems analysis and in engineering methodology for specifying designing implementing introducing and using computer based systems for design purposes The first chapter gives an impression of the book as a whole and following chapters deal with the history and the components of CAD the process aspect of CAD CAD architecture graphical devices and systems CAD engineering methods CAD data transfer and application examples The flood of new developments in the field and the success of the first edition of this book have led the authors to prepare this completely revised updated and extended second edition Extensive new material is included on computer graphics implementation methodology and CAD data transfer the material on graphics standards is updated The book is aimed primarily at engineers who design or install CAD systems It is also intended for students who seek a broad fundamental background in CAD

CGM and CGI David B. Arnold, Peter R. Bono, 2012-12-06 We have written this book principally for users and practitioners of computer graphics In particular system designers independent software vendors graphics system implementers and application program developers need to understand the basic standards being put in place at the so called Virtual Device Interface and how they relate to other industry standards both formal and de facto Secondly the book has been targetted at technical managers and advanced students who need some understanding of the graphics standards and how they fit together along with a good overview of the Computer Graphics Interface CGI proposal and Computer Graphics Metafile CGM standard in particular Part I Chapters 1 2 and 3 Part II Chapters 10 and 11 Part III Chapters 15 16 and 17 and some of the Appendices will be of special interest Finally these same sections will interest users in government and industry who are responsible for selecting buying and installing commercial implementations of the standards The CGM is already a US Federal Information Processing Standard FIPS 126 and we expect the same status for the CGI when its development is completed and it receives formal approval by the standards making bodies

Modeling Design Objects and Processes

Takaaki Yagiu, 2012-12-06 A little more than a decade ago my colleagues and I faced the necessity for providing a database management system which might commonly serve a number of different types of computer aided design applications at different manufacturing enterprises We evaluated some wellknown cases of conceptual models and commercially available DBMSs and found none fuHy meeting the requirements Yet the analysis of them led us to the development of what we named the Logical Structure Management System LMS Syntactically the LMS language is somewhat similar to ALPHA by E F Codd The underlying conceptual model is entirely different from that of the relational model however LMS has been since put into practical use meanwhile a further effort in search of a sound theoretical base and a concrete linguistic framework for true product modeling together with comparative studies of various approaches has been made Here the term product modeling is used to signify the construction of informational models of design objects and design processes in which it must be

possible to include not a fixed set of attributes and relations such as geometry physical properties part of hierarchy etc but whatever aspects of design designers may desire to be included The purpose of this book is to present the major results of the said effort which are primarily of a theoretical or conceptual nature Following the introduction Chap **Computer Graphics Programming** Günter Enderle,Klaus Kansy,Günther Pfaff,2012-12-06 TO COMPUTER GRAPHICS BASED ON GKS Part I gives an introduction to basic concepts of computer graphics and to the principles and concepts of GKS The aims of this part are twofold to provide the beginner with an overview of the terminology and concepts of computer graphics based on GKS and to give the computer graphics expert an introduction to the GKS standard In the early chapters of this part the main areas of computer graphics the various classes of computer graphics users the interfaces of GKS and its underlying design concepts are discussed and important terms are defined The later chapters give an informal introduction to the main concepts of GKS and their interrelationships output attributes coordinate systems transformations input segments metafile state lists and error handling This introduction to the GKS framework will prepare the ground for the detailed description of 2D GKS functions in Part III and the 3D extensions to GKS in Part IV

1 WHAT IS COMPUTER GRAPHICS 1.1 Definition of Computer Graphics The Data Processing Vocabulary of the International Organization for Standardization ISO ISO 84 defines Computer Graphics as follows Methods and techniques for converting data to and from a graphic display via computer This definition refers to three basic components of any computer graphics system namely data computer and display

Engineering Databases Jose L. Encarnacao,Peter C. Lockemann,2012-12-06 Automation is nothing new to industry It has a long tradition on the factory floor where its constant objective has been to increase the productivity of manufacturing processes Only with the advent of computers could the focus of automation widen to include administrative and information handling tasks More recently automation has been extended to the more intellectual tasks of production planning and control material and resource planning engineering design and quality control New challenges arise in the form of flexible manufacturing assembly automation and automated floor vehicles to name just a few The sheer complexity of the problems as well as the state of the art has led scientists and engineers to concentrate on issues that could easily be isolated For example it was much simpler to build CAD systems whose sole objective was to ease the task of drawing rather than to worry at the same time about how the design results could be interfaced with the manufacturing or assembly processes It was less problematic to gather statistics from quality control and to print reports than to react immediately to first hints of irregularities by interfacing with the designers or manufacturing control or even better by automatically diagnosing the causes from the design and planning data A heavy though perhaps unavoidable price must today be paid whenever one tries to assemble these isolated solutions into a larger integrated system *Computer-Aided Design and Manufacturing* U. Rembold,R. Dillmann,2012-12-06 Manufacturing contributes to over 60 % of the gross national product of the highly industrialized nations of Europe The advances in mechanization and automation in manufacturing of international

competitors are seriously challenging the market position of the European countries in different areas. Thus it becomes necessary to increase significantly the productivity of European industry. This has prompted many governments to support the development of new automation resources. Good engineers are also needed to develop the required automation tools and to apply these to manufacturing. It is the purpose of this book to discuss new research results in manufacturing with engineers who face the challenge of building tomorrow's factories. Early automation efforts were centered around mechanical gear and cam technology and hardwired electrical control circuits. Because of the decreasing life cycle of most new products and the enormous model diversification, factories cannot be automated efficiently any more by these conventional technologies. With the digital computer, its fast calculation speed and large memory capacity, a new tool was created which can substantially improve the productivity of manufacturing processes. The computer can directly control production and quality assurance functions and adapt itself quickly to changing customer orders and new products.

Three-Dimensional Computer Vision
Yoshiaki Shirai, 2012-12-06

The purpose of computer vision is to make computers capable of understanding environments from visual information. Computer vision has been an interesting theme in the field of artificial intelligence. It involves a variety of intelligent information processing: both pattern processing for extraction of meaningful symbols from visual information and symbol processing for determining what the symbols represent. The term 3D computer vision is used if visual information has to be interpreted as three-dimensional scenes. 3D computer vision is more challenging because objects are seen from limited directions and some objects are occluded by others. In 1980 the author wrote a book *Computer Vision in Japanese* to introduce an interesting new approach to visual information processing developed so far. Since then computer vision has made remarkable progress: various rangefinders have become available, new methods have been developed to obtain 3D information, knowledge representation frameworks have been proposed, geometric models which were developed in CAD/CAM have been used for computer vision, and so on. The progress in computer vision technology has made it possible to understand more complex 3D scenes. There is an increasing demand for 3D computer vision. In factories, for example, automatic assembly and inspection can be realized with fewer constraints than conventional ones which employ two-dimensional computer vision.

Object-Oriented Graphics
Peter Wisskirchen, 2012-12-06

At present, object-oriented programming is emerging from the research laboratories and invading into the field of industrial applications. More and more products have been implemented with the aid of object-oriented programming techniques and tools, usually as extensions of traditional languages in hybrid development systems. Some of the better-known examples are OSF/Motif, News, Objective C on the NeXT computer, the C extension C and CLOS, an object-oriented extension of LISP. All of these developments incorporate interactive graphics. Effective object-oriented systems in combination with a graphics kernel does it mean that the field of computer graphics has now become merely an aspect of the object-oriented world? We do not think so. In spite of interesting individual developments, there are still no sound object-oriented graphics systems available. If it is

desired to develop a complex graphics application embedded in a window oriented system then it is still necessary to work with elementary tools. What is to be displayed and interactively modified inside a window must be specified with a set of graphics primitives at a low level or has to be written with a standardized graphics kernel system such as GKS or PHIGS. It is by kernels specified and implemented in a non object oriented style. With the terms GKS and PHIGS we enter the world of international graphics standards. GKS and PHIGS constitute systems not mere collections of graphics primitives.

Geometric Modeling Hans Hagen, Dieter Roller, 2012-12-06 This book is based on lectures presented at an international workshop on geometric modeling held at Hewlett Packard GmbH in Boblingen FRG in June 1990. International experts from academia and industry were selected to speak on the most interesting topics in geometric modeling. The resulting papers published in this volume give a state of the art survey of the relevant problems and issues. The following topics are discussed: Methods for constructing surfaces, four different solutions to the multidimensional problem of constructing an interpolant from surface data are provided. Surfaces in solid modeling: current results on the implementation of free form solids in three well established solid models are reviewed. Box splines and applications: an introduction to box spline methods for the representation of surfaces is given. Basic properties of box splines are derived and refinement and evaluation methods for box splines are presented in detail. Shape preserving properties: the construction of non rectangular box spline surfaces, applications to surface modeling and imbedding problems are discussed. Advanced computer graphics techniques for volume visualization: the steps to be executed in the visualization process of volume data are described and tools are discussed that assist in handling this data. Rational B splines: an introduction to the representation of curves and surfaces using rational B splines is given together with a critical evaluation of their potential for industrial application. Computer Integrated

Manufacturing Kiyoji Asai, I. Burhan Turksen, Gunduz Ulusoy, 2012-12-06 The current state of expectations is that Computer Integrated Manufacturing (CIM) will ultimately determine the industrial growth of world nations within the next few decades. Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), Flexible Manufacturing Systems (FMS), Robotics together with Knowledge and Information Based Systems (KIBS) and Communication Networks are expected to develop to a mature state to respond effectively to the managerial requirements of the factories of the future that are becoming highly integrated and complex. CIM represents a new production approach which will allow the factories to deliver a high variety of products at a low cost and with short production cycles. The new technologies for CIM are needed to develop manufacturing environments that are smarter, faster, close coupled, integrated, optimized and flexible. Sophistication and a high degree of specialization in materials science, artificial intelligence, communications technology and knowledge information science techniques are needed among others for the development of realizable and workable CIM systems that are capable of adjusting to volatile markets. CIM factories are to allow the production of a wide variety of similar products in small batches through standard but multi mission oriented designs that accommodate flexibility with specialized software. **Resources**

in Human-computer Interaction ,1990 **Computerworld** ,1985-04-22 For more than 40 years Computerworld has been the leading source of technology news and information for IT influencers worldwide Computerworld s award winning Web site Computerworld com twice monthly publication focused conference series and custom research form the hub of the world s largest global IT media network **Computerworld** ,2002-03-18 For more than 40 years Computerworld has been the leading source of technology news and information for IT influencers worldwide Computerworld s award winning Web site Computerworld com twice monthly publication focused conference series and custom research form the hub of the world s largest global IT media network Computerworld ,1990-01-29 For more than 40 years Computerworld has been the leading source of technology news and information for IT influencers worldwide Computerworld s award winning Web site Computerworld com twice monthly publication focused conference series and custom research form the hub of the world s largest global IT media network *InfoWorld* ,2002-03-18 InfoWorld is targeted to Senior IT professionals Content is segmented into Channels and Topic Centers InfoWorld also celebrates people companies and projects

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