Preface

The tenth edition of the series of biennial international workshops on Automated Deduction in Geometry (ADG) took place at the University of Coimbra (Portugal) during July 9–11, 2014. ADG is a well-reputed conference where researchers and software developers working on geometry and automated deduction meet and discuss topics and applications related to automated reasoning in geometry. We acknowledge the support for ADG 2014 provided by the Centre for Mathematics of the University of Porto, the Center for Informatics and Systems, Center for Mathematics and the Science Museum of the University of Coimbra, the Portuguese Foundation for Science and Technology Portugal, and the City Hall of Coimbra.

The ADG 2014 workshop was a fruitful meeting, where four invited talks and 13 ordinary communications were given. The guest speakers were James Davenport, University of Bath, UK, António Leal Duarte, University of Coimbra, Portugal, Deepak Kapur, University of New Mexico, USA, and Tomás Recio, University of Cantabria, Spain.

From the beginning of the ADG meetings, it has been customary to launch an open call for papers inviting workshop participants and other involved people in the ADG community to participate in a proceedings volume in the LNAI series of LNCS. After a detailed peer-review process, we selected 11 articles, which show the trend set of current research in automated reasoning in geometry.

This volume includes a paper by Md. Ashraful Alam and Ileana Streinu describing an initial study of geodesic star unfoldings, a generalization of shortest-path star unfoldings of 3D convex polyhedra with a very simple characterization. In their contribution, Ciprian Borcea and Ileana Streinu study several properties of deformation spaces, including singularities, for families of volume frameworks associated with polygons. James H. Davenport and Matthew England discuss the recent major advances in Collins method for the real quantifier elimination, first proposed by Tarski in the 1930s. In the context of the new version 5 of GeoGebra, Zoltán Kovács presents the Relation Tool, an intuitive graphical user interface between various geometry automatic theorem provers and GeoGebra. In the paper by Vesna Marinković, Predrag Janičić, and Pascal Schreck, the authors present a formal logical framework describing the traditional four-phase process of geometric construction solving, leading to automated production of constructions with corresponding human readable correctness proofs. Shuichi Moritsugu describes computations of the relations between the circumradius R and area S of cyclic polygons given by the lengths of the sides, succeeding in computing integrated formulae of the circumradius and the area for cyclic pentagons and hexagons. The paper by Pavel Pech is on the extension of the well-known Simson–Wallace theorem on skew quadrilaterals in E^3, investigating the locus of a point P whose orthogonal projections K, L, M, N onto the sides of a skew quadrilateral form a tetrahedron of a constant volume s. Pedro Quaresma and Nuno Baeta report the current status of the I2GATP format and its accompanying components. Meera Sitharam and

Joel Willoughby consider a generalization of the concept of d-flattenability of graphs, introduced for the l_2 norm by Belk and Connelly, to general l_p norms, with integer p, $1 \leq p < \infty$. Dan Song, Dongming Wang, and Xiaoyu Chen describe how they adopted techniques of Hough transform and randomized detection algorithms to detect geometric objects from scanned and photographed images, then use methods of image matching to recognize labels for the detected geometric objects, and finally employ numerical-computation-based methods to mine geometric relations among the objects. Finally, the paper by Menghan Wang and Meera Sitharam extends the combinatorial characterization of pinned subspace-incidence systems (H, X) that are minimally rigid to general pinned subspace-incidence systems, with H being a non-uniform hypergraph and pins in X being subspaces with arbitrary dimension.

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