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Titolo	Fundamentals of Geometry Construction [[electronic resource]] : The Math Behind the CAD // by Jorge Angeles, Damiano Pasini
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-43131-2
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (182 pages)
Collana	Springer Tracts in Mechanical Engineering, , 2195-9862
Disciplina	620.004250285
Soggetti	Engineering design Computer-aided engineering Algebraic geometry Engineering Design Computer-Aided Engineering (CAD, CAE) and Design Algebraic Geometry
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction to Geometry Construction -- 2D Objects -- 3D Objects -- Affine Transformations.
Sommario/riassunto	The textbook provides both beginner and experienced CAD users with the math behind the CAD. The geometry tools introduced here help the reader exploit commercial CAD software to its fullest extent. In fact, the book enables the reader to go beyond what CAD software packages offer in their menus. Chapter 1 summarizes the basic Linear and Vector Algebra pertinent to vectors in 3D, with some novelties: the 2D form of the vector product and the manipulation of "larger" matrices and vectors by means of block-partitioning of larger arrays. In chapter 2 the relations among points, lines and curves in the plane are revised accordingly; the difference between curves representing functions and their geometric counterparts is emphasized. Geometric objects in 3D, namely, points, planes, lines and surfaces are the subject of chapter 3; of the latter, only quadrics are studied, to keep the discussion at an elementary level, but the interested reader is guided to the literature on splines. The concept of affine transformations, at the core of CAD

software, is introduced in chapter 4, which includes applications of these transformations to the synthesis of curves and surfaces that would be extremely cumbersome to produce otherwise. The book, catering to various disciplines such as engineering, graphic design, animation and architecture, is kept discipline-independent, while including examples of interest to the various disciplines. Furthermore, the book can be an invaluable complement to undergraduate lectures on CAD.
