



Rational Algebraic Curves: A Computer Algebra Approach (Algorithms and Computation in Mathematics)

By J. Rafael Sendra, Franz Winkler, Sonia Pérez-Díaz

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The central problem considered in this introduction for graduate students is the determination of rational parametrizability of an algebraic curve and, in the positive case, the computation of a good rational parametrization. This amounts to determining the genus of a curve: its complete singularity structure, computing regular points of the curve in small coordinate fields, and constructing linear systems of curves with prescribed intersection multiplicities. The book discusses various optimality criteria for rational parametrizations of algebraic curves.

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Editorial Review

Review

From the reviews:

"The central problem in the book is the question whether a given algebraic curve is parametrizable and in case to compute a good rational parametrization. This involves an analysis of the singularities to compute the genus of the curve. ... There are several exercises at the end of each chapter. ... The book is a good basis for graduate students specializing in constructive algebraic curve geometry. It can be used for lectures and seminars in computer algebra based on Maple and CASA." (Gerhard Pfister, Zentralblatt MATH, Vol. 1129 (7), 2008)

"Algebraic geometry is a central field within mathematics which is often viewed as difficult for outsiders to enter. Recent years have seen many books which present various topics of algebraic geometry from a computational viewpoint, thereby making the subject more accessible. The book under review, RAC for short, is part of this positive trend. Its main focus is parametrizing rational plane algebraic curves. It is a graduate level text aimed at fairly wide readership, including for example readers interested primarily in computer-aided geometric design." (David P. Roberts, MathDL, May, 2008)

"The book Rational algebraic curves: a computer algebra approach is a very complete text on rational curves. ... The book is really an excellent reference on genus zero curves. It is very useful, mainly due to the computational material presented. It looks to be intended for graduate students, but anyone who wants to know how symbolic algebraic computation can clarify the study of algebraic curves will find it very helpful. A long list of references is provided at the end of the book." (Valmecir A. Bayer, Mathematical Reviews, Issue 2009 a)

Users Review

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