Review of the Ph.D. Thesis
"Interval linear and nonlinear systems'
by Jaroslav Horáček

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May 2, 2019

The subject of the thesis is interval methods for solving linear and non-linear systems of equations. This topic is a time-less one that forms the basis for numerous methods of formal verification.

The thesis represents an impressive volume that combines introductory and survey material with several original contributions. The former shows that the Ph.D. candidate achieved remarkable mastery of the field, and the latter significantly advances the state of the art. The main contributions of the thesis concern the following topics:

- enclosure methods for square and over-determined linear interval systems of equations

- showing unsolvability of interval linear systems of equations

- computing the determinant of interval matrices

- tightening boxes wrt. nonlinear systems of equations and inequalities

Moreover, the thesis includes an original application of interval methods in medicine.

I am not familiar with the medical application, and hence I am not able to judge its value. Nonetheless—even when not taking into account this application—the value of the scientific contributions contained in the thesis significantly go beyond what is usually necessary for successfully defending a Ph.D. thesis in the field. Still, those contributions are based on research papers where the doctoral candidate has one or two co-authors, and it is beyond the ability of the reviewer to evaluate the individual contribution of the candidate to those papers.

The thesis is based on solid methodology, supporting theoretical results with computational experiments. I also appreciate the presentation style. It combines prose that is at the same time precise and readable with useful figures and nice type-setting. My only criticism in this respect concerns the presentation of the medical application that would have benefited from a better explanation of terminology and context for readers not familiar with this application area.

Usage of the English language is in general o.k., but is slightly suffering from problems that are typical for Czech native speakers, for example concerning the use of articles. Also, every now and then an ill-formed idiom resulting from literal translation from Czech occurs (e.g., "Let us have a matrix A" instead of "Let A be a matrix"). In any case, this is not a problem specific to this thesis, which rather surpasses the local standard in this respect.

Let me conclude this review with the statement that under the assumption that the author of the thesis significantly contributed to the underlying research papers

the dissertation under review clearly proves the ability of the author for independent scientific work.