

# Commutative Algebra

## General Commutative Ring Theory

*13Axx excluding 13A50*

- [1] David F. Anderson, Andrea Frazier, Aaron Lauve, and Philip S. Livingston. The zero-divisor graph of a commutative ring: II. In *Ideal Theoretic Methods in Commutative Algebra (Columbia, MO, 1999)*, volume 220 of *Lecture Notes in Pure and Appl. Math.*, pages 61–72. Dekker, New York, 2001.
- [2] David F. Anderson and Philip S. Livingston. The zero-divisor graph of a commutative ring. *J. Algebra*, 217(2):434–447, 1999.
- [3] David A. Cox, John Little, and Donal O’Shea. *Using Algebraic Geometry*, volume 185 of *Graduate Texts in Mathematics*. Springer, New York, second edition, 2005.
- [4] Miles Reid. Graded rings and birational geometry. *Preprint*, 72 pages, 2000.
- [5] R. J. Shank. Classical covariants and modular invariants. In *Invariant Theory in all Characteristics*, volume 35 of *CRM Proc. Lecture Notes*, pages 241–249. Amer. Math. Soc., Providence, RI, 2004.

# Commutative Algebra

## Invariant Theory

13A50

- [1] Thomas Bayer. An algorithm for computing invariants of linear actions of algebraic groups up to a given degree. *J. Symbolic Comput.*, 35(4):441–449, 2003.
- [2] Dave Benson. Dickson invariants, regularity and computation in group cohomology. *Illinois J. Math.*, 48(1):171–197, 2004.
- [3] Mireille Boutin and Gregor Kemper. On reconstructing  $n$ -point configurations from the distribution of distances or areas. *Adv. in Appl. Math.*, 32(4):709–735, 2004.
- [4] Mireille Boutin and Gregor Kemper. On reconstructing configurations of points in  $P^2$  from a joint distribution of invariants. *Appl. Algebra Engrg. Comm. Comput.*, 15(6):361–391, 2005.
- [5] H. E. A. Campbell, B. Fodden, and David L. Wehlau. Invariants of the diagonal  $C_p$ -action on  $V_3$ . *J. Algebra*, 303(2):501–513, 2006.
- [6] H. E. A. Campbell, I. P. Hughes, G. Kemper, R. J. Shank, and D. L. Wehlau. Depth of modular invariant rings. *Transform. Groups*, 5(1):21–34, 2000.
- [7] Chris Charnes, Martin Rötteler, and Thomas Beth. On homogeneous bent functions. In *Applied Algebra, Algebraic Algorithms and Error-correcting Codes (Melbourne, 2001)*, volume 2227 of *Lecture Notes in Comput. Sci.*, pages 249–259. Springer, Berlin, 2001.
- [8] Chris Charnes, Martin Rötteler, and Thomas Beth. Homogeneous bent functions, invariants, and designs. *Des. Codes Cryptogr.*, 26(1-3):139–154, 2002.
- [9] Wolfram Decker and Theo de Jong. Gröbner bases and invariant theory. In *Gröbner bases and applications (Linz, 1998)*, volume 251 of *London Math. Soc. Lecture Note Ser.*, pages 61–89. Cambridge Univ. Press, Cambridge, 1998.

- [10] Harm Derksen. Computation of invariants for reductive groups. *Adv. Math.*, 141(2):366–384, 1999.
- [11] Harm Derksen and Gregor Kemper. *Computational Invariant Theory. Invariant Theory and Algebraic Transformation Groups, I*. Springer-Verlag, Berlin, 2002.
- [12] Jan Draisma, Gregor Kemper, and David Wehlau. Polarization of separating invariants. *Preprint*, 17 pages, 2005.
- [13] Tom Fisher. The Hessian of a genus one curve. [arXiv:math.NT/0610403](https://arxiv.org/abs/math.NT/0610403), 28 pages, 2006.
- [14] Tom Fisher. The invariants of a genus one curve. [arXiv:math.NT/0610318](https://arxiv.org/abs/math.NT/0610318), 37 pages, 2006.
- [15] P. Fleischmann, M. Sezer, R. J. Shank, and C. F. Woodcock. The Noether numbers for cyclic groups of prime order. *Adv. Math.*, 207(1):149–155, 2006.
- [16] Karin Gatermann and Frédéric Guyard. Gröbner bases, invariant theory and equivariant dynamics. *J. Symbolic Comput.*, 28(1-2):275–302, 1999.
- [17] Karin Gatermann and Pablo A. Parrilo. Symmetry groups, semidefinite programs, and sums of squares. *J. Pure Appl. Algebra*, 192(1-3):95–128, 2004.
- [18] M. Grassl, T. Beth, and M. Rötteler. Computing local invariants of quantum-bit systems. *Phys. Rev. A.*, 58(3):833–1839, 1998.
- [19] Ian Hughes and Gregor Kemper. Symmetric powers of modular representations, Hilbert series and degree bounds. *Comm. Algebra*, 28(4):2059–2088, 2000.
- [20] Ian Hughes and Gregor Kemper. Symmetric powers of modular representations for groups with a Sylow subgroup of prime order. *J. Algebra*, 241(2):759–788, 2001.
- [21] D. B. Karagueuzian and P. Symonds. The module structure of a group action on a polynomial ring: Examples, generalizations, and applications. In *Invariant Theory in all Characteristics*, volume 35 of *CRM*

- Proc. Lecture Notes*, pages 139–158. Amer. Math. Soc., Providence, RI, 2004.
- [22] Gregor Kemper. Calculating invariants of modular reflection groups with Magma. *Preprint*, 5 pages, 1997.
  - [23] Gregor Kemper. Computational invariant theory. In *The Curves Seminar at Queen's. Vol. XII (Kingston, ON, 1998)*, volume 114 of *Queen's Papers in Pure and Appl. Math.*, pages 5–26. Queen's Univ., Kingston, ON, 1998.
  - [24] Gregor Kemper. The depth of invariant rings and cohomology. *J. Algebra*, 245(2):463–531, 2001.
  - [25] Gregor Kemper. Computing invariants of reductive groups in positive characteristic. *Transform. Groups*, 8(2):159–176, 2003.
  - [26] Gregor Kemper, Elmar Körding, Gunter Malle, B. Heinrich Matzat, Denis Vogel, and Gabor Wiese. A database of invariant rings. *Experiment. Math.*, 10(4):537–542, 2001.
  - [27] Gregor Kemper and Gunter Malle. Invariant fields of finite irreducible reflection groups. *Math. Ann.*, 315(4):569–586, 1999.
  - [28] Gregor Kemper and Allan Steel. Some algorithms in invariant theory of finite groups. In *Computational Methods for Representations of Groups and Algebras (Essen, 1997)*, volume 173 of *Progr. Math.*, pages 267–285. Birkhäuser, Basel, 1999.
  - [29] Simon King. Fast computation of secondary invariants. [arXiv:math/0701270](https://arxiv.org/abs/math/0701270), 13 pages, 2007.
  - [30] Simon King. Minimal generating sets of non-modular invariant rings of finite groups. [arXiv:math/0703035](https://arxiv.org/abs/math/0703035), 14 pages, 2007.
  - [31] P. H. Kropholler, S. Mohseni Rajaei, and J. Segal. Invariant rings of orthogonal groups over  $\mathbf{F}_2$ . *Glasg. Math. J.*, 47(1):7–54, 2005.
  - [32] Martin Lorenz. *Multiplicative Invariant Theory*, volume 135 of *Encyclopaedia of Mathematical Sciences*. Springer-Verlag, Berlin, 2005.

- [33] Jürgen Müller and Christophe Ritzenthaler. On the ring of invariants of ordinary quartic curves in characteristic 2. *J. Algebra*, 303(2):530–542, 2006.
- [34] Gabriele Nebe, Eric M. Rains, and Neil J. A. Sloane. *Self-dual Codes and Invariant Theory*, volume 17 of *Algorithms and Computation in Mathematics*. Springer-Verlag, Berlin, 2006.
- [35] W. Plesken and D. Robertz. Constructing invariants for finite groups. *Experiment. Math.*, 14(2):175–188, 2005.
- [36] Marc Stetson Renault. *Computing Generators for Rings of Multiplicative Invariants*. PhD Thesis, Temple University, 2002.
- [37] Müfit Sezer and R. James Shank. On the coinvariants of modular representations of cyclic groups of prime order. *J. Pure Appl. Algebra*, 205(1):210–225, 2006.
- [38] R. J. Shank. Classical covariants and modular invariants. In *Invariant Theory in all Characteristics*, volume 35 of *CRM Proc. Lecture Notes*, pages 241–249. Amer. Math. Soc., Providence, RI, 2004.
- [39] R. James Shank and David L. Wehlau. On the depth of the invariants of the symmetric power representations of  $SL_2(\mathbf{F}_p)$ . *J. Algebra*, 218(2):642–653, 1999.
- [40] R. James Shank and David L. Wehlau. Computing modular invariants of  $p$ -groups. *J. Symbolic Comput.*, 34(5):307–327, 2002.
- [41] R. James Shank and David L. Wehlau. Noether numbers for subrepresentations of cyclic groups of prime order. *Bull. London Math. Soc.*, 34(4):438–450, 2002.
- [42] R. James Shank and David L. Wehlau. Decomposing symmetric powers of certain modular representations of cyclic groups. [arXiv:math.AC/0509904](https://arxiv.org/abs/math/0509904) v2, 14 pages, 2005.
- [43] Nicolas M. Thiéry. Algebraic invariants of graphs; A study based on computer exploration. *SIGSAM Bulletin*, 34(3):9–20, 2000.

# Commutative Algebra

## Ring Extensions

13Bxx

- [1] Robert S. Coulter, George Havas, and Marie Henderson. On decomposition of sub-linearised polynomials. *J. Aust. Math. Soc.*, 76(3):317–328, 2004.
- [2] Hans-Christian Graf von Bothmer, Oliver Labs, Josef Schicho, and Christiaan van de Woestijne. The Casas-Alvero conjecture for infinitely many degrees. [arXiv:math.AC/0605090](https://arxiv.org/abs/math/0605090), page 6, 2006.

# Commutative Algebra

## Modules and Ideals

13Cxx

- [1] Jon F. Carlson. Cohomology, computations, and commutative algebra. *Notices Amer. Math. Soc.*, 52(4):426–434, 2005.
- [2] Gregor Kemper. The depth of invariant rings and cohomology. *J. Algebra*, 245(2):463–531, 2001.
- [3] R. James Shank and David L. Wehlau. On the depth of the invariants of the symmetric power representations of  $\mathrm{SL}_2(\mathbf{F}_p)$ . *J. Algebra*, 218(2):642–653, 1999.

# Commutative Algebra

## Homological Methods

13Dxx

- [1] Selma Altınok, Gavin Brown, and Miles Reid. Fano 3-folds,  $K3$  surfaces and graded rings. In *Topology and Geometry: Commemorating SISTAG*, volume 314 of *Contemp. Math.*, pages 25–53. Amer. Math. Soc., Providence, RI, 2002.
- [2] Gavin Brown. Graded rings and special  $K3$  surfaces. In *Discovering Mathematics with Magma*, volume 19 of *Algorithms Comput. Math.*, pages 137–159. Springer, Berlin, 2006.
- [3] Laurent Busé and Jean-Pierre Jouanolou. On the closed image of a rational map and the implicitization problem. *J. Algebra*, 265(1):312–357, 2003.
- [4] Jeffrey B. Farr and Shuhong Gao. Computing Gröbner bases for vanishing ideals of finite sets of points. In *Applied Algebra, Algebraic Algorithms and Error-correcting Codes*, volume 3857 of *Lecture Notes in Comput. Sci.*, pages 118–127. Springer, Berlin, 2006.
- [5] Ian Hughes and Gregor Kemper. Symmetric powers of modular representations, Hilbert series and degree bounds. *Comm. Algebra*, 28(4):2059–2088, 2000.
- [6] Ian Hughes and Gregor Kemper. Symmetric powers of modular representations for groups with a Sylow subgroup of prime order. *J. Algebra*, 241(2):759–788, 2001.
- [7] Mikael Johansson. Computation of Poincaré-Betti series for monomial rings. *Rend. Istit. Mat. Univ. Trieste*, 37(1-2):85–94 (2006), 2005.
- [8] Gregor Kemper. Computational invariant theory. In *The Curves Seminar at Queen's. Vol. XII (Kingston, ON, 1998)*, volume 114 of *Queen's Papers in Pure and Appl. Math.*, pages 5–26. Queen's Univ., Kingston, ON, 1998.

- [9] Gregor Kemper and Allan Steel. Some algorithms in invariant theory of finite groups. In *Computational Methods for Representations of Groups and Algebras (Essen, 1997)*, volume 173 of *Progr. Math.*, pages 267–285. Birkhäuser, Basel, 1999.

# Commutative Algebra

## Arithmetic Rings

13Fxx

- [1] Gregor Kemper. The calculation of radical ideals in positive characteristic. *J. Symbolic Comput.*, 34(3):229–238, 2002.
- [2] Martin Lorenz. *Multiplicative Invariant Theory*, volume 135 of *Encyclopaedia of Mathematical Sciences*. Springer-Verlag, Berlin, 2005.
- [3] Graham H. Norton and Ana Sălăgean. Strong Gröbner bases for polynomials over a principal ideal ring. *Bull. Austral. Math. Soc.*, 64(3):505–528, 2001.
- [4] Arno van den Essen, Andrzej Nowicki, and Andrzej Tyc. Generalizations of a lemma of Freudenburg. *J. Pure Appl. Algebra*, 177(1):43–47, 2003.

# Commutative Algebra

## Computational Methods

13-04

- [1] I. Abdeljaouad-Tej, S. Orange, G. Renault, and A. Valibouze. Computation of the decomposition group of a triangular ideal. *Appl. Algebra Engrg. Comm. Comput.*, 15(3-4):279–294, 2004.
- [2] Fatima Abu Salem, Shuhong Gao, and Alan G. B. Lauder. Factoring polynomials via polytopes. In *ISSAC 2004*, pages 4–11. ACM, New York, 2004.
- [3] Gwénolé Ars, Jean-Charles Faugère, Hideki Imai, Mitsuru Kawazoe, and Makoto Sugita. Comparison between XL and Gröbner basis algorithms. In *Advances in Cryptology—Asiacrypt 2004*, volume 3329 of *Lecture Notes in Comput. Sci.*, pages 338–353. Springer, Berlin, 2004.
- [4] Thomas Beth, Jörn Müller-Quade, and Rainer Steinwandt. Computing restrictions of ideals in finitely generated  $k$ -algebras by means of Buchberger’s algorithm. *J. Symbolic Comput.*, 41(3-4):372–380, 2006.
- [5] Alin Bostan, Bruno Salvy, and Éric Schost. Fast algorithms for zero-dimensional polynomial systems using duality. *Appl. Algebra Engrg. Comm. Comput.*, 14(4):239–272, 2003.
- [6] Wolfram Decker and Theo de Jong. Gröbner bases and invariant theory. In *Gröbner bases and applications (Linz, 1998)*, volume 251 of *London Math. Soc. Lecture Note Ser.*, pages 61–89. Cambridge Univ. Press, Cambridge, 1998.
- [7] Harm Derksen. Computation of invariants for reductive groups. *Adv. Math.*, 141(2):366–384, 1999.
- [8] Harm Derksen and Gregor Kemper. *Computational Invariant Theory. Invariant Theory and Algebraic Transformation Groups, I*. Springer-Verlag, Berlin, 2002.
- [9] C. Durvye and G. Lecerf. A concise proof of the Kronecker polynomial system solver from scratch. *Preprint*, 33 pages, 2006.

- [10] Nicholas Eriksson. Toric ideals of homogeneous phylogenetic models. In *ISSAC 2004*, pages 149–154. ACM, New York, 2004.
- [11] Jeffrey B. Farr and Shuhong Gao. Computing Gröbner bases for vanishing ideals of finite sets of points. In *Applied Algebra, Algebraic Algorithms and Error-correcting Codes*, volume 3857 of *Lecture Notes in Comput. Sci.*, pages 118–127. Springer, Berlin, 2006.
- [12] Jeffrey B. Farr and Shuhong Gao. Gröbner bases and generalized Padé approximation. *Math. Comp.*, 75(253):461–473 (electronic), 2006.
- [13] Shuhong Gao, Daqing Wan, and Mingsheng Wang. Primary decomposition of zero-dimensional ideals over finite fields. *Preprint*, 12 pages, 2006.
- [14] Karin Gatermann and Frédéric Guyard. Gröbner bases, invariant theory and equivariant dynamics. *J. Symbolic Comput.*, 28(1-2):275–302, 1999.
- [15] Vladimir P. Gerdt. Involutive algorithms for computing Gröbner bases. In *Computational Commutative and Non-commutative Algebraic Geometry*, volume 196 of *NATO Sci. Ser. III Comput. Syst. Sci.*, pages 199–225. IOS, Amsterdam, 2005.
- [16] Vladimir P. Gerdt and Yuri A. Blinkov. On computing Janet bases for degree compatible orderings. In *Proceedings of the 10th Rhine Workshop on Computer Algebra (Basel, 2006)*, pages 107–117. University of Basel, Basel, 2006.
- [17] Marc Giusti, Grégoire Lecerf, and Bruno Salvy. A Gröbner free alternative for polynomial system solving. *J. Complexity*, 17(1):154–211, 2001.
- [18] Marc Giusti and Éric Schost. Solving some overdetermined polynomial systems. In *ISSAC '99: Proceedings of the 1999 International Symposium on Symbolic and Algebraic Computation (Vancouver, BC)*, pages 1–8 (electronic), New York, 1999. ACM.
- [19] Mikael Johansson. Computation of Poincaré-Betti series for monomial rings. *Rend. Istit. Mat. Univ. Trieste*, 37(1-2):85–94 (2006), 2005.
- [20] Gregor Kemper. Computational invariant theory. In *The Curves Seminar at Queen's. Vol. XII (Kingston, ON, 1998)*, volume 114 of *Queen's*

*Papers in Pure and Appl. Math.*, pages 5–26. Queen’s Univ., Kingston, ON, 1998.

- [21] Gregor Kemper. An algorithm to calculate optimal homogeneous systems of parameters. *J. Symbolic Comput.*, 27(2):171–184, 1999.
- [22] Gregor Kemper. The calculation of radical ideals in positive characteristic. *J. Symbolic Comput.*, 34(3):229–238, 2002.
- [23] Gregor Kemper. Computing invariants of reductive groups in positive characteristic. *Transform. Groups*, 8(2):159–176, 2003.
- [24] Simon King. Fast computation of secondary invariants. [arXiv:math/0701270](https://arxiv.org/abs/math/0701270), 13 pages, 2007.
- [25] Simon King. Minimal generating sets of non-modular invariant rings of finite groups. [arXiv:math/0703035](https://arxiv.org/abs/math/0703035), 14 pages, 2007.
- [26] Alexey Koloydenko. Symmetric measures via moments. [arXiv:math.PR/0406173](https://arxiv.org/abs/math.PR/0406173), 50 pages, 2004.
- [27] Teresa Krick. Straight-line programs in polynomial equation solving. In *Foundations of Computational Mathematics: Minneapolis, 2002*, volume 312 of *London Math. Soc. Lecture Note Ser.*, pages 96–136. Cambridge Univ. Press, Cambridge, 2004.
- [28] G. Lecerf. Quadratic Newton iteration for systems with multiplicity. *Found. Comput. Math.*, 2(3):247–293, 2002.
- [29] Grégoire Lecerf. Computing the equidimensional decomposition of an algebraic closed set by means of lifting fibers. *J. Complexity*, 19(4):564–596, 2003.
- [30] Mbakop Guy Merlin. *Eziente Losung reeller Polynomialer Gleichungssysteme*. PhD Thesis, Humboldt-Universität, Berlin, 1999.
- [31] Bernard Mourrain. Generalized normal forms and polynomial system solving. In *ISSAC’05: Proceedings of the 2005 International Symposium on Symbolic and Algebraic Computation*, pages 253–260 (electronic). ACM, New York, 2005.

- [32] Jörn Müller-Quade and Rainer Steinwandt. Basic algorithms for rational function fields. *J. Symbolic Comput.*, 27(2):143–170, 1999.
- [33] Jörn Müller-Quade and Rainer Steinwandt. Gröbner bases applied to finitely generated field extensions. *J. Symbolic Comput.*, 30(4):469–490, 2000.
- [34] G. H. Norton and A. Sălăgean. Cyclic codes and minimal strong Gröbner bases over a principal ideal ring. *Finite Fields Appl.*, 9(2):237–249, 2003.
- [35] Fabrice Rouillier, Mohab Safey El Din, and Éric Schost. Solving the birkhoff interpolation problem via the critical point method: An experimental study. In Jürgen Richter-Gebert and Dongming Wang, editors, *ADG '00: Revised Papers from the Third International Workshop on Automated Deduction in Geometry (Zurich, 2000)*, volume 2061 of *Lecture Notes in Computer Science*, pages viii+325. Springer-Verlag, Berlin, 2001.
- [36] Éric Schost. Degree bounds and lifting techniques for triangular sets. In *Proceedings of the 2002 International Symposium on Symbolic and Algebraic Computation*, pages 238–245 (electronic), New York, 2002. ACM.
- [37] Éric Schost. Complexity results for triangular sets. *J. Symbolic Comput.*, 36(3-4):555–594, 2003.
- [38] Éric Schost. Computing parametric geometric resolutions. *Appl. Algebra Engrg. Comm. Comput.*, 13(5):349–393, 2003.
- [39] R. James Shank and David L. Wehlau. Computing modular invariants of  $p$ -groups. *J. Symbolic Comput.*, 34(5):307–327, 2002.
- [40] Jessica Sidman and Seth Sullivant. Prolongations and computational algebra. [arXiv:math.AC/0611696](https://arxiv.org/abs/math/0611696), 17 pages, 2006.
- [41] Allan Steel. Conquering inseparability: Primary decomposition and multivariate factorization over algebraic function fields of positive characteristic. *J. Symbolic Comput.*, 40(3):1053–1075, 2005.
- [42] Till Stegers. Faugère’s F5 algorithm revisited. *Preprint*, page 81, 2006.

- [43] Rainer Steinwandt. Decomposing systems of polynomial equations. In *Computer Algebra in Scientific Computing—CASC'99 (Munich)*, pages 387–407. Springer, Berlin, 1999.
- [44] Rainer Steinwandt. Implicitizing without tag variables. In *Proceedings of the 8th Rhine Workshop on Computer Algebra*, pages 217–224. 2002.
- [45] Rainer Steinwandt and Jörn Müller-Quade. Freeness, linear disjointness, and implicitization—a classical approach. *Beiträge Algebra Geom.*, 41(1):57–66, 2000.
- [46] Mark van Hoeij. Factoring polynomials and the knapsack problem. *J. Number Theory*, 95(2):167–189, 2002.