

1. Record Nr.	UNISA996466367803316
Autore	Gerhard Jürgen
Titolo	Modular Algorithms in Symbolic Summation and Symbolic Integration [[electronic resource] /] / by Jürgen Gerhard
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2005
ISBN	3-540-30137-2
Edizione	[1st ed. 2005.]
Descrizione fisica	1 online resource (XVI, 228 p.)
Collana	Lecture Notes in Computer Science, , 0302-9743 ; ; 3218
Classificazione	54.10
Disciplina	005.1
Soggetti	Algorithms Numerical analysis Computer science—Mathematics Computer mathematics Algorithm Analysis and Problem Complexity Numeric Computing Symbolic and Algebraic Manipulation Computational Science and Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references (p. [207]-216) and index.
Nota di contenuto	1. Introduction -- 2. Overview -- 3. Technical Prerequisites -- 4. Change of Basis -- 5. Modular Squarefree and Greatest Factorial Factorization -- 6. Modular Hermite Integration -- 7. Computing All Integral Roots of the Resultant -- 8. Modular Algorithms for the Gosper-Petkovšek Form -- 9. Polynomial Solutions of Linear First Order Equations -- 10. Modular Gosper and Almkvist & Zeilberger Algorithms.
Sommario/riassunto	This work brings together two streams in computer algebra: symbolic integration and summation on the one hand, and fast algorithmics on the other hand. In many algorithmically oriented areas of computer science, the analysis of algorithms—placed into the limelight by Don Knuth's talk at the 1970 ICM—provides a crystal-clear criterion for success. The researcher who designs an algorithm that is faster (asymptotically, in the worst case) than any previous method receives instant gratification: her result will be recognized as valuable. Alas, the downside is that

such results come along quite infrequently, despite our best efforts. An alternative evaluation method is to run a new algorithm on examples; this has its obvious problems, but is sometimes the best we can do. George Collins, one of the fathers of computer algebra and a great experimenter, wrote in 1969: "I think this demonstrates again that a simple analysis is often more revealing than a ream of empirical data (although both are important)." Within computer algebra, some areas have traditionally followed the former methodology, notably some parts of polynomial algebra and linear algebra. Other areas, such as polynomial system solving, have not yet been amenable to this approach. The usual "input size" parameters of computer science seem inadequate, and although some natural "geometric" parameters have been identified (solution dimension, regularity), not all (potential) major progress can be expressed in this framework. Symbolic integration and summation have been in a similar state.
