# Computational Linear and Commutative Algebra

Lorenzo Robbiano

A new book written with Martin Kreuzer will be described in my talk.

• *From the back cover of the book:*

This book combines, in a novel and general way, an extensive development of the theory of families of commuting matrices with applications to zero-dimensional commutative rings, primary decompositions and polynomial system solving. It integrates the *Linear Algebra of the Third Millennium*, developed exclusively here, with classical algorithmic and algebraic techniques. Even the experienced reader will be pleasantly surprised to discover new and unexpected aspects in a variety of subjects including eigenvalues and eigenspaces of linear maps, joint eigenspaces of commuting families of endomorphisms, multiplication maps of zero-dimensional affine algebras, computation of primary decompositions and maximal ideals, and solution of polynomial systems.

This book completes a trilogy initiated by the uncharacteristically witty books Computational Commutative Algebra 1 and 2 by the same authors. The material treated here is not available in book form, and much of it is not available at all. The authors continue to present it in their lively and humorous style, interspersing core content with funny quotations and tongue-in-cheek explanations.

• *From the review of David A. Cox:*

– This book is a lovely blend of commutative and linear algebra.

– The book contains many new results and concepts, along with known ideas drawn from a widely scattered literature.

## References

[1] M. Kreuzer and L. Robbiano, *Computational Linear and Commutative Algebra*. Springer, 2016

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