Links to Projects. Mathematical Software, icms2006—developer's meeting

This document is a collection of links and descriptions of projects related to icms2006—developer's meeting.

1. **ActiveMath**
   `http://www.activemath.org`
   License: Free and open-source for public educational institution
   ActiveMath is a learning environment for mathematics. It is a web-server based on java servlets which presents semantic OMDoc content to contemporary web-browsers with good quality.
   ActiveMath supports the learning experience by modelling the learners' competencies in a learner-model that is fed by tracking the reading and the interactive exercises. The interactive exercises can be rich and multiple-steps exercises and use computer-algebra-systems to evaluate a learner's input.
   The content items of ActiveMath are annotated with pedagogical and mathematical knowledge which allows the learner to obtain courses prepared on demand on given learning goals.
   Finally, the semantic OMDoc representation allows copy-and-paste of formulae and search for content items by text, annotations, or formulae.
2. **Aldor**
   `http://www.aldor.org`
   License: Other (BSD like)
   Aldor is a computer programming language, like Scheme, Java or C♯.
3. **Algorithms in real algebraic geometry (interactive book)**
   `http://perso.univ-rennes1.fr/marie-francoise.roy/bpr-posted1.html`
   License: GPL, others
   Algorithms in real algebraic geometry, by S. Basu, R. Pollack and M.-F. Roy, is a preliminary test version of an extension of the first edition published by Springer in 2003. This interactive book is based on texmacs, and live examples can be computed within the book through the SARAG maxima library by F. Caruso. The final version is due to be published by Springer.
4. **Arageli**
   `http://www.unn.ru/cs/arageli`
   License: Free for academic and noncommercial use
   Arageli is a C++ library for doing symbolic computations. It contains arbitrary precision integer and rational numbers, vectors, matrices, polynomials, modular arithmetic, algorithms for number factorization, linear and integer programming etc. Creating new mathematical structures from existing ones (also in other libraries) is easy. Arageli is used in Skeleton, Integizer, Prelinea projects.
5. **The Atlas of Lie Groups and Representations**
   `http://atlas.math.umd.edu/`
   License:

This is a project to make available information about representations of semi-simple Lie groups over real and p-adic fields. The software is in an early stage of development. Given a general connected complex group G, the software will compute among other things: parameters for the irreducible representations of G with regular integral infinitesimal character, Kazhdan-Lusztig polynomials for representations with regular integral infinitesimal character, ... etc. (Alfred G. Noel, University of Massachusetts Boston)

6. **BESSELINT**
   `http://www.cs.kuleuven.be/~nines/software/BESSELINT/`
   License:
   BESSELINT is a Matlab program to compute integrals of the form
   $$\int_0^\infty x^m \prod_{i=1}^{k} J_{\nu_i}(a_i x) dx$$
   with $J_{\nu_i}(x)$ the Bessel function of the first kind and (real) order ν_i. The parameter m is a real number such that $\sum_i \nu_i + m > -1$ and the coefficients a_i are strictly positive real numbers. In the near future this will be extended to compute the Laplace transform of a product of Bessel functions with possibly an additional factor of $1 + dx^2$ in the denominator (where d is a real number). (Joris Van Deun and Ronald Cools, K.U.Leuven)
7. **CoCoA4**
   `http://cocoa.dima.unige.it/`
   License: The executables are free
   The interactive system CoCoA-4.6 offers facilities for COmputations in COmmutative Algebra: Gröbner bases and related operations on ideals and modules, Hilbert functions, factorization of polynomials, and some exact linear algebra. CoCoA-4.6 is well-suited to teaching with its simple and mathematically natural command language, and an extensive online help facility. It is free and runs on most common platforms.
8. **CoCoALib**
   `http://cocoa.dima.unige.it/`
   License: GPL, others
   The C++ library CoCoALib offers data structures and operations for COmputations in COmmuative Algebra, most particularly Gröbner bases. Ease of use through a clean design is paramount (with some concessions to guarantee good performance). The library comes with full documentation and numerous example programs. A "beta" release is anticipated in late 2006. A server and interactive system are planned.
9. **Computer Algebra Animation**
   `http://www.math.kobe-u.ac.jp/caa`
   License: GPL
   An experimental project for algorithm animations and graphical or interactive user interface in computer algebra with Java and OpenXM.
10. **Coq**
    `http://coq.inria.fr`
    License: LGPL

Coq is a proof assistant.

11. **DEpthLAUNAY**
    http://www.dma.fi.upm.es/mabellanas/delonedepth/
    License: QPL
    DEpthLAUNAY is a C++ software developed with CGAL (http://www.CGAL.org) that computes the following geometric structures given a finite set of points in the plane: convex hull, convex layers, convex levels, Delaunay triangulation, Delaunay layers, Delaunay levels, and Voronoi diagram. Input points can be randomly generated, introduced interactively or simply aquired from image files. (Manuel Abellanas, Universidad Politecnica de Madrid)
12. **Epsilon**
    http://www-calfor.lip6.fr/~wang/epsilon
    License: Free for academic and noncommercial use
    Epsilon is a library of functions implemented in Maple and Java for polynomial elimination and triangular decomposition with (geometric) applications. It has 8 modules and contains more than 70 functions, with documentation, examples, and Maple worksheets. (Dongming Wang, Beihang University, China and UPMC-CNRS, France)
13. **GAP**
    http://www.gap-system.org
    License: GPL
    GAP is a system for computational discrete algebra, with particular emphasis on Computational Group Theory. GAP provides a programming language, a library of thousands of functions implementing algebraic algorithms written in the GAP language as well as large data libraries of algebraic objects.
14. **GAP package Alnuth**
    http://www.gap-system.org/Packages/alnuth.html
    License: GPL
    The Alnuth package provides various methods to compute with number fields which are given by a defining polynomial or by generators. Some of the methods provided in this package are written in GAP code. The other part of the methods is imported from the Computer Algebra System KANT.
15. **GCLC/WinGCLC**
    http://www.matf.bg.ac.yu/~janicic/gclc/
    License: Free for academic and noncommercial use
    GCLC/WinGCLC is a tool for visualizing and teaching geometry (and not only geometry), and for producing mathematical illustrations. It has support for a range of geometrical constructions and transformations, for symbolic expressions, parametric curves, program loops, for automated proving of geometrical conjectures, for exporting figures into LaTeX and bitmap format etc.
16. **GEX**
    http://www.mmrc.iss.ac.cn/gex/
    License:

Geometry Expert (GEX) is a software for dynamic geometric diagram drawing and automated geometry theorem proving and discovering. As a dynamic geometry software, GEX can be used to build dynamic visual models to assist manipulating and teaching various mathematical concepts. As an automated reasoning software, GEX can be used to prove and discover hundreds of non-trivial geometry theorems automatically Geometry Expert (GEX) is a software for dynamic geometric diagram drawing and automated geometry theorem proving and discovering. As a dynamic geometry software, GEX can be used to build dynamic visual models to assist manipulating and teaching various mathematical concepts. As an automated reasoning software, GEX can be used to prove and discover hundreds of non-trivial geometry theorems automatically

17. **Gfan**
    `http://home.imf.au.dk/ajensen/software/gfan/gfan.html`
    License:
    Gfan is a command line tool for enumerating the reduced Gröbner bases of a polynomial ideal in n variables. Hereby the Gröbner fan, an n-dimensional polyhedral complex, is computed. The tropical variety is a certain subcomplex which can also be computed by the software. Gfan uses Gmp and Cddlib for exact arithmetic and polyhedral computations, respectively.
18. **GiNaC**
    `http://www.ginac.de/`
    License: GPL
    GiNaC looks like a computer algebra system and a library, but the name GiNac is an iterated and recurseive abbreviation for GiNaC is Not a Computer Algebra System.
19. **GloptiPoly**
    `http://www.laas.fr/~henrion/software/gloptipoly`
    License: GPL, requires Matlab
    Matlab/SeDuMi add-on to build and solve convex LMI relaxations of the (generally non-convex) global optimization problem of minimizing a multivariable polynomial function subject to polynomial inequality, equality or integer constraints. (Didier Henrion and Jean-Bernard Lasserre, LAAS-CNRS, Toulouse, France)
20. **GiANT: Graphical Algebraic Number Theory**
    `http://giantsystem.sourceforge.net`
    License: GPL
    GiANT is a graphical interface for working with number fields. GiANT offers interactive diagrams, drag-and-drop functionality, and typeset formulas. GiANT is written in Java, but uses KASH to perform its computations.
21. **GMP: GNU Multiple Precision Arithmetic Library**
    `http://www.swox.com/gmp`
    License: LGPL
    GMP is a free library for arbitrary precision arithmetic, operating on signed integers, rational numbers, and floating point numbers. There is no practical limit to the precision except the ones implied by the available memory in the

machine GMP runs on. GMP has a rich set of functions, and the functions have a regular interface.

22. **HOL Light**
    `http://www.cl.cam.ac.uk/users/jrh13/hol-light/index.html`
    License: Custom BSD-like
    HOL Light is a theorem prover for classical higher-order logic. It is a rationalized re-implementation in Objective CAML (OCaml) of Mike Gordon's original HOL system. HOL Light generates proofs using very low-level primitive inference steps, but has numerous higher-level automated rules and a good library of pre-proved mathematics. (John Harrison.)
23. **jReality**
    `http://www.jreality.de`
    License:
    jReality is a library that allows for interactive manipulation of scientific data on a wide variety of platforms. It is written in Java. The output media include software only Java rendering, hardware accelerated OpenGL rendering stereo viewing, immersive virtual reality applications like in the PORTAL as well as file formats like PIXAR's renderman and SVG.
24. **jtem - Java Tools for Experimental Mathematics**
    `http://www.jtem.de`
    License: GPL
    jtem is a collection of mostly mathematical tools and algorithms implemented in Java. The libraries include a wide range from complex numbers to theta-functions, basic linear algebra and adaptive ODE solvers.
25. **Kan/sm1**
    `http://www.openxm.org`
    License: GPL, LGPL
    Kan/sm1 is originally developed for a computer algebra system for the ring of differential operators D. It is designed to be a backend system with a postscript-like small language. It is now used for a controller of OpenXM communications behind as well as a system for the D.
26. **KASH/KANT**
    `http://www.math.tu-berlin.de/~kant/kash.html`
    License: Other
    KASH/KANT is a computer algebra system specialized for algebraic number theory and its applications. It offers powerful functions for working with number fields, function fields, and local fields, as well as functions for solving Diophantine equations. The KANT shell KASH provides a programming language and an interactive help system.
27. **KENZO**
    `http://www-fourier.ujf-grenoble.fr/~sergerar/Kenzo`
    License:
    KENZO program is a Common Lisp Object System (CLOS) whose purpose is to compute various invariants in Algebraic Topology Framework (mainly homology groups). It implements and uses numerous algebraic structures as

dg-algebras, simplicial groups, morphisms, reductions, chain complexes, etc. It allows to compute homology groups of sophisticated spaces.

28. **KENZO package for A-infinity structures: ARAIA and CRAIC**
    `http://www.ehu.es/aba/investigation.htm`
    License:
    The package component we add to KENZO allows us to compute A-infinity-(co)algebra structures induced on the small module of a reduction if the big dg-module is a (co)algebra. (Ainhoa Berciano Alcaraz)
29. **KETpic**
    `http://www.kisarazu.ac.jp/~masa/math/E.html`
    License: Free for academic and noncomercial use
    KETpic is a macro package for Maple, which generates TEXsource codes for clear drawings. This supports users to draw every kind of complicated figure easily with the highest accuracy. The current version as well as the latest Maple runs on major OS: Windows, Mac and Linux. One can download the package, various samples, the command reference and a template of TEXsource from the indicated web site. (Masayoshi SEKIGUCHI)
30. **KNOPPIX/math**
    `http://www.knoppix-math.org`
    License:
    KNOPPIX/Math is a project to archive free mathematical software and free mathematical documents and provide them on KNOPPIX.
31. **libMpIeee**
    `http://www.mpieee.ua.ac.be`
    License:
    libMpIeee is a C++ software library for radix 2^n or 10^m mixed precision floating-point arithmetic, that is fully compliant with the IEEE 754/854 standards for floating-point arithmetic.
    This implies, among others, that the basic operations as well as the remainder and square root operations are exactly rounded, involving a relative error of at most 0.5 units in the last place (ULP) for round to nearest and 1 ULP for directed roundings. As required by the IEEE 754/854 standards, libMpIeee also provides denormal numbers, signed zeroes, signed infinities and NaN (Not-a-Number).
    Moreover, the conversions between decimal and binary are implemented to satisfy the same error bound as the basic operations. The elementary functions are computed with a relative error of at most 1 ULP for round to nearest and 2 ULP for directed roundings. More information on the implementation of these elementary functions can be found in the contribution "Towards reliable software for the evaluation of a class of special functions" by Annie Cuyt and Stefan Becuwe.
32. **Linbox**
    `http://www.linalg.org`
    License: LGPL
    LinBox is a C++ template library for exact, high-performance linear algebra computation.

33. **LiveTeXmacs**
    ftp://math.cgu.edu.tw/pub/KNOPPIX
    License: GPL
    LiveTeXmacs is a knoppix-based live distribution for mathematical education. Many mathematical software systems (Axiom, Gnuplot, Maxima, Octave, R etc) are integrated in this distribution. In addition to this, it also includes free documentations for calculus, mathematical (2D/3D) visualization and stochastic processes etc, which are made by TeXmacs.
    Web applications, such as PHP, Python, Apache, SQL and Zope etc, are also supported. Especially, the Web Mathematics Interactive is pre-installed as the web application for Maxima, Gnuplot and more. Pre-installed development environment gives a scalability of the distribution even with very few knowledge about linux.
34. **Logiweb**
    http://logiweb.eu/
    License: GPL
    Logiweb is an infrastructure for publication and archival of machine verified mathematics. It allows users to publish definitions, theories, lemmas, proofs, and computer programs. The system allows proofs to reference previously published material across the Internet so that users in different sites may build on top of the work of each other. (Klaus Grue, University of Copenhagen)
35. **Macaulay2**
    http://www.math.uiuc.edu/Macaulay2
    License: GPL
    Macaulay2 is a software system to support researches in algebraic geometry and commutative algebra.
36. **Magma**
    http://magma.maths.usyd.edu.au
    License: Commercial
    Magma is a large, well-supported software package designed to solve computationally hard problems in algebra, number theory, geometry and combinatorics. It provides a mathematically rigorous environment for computing with algebraic, number-theoretic, combinatoric and geometric objects.
37. **Maple**
    http://www.maplesoft.com
    License: Commercial
    Maple is a tool for solving mathematical problems and creating interactive technical applications.
38. **Mathematica**
    http://www.wolfram.com
    License: Commercial
    Mathematica is a system for doing mathematics. The cite also provides http://functions.wolfram.com (a data base for special functions) and http://library.wolfram.com (a collection of notebooks).

39. **math-polyglot**
    http://www.math.kobe-u.ac.jp/math-polyglot
    License: GFL, BSD
    This project is started for editing icms2006 — developer's meeting DVD's. It provides sample codes for mathematical software systems in our DVD's. Samples are grouped with mathematical problems. This project also provides inputs for testing and checking if the installation is properly done to the knoppix-math. The project will be moved to a MediaWiki of knoppix-math after the icms2006. (Nobuki Takayama, Kobe University)
40. **MATLAB**
    http://www.mathworks.com
    License: Commercial
    Matlab is a language for technical computing and an interactive environment.
41. **Mizar**
    http://www.mizar.org
    License:
    Mizar project provides a database for mathematics (7000 definitions, 40000 theorems) as well as the mizar system.
42. **MPFR library for multiple precision floating point computation**
    http://www.mpfr.org
    License: LGPL
    The MPFR library is a C library for multiple-precision floating-point computations with exact rounding (also called correct rounding). It is based on the GMP multiple-precision library. The main goal of MPFR is to provide a library for multiple-precision floating-point computation which is both efficient and has a well-defined semantics.
43. **Multi Parametric Toolbox**
    http://control.ee.ethz.ch/~mpt/
    License: GPL
    The Multi-Parametric Toolbox (MPT) is a free Matlab toolbox for design, analysis and deployment of optimal controllers for constrained linear, nonlinear and hybrid systems. Efficiency of the code is guaranteed by the extensive library of algorithms from the field of computational geometry and multi-parametric optimization.
    The toolbox offers a broad spectrum of algorithms compiled in a user friendly and accessible format: starting from different performance objectives (linear, quadratic, minimum time) to the handling of systems with persistent additive and polytopic uncertainties. Users can add custom constraints, such as polytopic, contraction, or collision avoidance constraints, or create custom objective functions. Resulting optimal control laws can either be embedded into your applications in a form of a C code, or deployed to target platforms using Real Time Workshop.
44. **MuPad**
    http://www.mupad.de
    License: Commercial

MuPad is a mathematical expert system mainly symbolic/algebraic computation and numerical calculations with arbitrary accuracy.

45. **MuPAD-Combinat**
    `http://mupad-combinat.sourceforge.net`
    License:
    MuPAD-Combinat is an open-source algebraic combinatorics package for the computer algebra system MuPAD `http://www.mupad.de`. Its main purpose is to provide an extensible toolbox for computer exploration, and foster code sharing between researchers in this area. The core of the package is integrated in the official library of MuPAD since version 2.5.0.
46. **NZMATH**
    `http://tnt.math.metro-u.ac.jp/nzmath/`
    License: BSD
    NZMATH is a number theory oriented calculation system based on the scripting language Python. It is currently providing the Python library package named nzmath, which contains modules for primality testings, factorization, polynomial, matrix, elliptic curves, etc. (MATSUI Tetsushi, Tokyo Metropolitan University)
47. **Octave**
    `http://www.octave.org`
    License: GPL
    GNU Octave is a high-level language, primarily intended for numerical computations.
48. **Oorange**
    `http://www.oorange.de`
    License: GPL
    Oorange is a development environment that was initially designed for experimental mathematics but has become a general Java programming tool. It's main feature is its interactive programming, also known as rapid prototyping. It also fits into component oriented development.
49. **OpenMath**
    `http://www.openmath.org`
    License:
    OpenMath is an emerging standard for representing mathematical objects with their semantics, allowing them to be exchanged between computer programs, stored in databases, or published on the worldwide web.
50. **OpenXM**
    `http://www.openxm.org`
    License: BSD, GPL, FFL
    OpenXM is an infrastructure for communications among mathematical software systems. The project has proposed protocols OpenXM RFC 100, 101, 102, 103, 104. The OpenXM package is a collection of software systems supporting OpenXM protocols. The current distribution contains asir, sm1, Macaulay 2, PHCpack, gnuplot, polymake, cdd, ntl, pari, supports for Maple, Mathematica, OpenMath, and some small sized systems.

51. **webOrigami**
    http://weborigami.score.cs.tsukuba.ac.jp/webOrigami/jsp/
    License:
    Origami assistant on a web.
52. **ORMS**
    http://orms.mfo.de
    License:
    The Oberwolfach References on Mathematical Software (ORMS) project is a web-interfaced collection of information and links on mathematical software, see http://orms.mfo.de.
    It presents carefully selected software, including general purpose software systems, teaching software, and more specialized packages up to specific implementations on particular mathematical research problems. Each software package is presented by a short description of its mathematical features, information on basic properties like license type and distribution media are provided, and links to syntax examples, possible demo versions and manuals are given. The ORMS offers a choice of retrieval functions, for example, searching via browsing through a mathematical classification scheme, a structured key word search, and a full text search in the description of the software systems.
    The success of this project will rely on the co-operation of experienced users from different areas of mathematical software. We therefore encourage discussion (at orms@mfo.de) and we will be grateful to contributions (at contrib-orms@mfo.de).
53. **Pari-GP**
    http://pari.math.u-bordeaux.fr
    License: GPL
    The PARI system is a package which is capable of doing formal computations on recursive types at high speed. It is primarily aimed at number theorists, but is useful to anyone whose primary need is speed. The functionality of PARI is available through a sophisticated programmable calculator, named GP, which also implements many features of high level languages.
54. **PHCpack**
    http://www.math.uic.edu/~jan/download.html
    License: GPL, free software
    PHCpack is a package for Polynomial Homotopy Continuation. Version 1 was archived by ACM TOMS as Algorithm 795. Currently it is a platform for "numerical algebraic geometry" providing algorithms developed jointly with Andrew Sommese and Charles Wampler. Contributions made by Anton Leykin, Yusong Wang, Ailing Zhao, and Yan Zhuang. (Jan Verschelde, UIC.)
55. **PHCmaple**
    http://www.math.uic.edu/~leykin/PHCmaple
    License: GPL
    This Maple package provides a convenient interface to the functions of PHCpack, a collection of numerical algorithms for solving polynomial systems using polynomial homotopy continuation.

56. **polymake**
    http://www.math.tu-berlin.de/polymake/
    License: GPL
    polymake is a modular, object-oriented tool for experimental discrete geometry. The main applications are dealing with polytopes and polyhedra, polyhedral surfaces, and finite simplicial complexes. It offers an unified interface to a wide variety of free software packages from the field, especially for visualisation. It can be used interactively as well as driven by perl scripts or C++ programs. (Ewgenij Gawrilow, Technische Universität Berlin, and Michael Joswig, Technische Universität Darmstadt)
57. **ProofPower**
    http://www.lemma-one.com/ProofPower/index/index.html
    License: GPL
    ProofPower is a tool for specification and proof in Higher-Order Logic (HOL) and in the Z Notation, based on a re-engineering of Mike Gordon's original HOL system. Like other systems in the LCF tradition, it uses a powerful strongly-typed functional programming language (Standard ML) to ensure logical correctness by reducing all proof steps to primitive inferences rules and to provide a rich and extensible repertoire of automated derived inference rules and decision procedures. Its is used commercially for the verification of safety-critical avionics control systems. Libraries of discrete and continuous mathematics have been and continue to be developed to support these applications and for their intrinsic interest.
58. **QaoS - Querying Algebraic Objects System**
    http://www.math.tu-berlin.de/~kant/database.html
    License: BSD like
    QaoS (Querying Algebraic Objects System) is a stand-alone solution for access to the KANT databases of algebraic and transcendental field extensions. QaoS transfers information via the hypertext transport protocol (HTTP). It can be accessed through a web interface and various computer algebra systems (GAP 4, KASH 2.56, KASH 3, Maple, and SAGE).
59. **R**
    http://www.r-project.org
    License: GPL
    R is a system for statistical computing and graphics.
60. **Risa/Asir**
    http://www.math.kobe-u.ac.jp/Asir
    License: Other(FFL, BSD)
    Risa/Asir is a computer algebra system. Here is a list of some commands: fctr (factorization), gr, nd_gr_trace (Groebner basis), primadec (primary ideal decomposition), af (factorization over algebraic numbers), ifplot (plot of implicit functions), ox_* (OpenXM communication functions), generic_bfct (b-function).
61. **SAGE: Software for Algebra and Geometry Experimentation**
    http://sage.scipy.org/sage
    License: GPL

The Python-based computer algebra system SAGE comes with the systems GAP, PARI, Singular. and provides interfaces KASH/KANT, Gnuplot, Octave, Magma, Mathematica, and Maple. It includes functions for basic algebraic geometry, elliptic curves over the rational numbers, modular forms, linear algebra and Z-modules, and noncommutative algebra.

62. **SARAG**
`http://perso.univ-rennes1.fr/marie-francoise.roy/bpr-posted1.html`
License: GPL
SARAG(Some Algorithms in Real Algebraic Geometry) is a software library that implements some algorithms in real algebraic geometry written in the free computer algebra system Maxima. SARAG has two main applications: extending the capabilities of Maxima and being part of the interactive version of the book "Algorithms in Real Algebraic Geometry" by S. Basu, R. Pollack, M.-F. Roy, which can be now freely downloaded.
63. **sgpviz**
`http://www.gap-system.org/Packages/sgpviz.html`
License:
The GAP package *sgpviz* is a package designed to visualize finite semigroups through their $\mathcal{D}$-classes or Cayley graphs, as well as to make friendlier the usage of GAP when dealing with finite semigroups.
64. **Singular**
`http://www.singular.uni-kl.de`
License: GPL, others
SINGULAR is a Computer Algebra System for polynomial computations with emphasis on the special needs of commutative algebra, algebraic geometry, and singularity theory. SINGULAR's main computational objects are ideals and modules over a large variety of rings, including local rings and noncommutative G-algebras (in the subsystem PLURAL). Large variety of algorithms, including those based on Gröbner and standard bases, have powerful implementations in SINGULAR.
65. **Strong Noether Position**
`http://www-calfor.lip6.fr/~hashemi/Noether`
License:
We introduce the notion of a homogeneous ideal in Strong Noether Position (SNP); a new definition for the notion of generic coordinates for some problems. This definition is simple to check, because one can test it for the initial ideal of the ideal with respect to the degree reverse lexicographic ordering. It is explicit, because we can provide an algorithm to decide whether a monomial ideal is in SNP or not. We propose some methods to compute the Castelnuovo-Mumford regularity of an ideal which one of them is more efficient than that of [Bermejo-Gimenez, 2005]. (Amir Hashemi)
66. **Surface Evolver**
`http://www.susqu.edu/facstaff/b/brakke/evolver/`
License:
The Surface Evolver is an interactive program for the study of surfaces shaped by surface tension and other energies, and subject to various con-

straints. A surface is implemented as a simplicial complex (a union of triangles) and is evolved toward minimal energy by a gradient descent method. The Evolver can handle arbitrary topology. Graphical output is available in several file formats.

67. **surfex**
    `http://www.surfex.algebraicsurface.net`
    License: Freeware

    surfex is a tool for interactive high quality real algebraic surface visualization. It is mainly an intuitive interface which combines the strenghts of several visualization tools; at the moment, these include surf, javaview, and convert.

    One of the main features of surfex is the interactive visualization of families of algebraic varieties: The user can introduce parameters into some implicit equations and then play with these parameters via sliders. E.g., this allows one to visualize deformations of surface singularities.

    All the pictures can easily be exported, either as an animation which shows the whole deformation process, or as a snapshot of a single variety. The user can specify the quality of the output which can range from very high quality for printed publications to lower quality for websites.

    We also implemented a library for the computer algebra system Singular, called surfex.lib, which enhances the quality of the visualization of surfex using pre-computation of the singular locus etc.

68. **SYNAPS**
    `http://www-sop.inria.fr/galaad/logiciels/synaps`
    License: GPL

    SYNAPS (SYmbolic Numeric APplications) is a C++ library devoted to symbolic and numeric computations. It provides data-structures for the manipulation of basic algebraic objects, such as vectors, matrices (dense, sparse, structured), univariate and multivariate polynomials. It contains solvers for univariate and multivariate polynomials, including generalized normal form or subdivision solvers, tools for the manipulatiion of algebraic numbers, for the construction of resultants, ...

69. **TC**
    `ftp://tnt.math.metro-u.ac.jp/pub/math-packs/tc/`
    License: GPL

    TC (Tiny C) is an interpreter of multi-precision C language suitable for floating-point calculations of several thousands digits which often appear in computational algebraic number theory. Furthermore TC ver.4, which is equipped with PARI library and turned TCP ver.1, provides frequently used PARI library functions by C-like functions which are easy to call from TC. (Takashi Fukuda)

70. **TeXmacs**
    `http://www.texmacs.org`
    License: GPL

    GNU TeXmacs is a free wysiwyw editing platform for scientists.

71. **Virtual Math Laboratories**
`http://www.jreality.de`
License: GPL
Virtual Math Labs is a collection of educational and scientific java web start applications. The library of mathematical experiments shows topics from varies areas, e.g. dynamical systems, polyhedral surfaces, calculus, and curves and surfaces.

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