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SPECIAL ISSUE ON ALGEBRA AND COMPUTATIONAL ALGEBRAIC GEOMETRY

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Algebraic geometry is one of the main branches of modern mathematics with roots from classical Italian geometers. Its modern flavor started with Grothendieck and continued with many illustrious algebraic geometers of the second half of the 20-th century. During the last twenty years, the subject has changed drastically due to developments of new computational techniques and access to better computing power. Such changes have spurred a new direction of algebraic geometry, the so called *computational algebraic geometry*. While there is no universal agreement among mathematicians that what exactly is computational algebraic geometry, loosely stated it includes the areas of algebraic geometry where computer algebra can be used to obtain explicit results. It is obvious that such area will be of deep impact and importance in the future mathematics. Furthermore, such new developments have made possible applications of algebraic geometry in areas such as coding theory, computer security and cryptography, computer vision, mathematical biology, and many more.

This special issue contains papers that cover classical mathematical problems from a computational viewpoint and problems in newer developments. We intentionally did not limit the papers in a narrow area. Instead, we tried to present a wide variety of topics. This special issue consists of ten papers on the following topics:

The paper by D. Haran and M. Jarden studies the embedding problem. Let K be an ample field, G a finite group, and L a finite Galois extension of K such that $Gal(L/K)$ is isomorphic to a subgroup of G. They prove that $K(x)$ has a Galois extension F which is regular over L such that $Gal(F/K(x)) \cong G$ and F has a K-place ϕ such that $\phi(x) \in K$ and $\phi(F) = L \cup \{\infty\}$.

The paper by M. Joswig, B. Sturmfels, and J. Yu explores the relationship between convexity in tropical geometry and notions of convexity in the theory of affine buildings, from a combinatorial and computational perspective. Results include a convex hull algorithm for the Bruhat–Tits building of $SL_d(K)$ and techniques for computing with apartments and membranes.

The paper by J. Hakim is on discrete series representations of p-adic groups associated to symmetric spaces. The purpose of this paper is study the natural symmetric space analogues of various notions related to discrete series representations of a p-adic group such as Schur's orthogonality relations and formal degrees.

A. Elezi in his paper focuses on toric fibrations and mirror symmetry. The relation between the quantum $\mathcal{D}$-modules of a smooth variety X and a toric bundle is studied. The author describes the relation completely when X is a semi-ample

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