

Preface

The 10th International Workshop on Numerical Software Verification (NSV 2017) was held during July 22–23, 2017, in Heidelberg, Germany.

This year NSV 2017 took place alongside the International Workshop on Formal Methods for Rigorous Systems Engineering of Cyber-Physical Systems (RISE4CPS, a one-time, invite-only event, chaired by Ezio Bartocci of TU Vienna). NSV 2017 was co-located within CAV 2017, the 29th International Conference on Computer-Aided Verification.

The scope of NSV 2017 has broadened since the earlier editions, but its core retains known fundamental aspects. Numerical computations are ubiquitous in digital systems: Monitoring, supervision, prediction, simulation, and signal processing rely heavily on numerical calculus to achieve desired goals. Design and verification of numerical algorithms has a unique set of challenges, which set it apart from the rest of software verification. To achieve the verification and validation of global system properties, numerical techniques need to precisely represent the local behaviors of each component. The implementation of numerical techniques on modern hardware adds another layer of approximation because of the use of finite representations of infinite precision numbers that usually lack basic arithmetic properties, such as associativity. Finally, the development and analysis of cyber-physical systems (CPS), which involve interacting continuous and discrete components, pose a further challenge. It is hence imperative to develop logical and mathematical techniques for reasoning about programmability and reliability. The NSV workshop is dedicated to the development of such techniques.

NSV 2017 was a two-day event, featuring two invited talks, single-track regular podium sessions, and additionally four invited speakers providing tutorials within RISE4CPS.

In all, 18 Program Committee members helped to provide at least four reviews of the submitted contributions, which were presented during the single-track sessions and appear as full papers in these proceedings.

A highlight of NSV 2017 was the presence of two high-profile invited speakers: Kyoko Makino, Professor in the Department of Physics and Astronomy at Michigan State University (USA), gave a seminar titled “Verified Computations using Taylor Models and the Applications.” Nathalie Revol, researcher at Inria (Lyon, France), gave a talk titled “Introduction to the IEEE 1788-2015 Standard for Interval Arithmetic.”

Further details on NSV 2017 are featured on the website: <http://www.cs.ox.ac.uk/conferences/NSV17/>

Finally, a few words of acknowledgment are due. Thanks to Springer for publishing the NSV proceedings in its *Lecture Notes in Computer Science* series. Thanks to Sergiy Bogomolov and Pavithra Prabhakar from the Steering Committee for support, to Yassamine Seladji for the help with publicity, to Viraj Wijesuriya for the organization

of the workshop website, to all the Program Committee members and additional reviewers for their work in ensuring the quality of the contributions to NSV 2017, and to all the participants for contributing to this event.

June 2017

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Numerical Software Verification

10th International Workshop, NSV 2017, Heidelberg,
Germany, July 22-23, 2017, Proceedings

Abate, A.; Boldo, S. (Eds.)

2017, XXI, 115 p. 23 illus., Softcover

ISBN: 978-3-319-63500-2