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Forschungsgebiete

- Automatisierung und Flugführung für Kleinfluggeräte (MAVs)
- Statische Analyse von Blockdiagrammen
- Model Checking von Blockdiagrammen

Projekte

- [artshop](#)
- [IMAV](#)

Frühere Projekte

- [Teilnahme am Carolo Cup](#)

Lehre

Semester	Titel	Art
SS 2012	Praktikum Systemprogrammierung	P
WS 2012/13	Einführung in die technische Informatik	V/Ü
WS 2013/14	Einführung in die technische Informatik	V/Ü
SS 2015	NXT Programmierung mit Java	P
SS 2015	Seminar Modellbasiertes Testen und Analyse eingebetteter Software	S
WS 2015/16	Seminar Modellbasiertes Testen und Analyse eingebetteter Software	S
WS 2015/16	Seminar Formale und semiformale Methoden für eingebettete Software	S
SS 2016	NXT Programmierung mit Java	P
SS 2016	Seminar Formale und semiformale Methoden für eingebettete Software	S
WS 2016/17	Seminar Formale und semiformale Methoden für eingebettete Software	S

Sprechstunde

Nach Vereinbarung

Veröffentlichungen

[Der19]

[PDF](#)[BIB](#)

Dernehl, C. M., "Verification of embedded software models by combining abstract interpretation, symbolic execution and stability analysis", PhD Thesis, Aachen, 2019.

Verification of embedded software models by combining abstract interpretation, symbolic execution and stability analysis

Bibtex entry :

```
@phdthesis { Der19,
  author = { Dernehl, Christian Michael },
  othercontributors = { Kowalewski, Stefan and Moormann, Dieter },
  title = { Verification of embedded software models by combining
    abstract interpretation, symbolic execution and stability
    analysis },
  publisher = { RWTH Aachen University, Department of Computer
Science },
  school = { RWTH Aachen University },
  pages = { 1 Online-Ressource (xxiii, 156 Seiten) : Illustrationen,
    Diagramme },
  series = { Aachener Informatik-Berichte },
  year = { 2019 },
  address = { Aachen },
  doi = { 10.18154/RWTH-2019-05178 },
  typ = { PUB:(DE-HGF)11 },
  reportid = { RWTH-2019-05178 },
  cin = { 122810 / 120000 },
  url = {
http://publications.rwth-aachen.de/record/761850/files/761850.pdf },
}
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[DDK+17]

[PDF](#)[BIB](#)

Dankert, J., Dernehl, C., Kusmenko, E., Eckstein, L., Kowalewski, S., and Rumpe, B., "RapidCoop - Robuste Architektur durch geeignete Paradigmen für Kooperativ Interagierende Automobile", in *Proc. AAET - Automatisiertes und Vernetztes Fahren : Beiträge zum gleichnamigen 18. Braunschweiger Symposium vom 8. und 9. Februar 2017, Stadthalle, Braunschweig / ITS automotive nord e.V. (Hrsg.)*, Braunschweig, 2017, ITS automotive nord e.V., pp. 225-244.

RapidCoop - Robuste Architektur durch geeignete Paradigmen für Kooperativ Interagierende Automobile

Bibtex entry :

```
@inproceedings { DDK+17,
  author = { Dankert, Jens and Dernehl, Christian and Kusmenko,
    Evgeny
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      Bernhard },
  title = { RapidCoop - Robuste Architektur durch geeignete
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      f{"u"}r Kooperativ Interagierende Automobile },
  booktitle = { AAET - Automatisiertes und Vernetztes Fahren :
    Beitr{"a"}ge
      zum gleichnamigen 18. Braunschweiger Symposium vom 8. und 9.
      Februar 2017, Stadthalle, Braunschweig / ITS automotive nord
      e.V. (Hrsg.) },
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  pages = { 225-244 },
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  organization = { 18. Braunschweiger Symposium AAET -
    Automatisiertes und
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    http://www.se-rwth.de/publications/RapidCoop-Robuste-Architektur-durch-
    geeignete-Paradigmen-fuer-Kooperativ-Interagierende-
    Automobile.pdf?PHPSESSID=eb66ba2042d9500e5135d33f6b7575af },
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[DKK17]

[PDFBIB](#)

Dernehl, C., Kühn, J., and Kowalewski, S., "Case studies on automated verification with slope boundaries for block diagrams", *Computer Languages, Systems & Structures*, vol. 54, pp. 528-543, 2017

Case studies on automated verification with slope boundaries for block diagrams

Bibtex entry :

```
@article { DKK17,
  author = { Dernehl, Christian and K{"u"}hn, Jan and Kowalewski,
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    title = { Case studies on automated verification with slope
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    for block diagrams },
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    pages = { 528-543 },
    volume = { 54 },
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    address = { Amsterdam [u.a.] },
    issn = { 1477-8424 },
    doi = { 10.1016/j.cl.2017.09.001 },
    typ = { PUB:(DE-HGF)16 },
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    url = { http://publications.rwth-aachen.de/record/752271 },
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[Der16]

[PDFBIB](#)

Dernehl, C., "Automatic invariant checking for discrete block diagrams using Lyapunov functions with sat modulo theory solvers", in *Proc. 2016 European Control Conference (ECC) : June 29-July 1, 2016, Aalborg, Denmark / [European Control Association (EUCA)]*, Piscataway, NJ, 2016, IEEE, pp. 441-446.

Automatic invariant checking for discrete block diagrams using Lyapunov functions with sat modulo theory solvers

Bibtex entry :

```

@inproceedings { Der16,
    author = { Dernehl, Christian },
    title = { Automatic invariant checking for discrete block diagrams
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    booktitle = { 2016 European Control Conference (ECC) : June 29-July
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    2016, Aalborg, Denmark / [European Control Association
(EUCA)] },
    publisher = { IEEE },
    pages = { 441-446 },
    year = { 2016 },
    address = { Piscataway, NJ },
    organization = { 2016 European Control Conference, Aalborg
(Denmark),
    2016-06-29 - 2016-07-01 },
    doi = { 10.1109/ECC.2016.7810324 },
    typ = { PUB:(DE-HGF)7 },
    reportid = { RWTH-2017-06691 },
    cin = { 122810 / 120000 },
    url = { http://publications.rwth-aachen.de/record/696194 },
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}

[DHK16]

PDFBIB

Dernehl, C., Hansen, N., and Kowalewski, S., "Abstract Interpretation of MATLAB Code with Interval Sets", in *Proc. Critical systems: formal methods and automated verification : Joint 21st International Workshop on Formal Methods for Industrial Critical Systems and 16th International Workshop on Automated Verification of Critical Systems, FMICS-AVoCS 2016, Pisa, Italy, September 26-28, 2016 : proceedings / Maurice H. ter Beek, Stefania Gnesi, Alexander Knapp (eds.)*, Cham, 2016 in Lecture Notes in Computer Science, Springer International Publishing, pp. 25-38.

Abstract Interpretation of MATLAB Code with Interval Sets

Bibtex entry :

```
@inproceedings { DHK16,
  author = { Dernehl, Christian and Hansen, Norman and Kowalewski, Stefan },
  title = { Abstract Interpretation of MATLAB Code with Interval Sets },
  booktitle = { Critical systems: formal methods and automated verification
    : Joint 21st International Workshop on Formal Methods for Industrial Critical Systems and 16th International Workshop on Automated Verification of Critical Systems, FMICS-AVoCS 2016, Pisa, Italy, September 26-28, 2016 : proceedings / Maurice H. ter Beek, Stefania Gnesi, Alexander Knapp (eds.) },
  publisher = { Springer International Publishing },
  pages = { 25-38 },
  series = { Lecture Notes in Computer Science },
  year = { 2016 },
  address = { Cham },
  organization = { 21. International Workshop on Formal Methods for Industrial Critical Systems, Pisa (Italy), 2016-09-26 - 2016-09-28 },
  doi = { 10.1007/978-3-319-45943-1_2 },
  typ = { PUB:(DE-HGF)7 },
  reportid = { RWTH-2016-12021 },
  cin = { 122810 / 120000 },
  url = { http://publications.rwth-aachen.de/record/680837 },
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[DHK16a]

PDFBIB

Dernehl, C., Hansen, N., and Kowalewski, S., "Combining Abstract Interpretation with Symbolic Execution for a Static Value Range Analysis of Block Diagrams", in *Proc. Software engineering and formal methods : 14th international conference, SEFM 2016, held as part of STAF 2016, Vienna, Austria, July 4-8, 2016 : proceedings / Rocco De Nicola, Eva Kühn (eds.)*, Cham, 2016 in

Lecture Notes in Computer Science, Springer International Publishing, pp. 137-154.

Combining Abstract Interpretation with Symbolic Execution for a Static Value Range Analysis of Block Diagrams

Bibtex entry :

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@inproceedings { DHK16a,
  author = { Dernehl, Christian and Hansen, Norman and Kowalewski,
    Stefan },
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    for a Static Value Range Analysis of Block Diagrams },
  booktitle = { Software engineering and formal methods : 14th
    international
      conference, SEFM 2016, held as part of STAF 2016, Vienna,
      Austria, July 4-8, 2016 : proceedings / Rocco De Nicola, Eva
      K{\u}hn (eds.) },
  publisher = { Springer International Publishing },
  pages = { 137-154 },
  series = { Lecture Notes in Computer Science },
  year = { 2016 },
  address = { Cham },
  organization = { Software Engineering and Formal Methods : 14.
    International
      Conference, Vienna (Austria), 2016-07-04 - 2016-07-08 },
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  url = { http://publications.rwth-aachen.de/record/680854 },
}
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[DKK16]

[PDF](#)[BIB](#)

Dernehl, C., Kühn, J., and Kowalewski, S., "Abstract Interpretation for Block Diagrams : Two Case Studies", in *Proc. MoDeVVa 2016 : Model-Driven Engineering, Verification and Validation : proceedings of the 13th Workshop on Model-Driven Engineering, Verification and Validation co-located with ACM/IEEE 19th International Conference on Model Driven Engineering Languages and Systems (MODELS 2016) : Saint-Malo, France, October 3, 2016 / edited by Michalis Famelis, Daniel Ratiu, Gehan M. K. Selim*, Aachen, Germany, 2016 in CEUR workshop proceedings, RWTH Aachen, pp. 20-29.

Abstract Interpretation for Block Diagrams : Two Case Studies

Bibtex entry :

```
@inproceedings { DKK16,
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author = { Dernehl, Christian and K{"u}hn, Jan and Kowalewski,
Stefan },
title = { Abstract Interpretation for Block Diagrams : Two Case
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booktitle = { MoDeVva 2016 : Model-Driven Engineering, Verification
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Validation : proceedings of the 13th Workshop on
Model-Driven Engineering, Verification and Validation
co-located with ACM/IEEE 19th International Conference on
Model Driven Engineering Languages and Systems (MODELS 2016)
: Saint-Malo, France, October 3, 2016 / edited by Michalis
Famelis, Daniel Ratiu, Gehan M. K. Selim },
publisher = { RWTH Aachen },
pages = { 20-29 },
series = { CEUR workshop proceedings },
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Validation,
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typ = { PUB:(DE-HGF)7 },
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cin = { 122810 / 120000 },
url = { http://nbn-resolving.de/urn:nbn:de:0074-1713-7 },
}

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[GHD+16]

[PDFBIB](#)

Gerlitz, T., Hansen, N., Dernehl, C., and Kowalewski, S., "Artshop: A Continuous Integration and Quality Assessment Framework for Model-Based Software Artifacts", in *Proc. [12. Dagstuhl-Workshop Modelbasierte Entwicklung eingebetteter Systeme (MBEES) / Michaela Huhn (Ostfalia Hochschule - Wolfenbüttel, DE), Matthias Riebisch (Universität Hamburg, DE), Bernhard Schätz (fortiss GmbH - München, DE)]*, 2016, fortiss Technischer Bericht, pp. 13-22.

artshop: A Continuous Integration and Quality Assessment Framework for Model-Based Software Artifacts

Bibtex entry :

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@inproceedings { GHD+16,
author = { Gerlitz, Thomas and Hansen, Norman and Dernehl,
Christian
and Kowalewski, Stefan },
title = { artshop: A Continuous Integration and Quality Assessment
Framework for Model-Based Software Artifacts },
booktitle = { [12. Dagstuhl-Workshop Modelbasierte Entwicklung
eingebetteter Systeme (MBEES) / Michaela Huhn (Ostfalia
Hochschule – Wolfenb{"u}ttel, DE), Matthias Riebisch
(Universit{"a}t Hamburg, DE), Bernhard Sch{"a}tz (fortiss

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GmbH – M{"u"}nchen, DE)) },
publisher = { fortiss Technischer Bericht },
pages = { 13-22 },
year = { 2016 },
organization = { Modellbasierte Entwicklung eingebetteter Systeme,
Dagstuhl
(Germany), 2016-03-30 - 2016-04-01 },
typ = { PUB:(DE-HGF)8 },
reportid = { RWTH-CONV-207908 },
cin = { 122810 / 120000 },
url = { http://publications.rwth-aachen.de/record/573828 },
}
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[DHG+15]

[PDFBIB](#)

Dernehl, C., Hansen, N., Gerlitz, T., and Kowalewski, S., "Static Value Range Analysis for Matlab/Simulink-Models", in *Proc. Informatik 2015 : Tagung vom 28. September – 02. Oktober 2015 in Cottbus / Douglas W. Cunningham ... (Hrsg.)*, [Bonn], 2015 in GI-Edition : lecture notes in informatics, Ges. für Informatik, pp. 1649-1660.

Static Value Range Analysis for Matlab/Simulink-Models

Bibtex entry :

```
@inproceedings { DHG+15,
  author = { Dernehl, Christian and Hansen, Norman and Gerlitz,
Thomas
and Kowalewski, Stefan },
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  booktitle = { Informatik 2015 : Tagung vom 28. September – 02.
Oktober
2015 in Cottbus / Douglas W. Cunningham ... (Hrsg.) },
  publisher = { Ges. f{"u"}r Informatik },
  pages = { 1649-1660 },
  series = { GI-Edition : lecture notes in informatics },
  year = { 2015 },
  address = { [Bonn] },
  organization = { 45. Jahrestagung der Gesellschaft f{"u"}r
Informatik,
Cottbus (Germany), 2015-09-28 - 2015-10-02 },
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  url = { http://publications.rwth-aachen.de/record/573834 },
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```

[GDF+12]

[PDFBIB](#)

Gathmann, F., Dernehl, C. M., Franke, D., and Kowalewski, S., "An integrated vision aided GPS/INS Navigation System for ultra-low-cost MAVs", in *Proc. Proceedings / IMAV 2012 : Braunschweig, Germany, 03 - 06 July 2012 / Deutsche Gesellschaft für Ortung und Navigation*,

Bonn, 2012, Deutsche Gesellschaft für Ortung und Navigation, pp. 1-8.

An integrated vision aided GPS/INS Navigation System for ultra-low-cost MAVs

Bibtex entry :

```
@inproceedings { GDF+12,
  author = { Gathmann, Felix and Dernehl, Christian Michael and
    Franke,
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  title = { An integrated vision aided GPS/INS Navigation System for
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  booktitle = { Proceedings / IMAV 2012 : Braunschweig, Germany, 03 -
06
    July 2012 / Deutsche Gesellschaft f{"u}r Ortung und
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},
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  year = { 2012 },
  address = { Bonn },
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Flight
    Competition, Braunschweig (Germany), 2012-07-03 - 2012-07-06 },
  typ = { PUB:(DE-HGF)8 },
  reportid = { RWTH-CONV-236329 },
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  url = { http://publications.rwth-aachen.de/record/752304 },
}
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[DFD+11]

[PDFBIB](#)

Dernehl, C., Franke, D., Diab, H., and Kowalewski, S., "An Architecture with Integrated Image Processing for Autonomous Micro Aerial Vehicles", in *Proc. International Micro Air Vehicle conference and competitions 2011 (IMAV 2011)*, 't Harde, The Netherlands, September 12-15, 2011, 2011, IMAV, pp. 138-145.

An Architecture with Integrated Image Processing for Autonomous Micro Aerial Vehicles

Bibtex entry :

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@inproceedings { DFD+11,
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and
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booktitle = { International Micro Air Vehicle conference and
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doi = { 10.4233/uuid:19adedb6-e3d9-4cff-8ebc-6497b026adfe },
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Last update: **2017/03/23 13:55**

