

BOGDAN ICHIM

LIST OF PUBLICATIONS

— PEER REVIEWED JOURNAL PAPERS

- (1) W. Bruns and B. Ichim. *Computations of volumes in five candidates elections*. Scientific Reports **13** (2023), 13266.
- (2) W. Bruns and B. Ichim. *Polytope volume by descent in the face lattice and applications in social choice*. Mathematical Programming Computation **13** (2021), 415 – 442.
- (3) W. Bruns, B. Ichim and C. Söger. *Computations of volumes and Ehrhart series in four candidates elections*. Annals of Operations Research **280** (2019), 241 – 265.
- (4) B. Ichim and J. J. Moyano-Fernández. *On the score sheets of a round-robin football tournament*. Advances in Applied Mathematics **91** (2017), 24 – 43.
- (5) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *Stanley depth and the lcm-lattice*. Journal of Combinatorial Theory, Series A **150** (2017), 295 – 322.
- (6) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *How to compute the Stanley depth of a module*. Mathematics of Computation **86** (2017), 455 – 472.
- (7) W. Bruns, B. Ichim and C. Söger. *The power of pyramid decompositions in Normaliz*. Journal of Symbolic Computation **74** (2016), 513 – 536.
- (8) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *Lcm-lattices and Stanley depth : a first computational approach*. Experimental Mathematics **25** (2016), 46 – 53.
- (9) B. Ichim, L. Katthän and J. J. Moyano-Fernández. *The behavior of Stanley depth under polarization*. Journal of Combinatorial Theory, Series A **135** (2015), 332 – 347.
- (10) B. Ichim and A. Zarojanu. *An algorithm for computing the multigraded Hilbert depth of a module*. Experimental Mathematics **23** (2014), 322 – 331.
- (11) B. Ichim and J. J. Moyano-Fernández. *How to compute the multigraded Hilbert depth of a module*. Mathematische Nachrichten **287** (2014), 1274 – 1287.



- (12) W. Bruns, R. Hemmecke, B. Ichim, M. Köppe and C. Söger. *Challenging computations of Hilbert bases of cones associated with algebraic statistics*. Experimental Mathematics **20** (2011), 25 – 33.
- (13) W. Bruns and B. Ichim. *Normaliz : Algorithms for Affine Monoids and Rational Cones*. Journal of Algebra **324** (2010), 1098 – 1113.
- (14) B. Ichim and T. Römer. *On canonical modules of toric face rings*. Nagoya Mathematical Journal **194** (2009), 69 – 90.
- (15) B. Ichim and T. Römer. *On toric face rings*. Journal of Pure and Applied Algebra **210** (2007), 249 – 266.
- (16) W. Bruns and B. Ichim. *On the coefficients of Hilbert quasipolynomials*. Proceedings of the American Mathematical Society **135** (2007), 1305 – 1308.
- (17) B. Ichim and U. Vetter. *Length Formulas for the homology of generalized Koszul complexes*. Revue Roumaine de Mathématique Pures et Appliquées **52** (2007), 177 – 199.
- (18) B. Ichim and U. Vetter. *Koszul Bicomplexes and generalized Koszul complexes in projective dimension one*. Communications in Algebra **34** (2006), 4131 – 4156.

— PAPERS SUBMITTED TO PEER REVIEWED JOURNALS

- (19) B. Ichim and J. J. Moyano-Fernández. *On the consistency of the score sheets of a round-robin football tournament*. Preprint <https://arxiv.org/abs/2208.12372>.

— PEER REVIEWED CONFERENCE PROCEEDINGS

- (20) S. Cristea and B. Ichim. *On Predicting Electoral Outcomes Using TikTok Comments*. In ICAART 2026, Proceedings of the 18th International Conference on Agents and Artificial Intelligence (2026), volume 3, 2573 – 2580.
- (21) B. Ichim and A. Năstase. *On Improving the Efficiency of AI-Generated Text Detection*. In ENASE 2025, Proceedings of the 20th International Conference on Evaluation of Novel Approaches to Software Engineering (2025), 731 – 738.
- (22) B. Ichim and B. Issa. *Improving Machine Learning Performance in Credit Scoring by Data Analysis and Data Pre-processing*. In ICAART 2025, Proceedings of the 17th International Conference on Agents and Artificial Intelligence (2025), volume 3, 249 – 255.
- (23) S. Bomher and B. Ichim. *On the adjacency matrix of spatio-temporal neural network architectures for predicting traffic*. In VEHITS 2023, Proceedings of the 9th International Conference on Vehicle Technology and Intelligent Transport Systems (2023), 321 – 328.



- (24) B. Ichim and F. Iordache. *Predicting multiple traffic features using a spatio-temporal neural network architecture*. In VEHITS 2022, Proceedings of the 8th International Conference on Vehicle Technology and Intelligent Transport Systems (2022), 331 – 337.
- (25) B. Ichim and A. Zarojanu. *An introduction to Hilbert depth*. Proceedings of ICMS-50 2014, Chişinau (2014), 86 – 89.
- (26) V. Almendra and B. Ichim. *Introduction to jNormaliz 1.0*. Proceedings of ISOPAM, Iaşi (2011), 81 – 86.
- (27) W. Bruns, B. Ichim and C. Söger. *Introduction to Normaliz 2.5*. Lecture Notes in Computer Science **6327** (2010), 209 – 212.
- (28) W. Bruns and B. Ichim. *Introduction to Normaliz 2.2*. Proceedings of IC-TAMI 2009, Alba Iulia (2009), 113 – 132.
- (29) B. Ichim and U. Vetter. *Generalized Koszul complexes*. Analele Ştiinţifice ale Universităţii Ovidius Constanţa, Seria Matematică **14** (2006), 61 – 72.

— PAPERS IN PREPARATION FOR SUBMISSION

- (30) *On the behavior of the size of a monomial ideal* (with A. Zarojanu).

— THESES

- (1) *Generalised Koszul Complexes*. Ph. D. Thesis, Carl von Ossietzky Universität, Oldenburg, Germany (2004).
- (2) *Stanley – Reisner Rings*. M.Sc. Thesis, University of Bucharest, Romania (2001).
- (3) *Solutions of the Yang – Baxter Equation*. B.Sc. Thesis, University of Bucharest, Romania (1999).

— MATHEMATICAL SOFTWARE

• Normaliz 2

The software **Normaliz** is a key part or was integrated in several computational systems like : Macaulay2, Polymake, Singular, CoCoA, Regina, SageMath, GAP, SecDec. According to <http://www.swmath.org/software/630> it has been quoted 244 times in articles published and indexed in Zentralblatt MATH. **Normaliz 2**, versions 2.0 – 2.1 were completely written in C++ by me and I have participated in the development of **Normaliz 2**, versions 2.2 – 2.12. This laid the foundation on which the still ongoing development of Normaliz under the GNU General Public License (version 3) is based. Available at <https://www.normaliz.uni-osnabrueck.de/>.



- (1) W. Bruns, B. Ichim, Tim Römer and Christof Söger. **Normaliz 2.12**. An update of **Normaliz 2.11**, adds internal parallelization of large simplicial cones and faster linear algebra (2014).
- (2) W. Bruns, B. Ichim, Tim Römer and Christof Söger. **Normaliz 2.11**. An update of **Normaliz 2.10**, adds input types for semiopen cones, inhomogeneous systems and polyhedra (2014).
- (3) W. Bruns, B. Ichim and Christof Söger. **Normaliz 2.10** An update of **Normaliz 2.9**, adds corrections in the exchange of data between **Normaliz** and **NmzIntegrate** (2013).
- (4) W. Bruns, B. Ichim and Christof Söger. **Normaliz 2.9**. An update of **Normaliz 2.8**, improves volume computations and includes **NmzIntegrate 1.0** (2013).
- (5) W. Bruns, B. Ichim and Christof Söger. **Normaliz 2.8**. A major upgrade of **Normaliz 2.7**, adds arbitrary $\mathbb{Z}$ -gradings to **Normaliz** and improves the performance considerably (2012).
- (6) W. Bruns, B. Ichim and Christof Söger. **Normaliz 2.7**. A major upgrade of **Normaliz 2.5**, unites the former **norm64** and **normbig** in a single executable **normaliz** and h -vector computation are considerably improved (2011).
- (7) W. Bruns, B. Ichim and Christof Söger. **Normaliz 2.5**. A major upgrade of **Normaliz 2.2**, with the addition of new algorithms, new graphical interface and parallel processing (2010).
- (8) W. Bruns and B. Ichim. **Normaliz 2.2**. An update of **Normaliz 2.1**, containing mainly changes to the command line done by Christof Söger (2009).
- (9) W. Bruns and B. Ichim. **Normaliz 2.1**. An update of **Normaliz 2.0**, with the addition of the dual algorithm (2009).
- (10) W. Bruns and B. Ichim. **Normaliz 2.0**. A totally new C++ implementation of the program **Normaliz** (2008).

- **jNormaliz**

jNormaliz is a graphical interface for the software **Normaliz**. The interface is written in **Java**. That allowed us to combine the good portability (on different operating systems) of the graphical elements provided by **Java** with the computational advantages of the C++ implementation of **Normaliz**. **jNormaliz**, version 1.0 was written in collaboration with V. Almendra, while **jNormaliz**, versions 1.1 – 1.7 were completely written by me. Available at <https://www.normaliz.uni-osnabrueck.de/>.

- (11) V. Almendra and B. Ichim. **jNormaliz 1.7**, a Java GUI for the program **Normaliz 3.0** (2015).
- (12) V. Almendra and B. Ichim. **jNormaliz 1.6**, a Java GUI for the program **Normaliz 2.12** (2014).



- (13) V. Almendra and B. Ichim. **jNormaliz 1.5**, a Java GUI for the program **Normaliz 2.11** (2014).
- (14) V. Almendra and B. Ichim. **jNormaliz 1.4**, a Java GUI for the program **Normaliz 2.9** (2013).
- (15) V. Almendra and B. Ichim. **jNormaliz 1.2**, a Java GUI for the program **Normaliz 2.8** (2012).
- (16) V. Almendra and B. Ichim. **jNormaliz 1.1**, a Java GUI for the program **Normaliz 2.7** (2011).
- (17) V. Almendra and B. Ichim. **jNormaliz 1.0**, a Java GUI for the program **Normaliz 2.5** (2010).

• **Hdepth**

Hdepth is an experimental tool for computing the multigraded Hilbert depth of a module, implemented in **CoCoA**. **Hdepth, version 1.0** was written in collaboration with A. Zarojanu. It has been quoted 10 times in articles published and indexed in Zentralblatt MATH according to <http://www.swmath.org/software/12186>. Available at <https://dl.dropboxusercontent.com/s/urhrazy5ntgbwzf/Hdepth.htm>.

- (18) B. Ichim and A. Zarojanu. **Hdepth 1.0**. First implementation of an algorithm for computing the multigraded Hilbert depth of a module.

• **Sdepth**

Sdepth is a program for computing the Stanley depth of a module, which is a factor of two ideals. It was completely written in C++ by me. Test versions are available on request.

- (19) B. Ichim. **Sdepth 1.0**. A C++ implementation of an algorithm for computing the Stanley depth. Work in progress.

— MATHEMATICAL SOFTWARE DOCUMENTATION

- (1) V. Almendra and B. Ichim. *User Manual for jNormaliz, versions 1.0, 1.1, 1.2, 1.4, 1.5, 1.6, 1.7*. Included in the corresponding **jNormaliz** package.
- (2) W. Bruns, B. Ichim, Tim Römer and Christof Söger. *User Manual for Normaliz, versions 2.11, 2.12*. Included in the corresponding **Normaliz** package.
- (3) W. Bruns, B. Ichim and Christof Söger. *User Manual for Normaliz, versions 2.5, 2.7, 2.8, 2.9, 2.10*. Included in the corresponding **Normaliz** package.
- (4) W. Bruns and B. Ichim. *User Manual for Normaliz, versions 2.0, 2.1, 2.2*. Included in the corresponding **Normaliz** package.

