

Archive of Numerical Software

Special Issue 2017: Proceedings of the 3rd Dune User Meeting (2015)

Edited by Markus Blatt, Bernd Flemisch, and Oliver Sander

- 1 Editorial: Proceedings of the 3rd Dune User Meeting**
Markus Blatt / Bernd Flemisch / Oliver Sander
- 3 Using DUNE-ACFEM for Non-smooth Minimization of Bounded Variation Functions** // Martin Alkämper / Andreas Langer
- 21 The DUNE-FEM-DG module**
Andreas Dedner / Stefan Girke / Robert Klöforn / Tobias Malkmus
- 63 Asynchronous evaluation within parallel environments of coupled finite and boundary element schemes for the simulation of multiphysics problems** // Andreas Dedner / Alastair J. Radcliffe
- 95 The interface for functions in the dune-functions module**
Christian Engwer / Carsten Gräser / Steffen Müthing / Oliver Sander
- 111 The DUNE-DPG library for solving PDEs with Discontinuous Petrov–Galerkin finite elements**
Felix Gruber / Angela Klewinghaus / Olga Mula
- 129 Using DUNE-FEM for Adaptive Higher Order Discontinuous Galerkin Methods for Two-phase Flow in Porous Media** // Birane Kane
- 151 System testing in scientific numerical software frameworks using the example of DUNE** // Dominic Kempf / Timo Koch
- 169 FunG – Automatic differentiation for invariant-based modeling**
Lars Lubkoll
- 193 Extending DUNE: The dune-xt modules**
Tobias Leibner/ René Milk / Felix Schindler
- 217 The Dune FoamGrid implementation for surface and network grids**
Oliver Sander / Timo Koch / Natalie Schröder / Bernd Flemisch



Archive of Numerical Software // Special Issue 2017: Proceedings of the 3rd Dune User Meeting (2015)

Dune, the Distributed and Unified Numerics Environment, has been under continuous development for more than 13 years. Several European institutions participate in this development, and over time, a substantial user community has evolved. In order to establish and foster personal contacts within the community as well as between users and developers, a first Dune User Meeting was held in Stuttgart in 2010, followed by a second one that took place in 2013 in Aachen. In 2015, the third Dune User Meeting was held in Heidelberg from 28th to 29th of September. More than 30 users and developers from five European countries attended, presented Dune-related work and engaged in lively discussions. Ten presentations resulted in contributions to these proceedings.

About the Editors

Markus Blatt is an independent consultant and entrepreneur. As an applied mathematician he helps his customers developing, improving, and employing custom simulation software based upon open source and DUNE in particular.

After completing his PhD in applied mathematics, **Bernd Flemisch** turned to the engineering sciences. He is currently associate professor in the Department of Hydromechanics and Modelling of Hydro-systems at the University of Stuttgart. His research interests encompass computational models for porous media flow, transport and deformation phenomena, model coupling and decoupling as well as advanced discretization and solution techniques.

Oliver Sander is professor for numerical mathematics at the Technische Universität Dresden. He investigates and develops simulation methods for problems in mechanics, like contact and fracture mechanics, and plasticity.

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at <http://dnb.dnb.de>.



This work is published under the Creative Commons License 4.0 (CC BY-SA 4.0).



UNIVERSITÄTS-
BIBLIOTHEK
HEIDELBERG

The online version of this publication is freely available on the ebook-platform of the Heidelberg University Library heiBOOKS <http://books.ub.uni-heidelberg.de/heibooks> (open access).

urn: urn:nbn:de:bsz:16-heibooks-book-280-9

doi: <https://doi.org/10.11588/heibooks.280.364>

© 2017 by the authors.

Cover Image: Adaptive refinement with element parameterizations leads to non-conforming geometries (see p. 231 in this book). © Oliver Sander. Published under CC BY-SA 2.5.

eISSN: 2197-8263

ISBN 978-3-946531-61-6 (Softcover)

ISBN 978-3-946531-60-9 (PDF)