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Report on the doctoral thesis entitled

**Quadratic Clipping and its Generalization for Polynomial Systems**

by Michael Bartoň.

In his thesis, the candidate presents algorithms for solving univariate polynomials and systems of two (or possibly more) polynomials. Such algorithms have various applications, e.g., in Computer Aided Design (intersections of curves or surfaces) and Computer Graphics (ray tracing).

After presenting some introductory material, which is needed to make the thesis self-contained, Sections 3 and 4 describe a new algorithm for solving univariate polynomials. It is based on the idea of quadratic clipping. Given an interval containing the roots, a new interval is found by intersecting a strip bounded by two parabolas with the x-axis. The convergence rate is analyzed and a detailed comparison with the method of Bézier clipping is given. The results of these two sections, which are new and original, have been accepted for publication in Computer Aided Geometric Design and will appear shortly.

Section 5 describes a new technique for solving systems of two bivariate polynomials. Given a box containing the roots, a new box is found by intersecting two

strips with each other, where each strip is bounded by two parallel lines. The new algorithm is shown to compare well with existing techniques.

The thesis has been prepared with great care. The language is excellent, and the results are illustrated by many beautiful figures. With this work, the candidate demonstrates that he is capable of doing creative scientific work at a high level. Parts of it will appear shortly in a peer-refereed international journal, showing that it meets the standards of the international scientific community.

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