Dr. rer. nat. David Thönnessen

Kontakt

Wissenschaftlicher Mitarbeiter

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Fachausschüsse

- GMA Fachausschuss 7.25 - "Testen vernetzter Systeme in Industrie 4.0" (seit 2015)

Patente

- Elektrisch angetriebene Transportvorrichtung für wenigstens eine Person sowie Steuerungsverfahren hierfür (102016217804.0, 16.09.2016)
- Transportsystem mit automatischer Folgefunktion sowie Steuerungsverfahren (102016217805.9, 16.09.2016)
- Verfahren zur Vortriebssteuerung eines dreispurigen Fahrzeugs sowie Fahrzeug (102016221367.9, 28.10.2016)
- Fahrzeug mit elektromotorisch angetriebenen Rädern und Verfahren zum Lenken desselben (102016221366.0, 28.10.2016)
- Tethering of a Semi-Autonomous Vehicle (83866252, 03.08.2017)
- Conveying System with an Automatic Tethering Function (US20180081372A1, 14.09.2017)

Abschlussarbeiten

Im Rahmen meiner Forschungstätigkeit ergeben sich kontinuierlich Themen für Abschlussarbeiten. Bei Interesse bitte ich um Kontaktaufnahme per E-Mail oder persönlich bei mir im Büro.

Laufend

Abgeschlossen

- Complete Language Support and Error Detection of Sequential Function Charts in Twistturn
- Development of a Factory Acceptance Test for Reduction of Commissioning Times of Decentral Passenger Transport Facilities
- Development of a Prototype Vehicle Status Display and Interaction Device
- Extending Postsimulation by a Virtual Timebase
- Utilizing Sequential Function Charts to Specify Hardware-in-the-Loop Tests
- Analysis and Postsimulation of Hardware-in-the-Loop Tests
- Hardware-in-the-Loop Simulation Using an Extension of PLC Programming Languages
- Extension of Twistturn to Support Hardware-in-the-Loop Simulation
- Balance Point dependent Vehicle Dynamics Control
- Tethering semi-autonomous Vehicles by relative Positioning
- Integration of the PROFINET Stack into the RTAndroid Platform
- Design and Implementation of an efficient on-board Field Device Adapter for Twistturn
- OPC UA Connectivity of Android Devices and Machine Tools
- Utilizing Bluetooth for Supporting Real-Time Wireless Communication

Lehre

Semester	Titel	Art
Wintersemester 14/15	Praktikum Systemprogrammierung	P
	Ausgesuchte Themen zur Eingebetteten Software	S
Sommersemester 15	Praktikum Systemprogrammierung	P
	Dienste in der Industrie 4.0	S
Wintersemester 15/16	Praktikum Systemprogrammierung	P
	Modellbasiertes Testen & Analyse eingebetteter Software	S
Sommersemester 16	Praktikum Systemprogrammierung	P
	Eingebettete Software in Medizintechnik & eMobilität	S
Wintersemester 16/17	Praktikum Systemprogrammierung	P
	Eingebettete Software in Medizintechnik & eMobilität	S
Sommersemester 17	Praktikum Systemprogrammierung	P
	Modellbasiertes Testen & Analyse eingebetteter Software	S
Wintersemester 17/18	Modellierungssprachen für eingebettete Systeme	PS
	Modellbasiertes Testen & Analyse eingebetteter Software	S
	Praktikum Systemprogrammierung (Versuch 1)	P

Sommersemester 18	Modellbasiertes Testen & Analyse eingebetteter Software	S
	Praktikum Systemprogrammierung (Versuch 1)	P
Wintersemester 18/19	Modellbasiertes Testen & Analyse eingebetteter Software	S
Sommersemester 19	Proseminar: Grundlagen eingebetteter Systeme	PS
	Seminar: Ausgesuchte Themen zur Eingebetteten Software	S

Sprechstunde

Nach Vereinbarung.

Publikationen

[Tho21]
PDFBIB

Thönnessen, D., "Hardware-in-the-Loop testing of industrial automation systems using PLC languages", PhD Thesis, Aachen, 2021.

Hardware-in-the-Loop testing of industrial automation systems using PLC languages

Bibtex entry :

```
@phdthesis {  Tho21,
    author = { Th{\"o}nnessen, David },
    othercontributors = { Kowalewski, Stefan and Fabian, Martin },
    title = { Hardware-in-the-Loop testing of industrial automation
        systems using PLC languages },
    publisher = { RWTH Aachen University },
    school = { RWTH Aachen University },
    pages = { 1 Online-Ressource : Illustrationen, Diagramme },
    series = { Aachener Informatik-Berichte },
    year = { 2021 },
    address = { Aachen },
    doi = { 10.18154/RWTH-2021-08705 },
    typ = { PUB:(DE-HGF)11 },
    reportid = { RWTH-2021-08705 },
    cin = { 122810 / 120000 },
    url = {
http://publications.rwth-aachen.de/record/826036/files/826036.pdf },
}
```

[SRT+20]
PDFBIB

Smieschek, M., Rakel, S., Thönnessen, D., Derks, A., Stollenwerk, A., and Kowalewski, S., "A Remote Test Environment for a Large-Scale Microcontroller Laboratory Course", in *Proc. Cyber physical systems : model-based design : 9th international workshop, CyPhy 2019 and 15th*

international workshop, WESE 2019, New York City, NY, USA, October 17-18, 2019 : revised selected papers / Roger Chamberlain, Martin Edin Grimheden, Walid Taha (eds.), Cham, 2020 in Lecture Notes in Computer Science, Springer, pp. 231-246.

A Remote Test Environment for a Large-Scale Microcontroller Laboratory Course

Bibtex entry :

```
@inproceedings {  SRT+20,
    author = { Smieschek, Manfred and Rakel, Stefan and Th{\"o}nnessen,
        David and Derks, Andreas and Stollenwerk, André and
        Kowalewski, Stefan },
    title = { A Remote Test Environment for a Large-Scale
Microcontroller
        Laboratory Course },
    booktitle = { Cyber physical systems : model-based design : 9th
        international workshop, CyPhy 2019 and 15th international
        workshop, WESE 2019, New York City, NY, USA, October 17-18,
        2019 : revised selected papers / Roger Chamberlain, Martin
        Edin Grimheden, Walid Taha (eds.) },
    publisher = { Springer },
    pages = { 231-246 },
    series = { Lecture Notes in Computer Science },
    year = { 2020 },
    address = { Cham },
    organization = { Workshop on Embedded Systems and Cyber-Physical
Systems
        Education, New York (USA), 2019-10-17 - 2019-10-18 },
    doi = { 10.1007/978-3-030-41131-2_11 },
    typ = { PUB:(DE-HGF)7 },
    reportid = { RWTH-2020-02344 },
    cin = { 122810 / 120000 },
    url = {
http://publications.rwth-aachen.de/record/783169/files/Remote%20Pool%20
Final.pdf },
}
```

[KTF19]
PDFBIB

Khan, A., Thönnessen, D., and Fabian, M., "On-the-fly conformance testing of safety PLC code using QuickCheck", in *Proc. 2019 IEEE 17th International Conference on Industrial Informatics (INDIN) : Aalto University, Helsinki-Espoo, Finland, 22-25 July, 2019 : proceedings / organized by: Aalto University, Finland; Tampere University, Finland; Finnish Society of Automation, Finland ; sponsored by: the Institute of Electrical and Electronics Engineers (IEEE), IEEE Industrial Electronics Society (IES)*, Piscataway, NJ, 2019, IEEE, pp. 419-424.

On-the-fly conformance testing of safety PLC code using QuickCheck

Bibtex entry :

```
@inproceedings {  KTF19,
    author = { Khan, Adnan and Th{\"o}nnessen, David and Fabian, Martin
},
    title = { On-the-fly conformance testing of safety PLC code using
        QuickCheck },
    booktitle = { 2019 IEEE 17th International Conference on Industrial
        Informatics (INDIN) : Aalto University, Helsinki-Espoo,
        Finland, 22-25 July, 2019 : proceedings / organized by:
        Aalto University, Finland; Tampere University, Finland;
        Finnish Society of Automation, Finland ; sponsored by: the
        Institute of Electrical and Electronics Engineers (IEEE),
        IEEE Industrial Electronics Society (IES) },
    publisher = { IEEE },
    pages = { 419-424 },
    year = { 2019 },
    address = { Piscataway, NJ },
    organization = { 17th IEEE International Conference on Industrial
        Informatics, Helsinki (Finland), 2019-07-22 - 2019-07-25 },
    doi = { 10.1109/INDIN41052.2019.8972277 },
    typ = { PUB:(DE-HGF)7 },
    reportid = { RWTH-2019-04271 },
    cin = { 122810 / 120000 },
    url = { http://publications.rwth-aachen.de/record/760542 },
}
```

[TSF+19]
PDFBIB

Thönnessen, D., Smallbone, N., Fabian, M., Claessen, K., and Kowalewski, S., "Testing Safety PLCs Using QuickCheck", in *Proc. 2019 IEEE 15th International Conference on Automation Science and Engineering : (CASE) : August 22-26, 2019, Vancouver, BC, Canada / sponsored by IEEE Robotics and Automation Society ; CASE editorial board: editor-in-chief: Spiridon (Spyros) Reveliotis ; editors: Cappelleri, David; Dimarogonas, Dimos V.; Dotoli, Mariagrazia; Fanti, Maria Pia; LUTZ, Philippe; Seatzu, Carla; Xie, Xiaolan*, Piscataway, NJ, 2019, IEEE, pp. 1388-1393.

Testing Safety PLCs Using QuickCheck

Bibtex entry :

```
@inproceedings {  TSF+19,
    author = { Th{\"o}nnessen, David and Smallbone, Nick and Fabian,
Martin
        and Claessen, Koen and Kowalewski, Stefan },
    title = { Testing Safety PLCs Using QuickCheck },
    booktitle = { 2019 IEEE 15th International Conference on Automation
        Science and Engineering : (CASE) : August 22-26, 2019,
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        Vancouver, BC, Canada / sponsored by IEEE Robotics and
        Automation Society ; CASE editorial board: editor-in-chief:
        Spiridon (Spyros) Reveliotis ; editors: Cappelleri, David;
        Dimarogonas, Dimos V.; Dotoli, Mariagrazia; Fanti, Maria
        Pia; LUTZ, Philippe; Seatzu, Carla; Xie, Xiaolan },
    publisher = { IEEE },
    pages = { 1388-1393 },
    year = { 2019 },
    address = { Piscataway, NJ },
    organization = { 15th International Conference on Automation
Science and
        Engineering, Vancouver (Canada), 2019-08-22 - 2019-08-26 },
    doi = { 10.1109/COASE.2019.8843227 },
    typ = { PUB:(DE-HGF)7 },
    reportid = { RWTH-2019-04632 },
    cin = { 122810 / 120000 },
    url = { http://publications.rwth-aachen.de/record/761173 },
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[BFH+18]
PDFBIB

Bordasch, M., Facchi, C., Heidepriem, S., Jähnert, J., Jung, T., Köllner, C., Kraas, A., Krause, J., Krüning, K., Kugler, A., Maschler, B., Schleicher, C., Siegrist, D., Simon, H., Störmer, C., Thönnessen, D., Wassermann, E., Weyrich, M., Wimmer, T., and Zeller, A., "VDI Status Report Testing of Networked Systems for Industrie 4.0", 2018.

VDI Status Report Testing of Networked Systems for Industrie 4.0

Bibtex entry :

```
@techreport {  BFH+18,
    author = { Bordasch, Manuel and Facchi, Christian and Heidepriem,
        Sebastian and J{\"a}hnert, J{\"u}rger and Jung, Tobias and
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        and Kr{\"u}ning, Kai and Kugler, Alexander and Maschler,
        Benjamin and Schleicher, Christian and Siegrist, Daniel and
        Simon, Hendrik and St{\"o}rmer, Christoph and
        Th{\"o}nnessen, David and Wassermann, Erik and Weyrich,
        Michael and Wimmer, Thomas and Zeller, Andreas },
    title = { VDI Status Report Testing of Networked Systems for
Industrie
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    pages = { 1-20 },
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    url = {
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https://www.vdi.de/ueber-uns/presse/publikationen/details?tx_vdipublica
tions_publicationdetails%5Bpublication%5D=19&cHash=e6b4c230eafa31d95ceb
75395274c78c },
}
```

[TK18]
PDFBIB

Thönnessen, D. and Kowalewski, S., "Agiles Testen von cyber-physischen Produktionssystemen : Einsatz von SPS-Sprachen zur Testfallbeschreibung", *Atp-Edition : automatisierungstechnische Praxis*, vol. 60, iss. 3, pp. 46-55, 2018

Agiles Testen von cyber-physischen Produktionssystemen : Einsatz von SPS-Sprachen zur Testfallbeschreibung

Bibtex entry :

```
@article {  TK18,
    author = { Th{\"o}nnessen, David and Kowalewski, Stefan },
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        Einsatz von SPS-Sprachen zur Testfallbeschreibung },
    journal = { Atp-Edition : automatisierungstechnische Praxis },
    publisher = { DIV Dt. Industrieverl. },
    pages = { 46-55 },
    volume = { 60 },
    number = { 3 },
    year = { 2018 },
    address = { M{\"u}nchen },
    issn = { 2364-3137 },
    doi = { 10.17560/atp.v58i03.1917 },
    typ = { PUB:(DE-HGF)16 },
    reportid = { RWTH-2018-225395 },
    cin = { 122810 / 120000 },
    url = { http://publications.rwth-aachen.de/record/727012 },
}
```

[TK18a]
PDFBIB

Thönnessen, D. and Kowalewski, S., "Using PLC Programming Languages for Test-Case Specification of Hardware-in-the-loop Tests", in *Proc. [Modellbasierte Entwicklung eingebetteter Systeme, MBEES 2018, 2018-04-16 - 2018-04-18, Hamburg, Germany]*, 2018, fortiss Technischer Bericht, pp. 41-50.

Using PLC Programming Languages for Test-Case Specification of Hardware-in-the-loop Tests

Bibtex entry :

```
@inproceedings {  TK18a,
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    author = { Th{\"o}nnessen, David and Kowalewski, Stefan },
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    booktitle = { [Modellbasierte Entwicklung eingebetteter Systeme,
MBEES
        2018, 2018-04-16 - 2018-04-18, Hamburg, Germany] },
    publisher = { fortiss Technischer Bericht },
    pages = { 41-50 },
    year = { 2018 },
    organization = { Modellbasierte Entwicklung eingebetteter Systeme,
Hamburg
        (Germany), 2018-04-16 - 2018-04-18 },
    typ = { PUB:(DE-HGF)8 },
    reportid = { RWTH-CONV-236290 },
    cin = { 122810 / 120000 },
    url = { http://publications.rwth-aachen.de/record/752269 },
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```

[TRR+18]
PDFBIB

Thönnessen, D., Reinker, N., Rakel, S., and Kowalewski, S., "A concept for PLC hardware-in-the-loop testing using an extension of structured text", in *Proc. 2017 22nd IEEE International Conference on Emerging Technologies and Factory Automation : September 12-15, 2017, Limassol, Cyprus / ABB, IEEE, IES, University of Cyprus*, [Piscataway, NJ], 2018 in IEEE International Conference on Emerging Technologies and Factory Automation-ETFA, IEEE, p. 8.

A concept for PLC hardware-in-the-loop testing using an extension of structured text

Bibtex entry :

```
@inproceedings {  TRR+18,
    author = { Th{\"o}nnessen, David and Reinker, Niklas and Rakel,
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    title = { A concept for PLC hardware-in-the-loop testing using an
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    booktitle = { 2017 22nd IEEE International Conference on Emerging
        Technologies and Factory Automation : September 12-15, 2017,
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    publisher = { IEEE },
    pages = { 8 Seiten },
    series = { IEEE International Conference on Emerging Technologies
and
        Factory Automation-ETFA },
    year = { 2018 },
    address = { [Piscataway, NJ] },
    organization = { 22nd IEEE International Conference on Emerging
```

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Technologies
        and Factory Automation, Limassol (Cyprus), 2017-09-12 -
        2017-09-15 },
    doi = { 10.1109/ETFA.2017.8247580 },
    typ = { PUB:(DE-HGF)7 },
    reportid = { RWTH-2018-223452 },
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    url = { http://publications.rwth-aachen.de/record/722218 },
}
```

[TRR+18a]
PDFBIB

Thönnessen, D., Rakel, S., Reinker, N., and Kowalewski, S., "Matching Discrete Signals for Hardware-in-the-Loop-Testing of PLCs", *IFAC-PapersOnLine*, vol. 51, iss. 10, pp. 229-234, 2018

Matching Discrete Signals for Hardware-in-the-Loop-Testing of PLCs

Bibtex entry :

```
@article {  TRR+18a,
    author = { Th{\"o}nnessen, David and Rakel, Stefan and Reinker,
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        and Kowalewski, Stefan },
    title = { Matching Discrete Signals for Hardware-in-the-Loop-
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        of PLCs },
    journal = { IFAC-PapersOnLine },
    pages = { 229-234 },
    volume = { 51 },
    number = { 10 },
    year = { 2018 },
    address = { Laxenburg },
    issn = { 2405-8963 },
    organization = { 3rd IFAC Conference on Embedded Systems,
Computational
        Intelligence and Telematics in Control },
    doi = { 10.1016/j.ifacol.2018.06.267 },
    typ = { PUB:(DE-HGF)16 },
    reportid = { RWTH-2018-227582 },
    cin = { 122810 / 110000 / 120000 },
    url = { http://publications.rwth-aachen.de/record/731576 },
}
```

[TRR+18b]
PDFBIB

Thönnessen, D., Reinker, N., Rakel, S., Svetlakov, A., and Kowalewski, S., "Correctness Properties and Exemplified Applicability of a Signal Matching Algorithm with Multidimensional Tolerance Specifications", in *Proc. 2018 IEEE 14th International Conference on Automation Science and Engineering (CASE) : Munich, Germany, August 20-24, 2018*, Piscataway, NJ, 2018,

IEEE, pp. 1197-1202.

Correctness Properties and Exemplified Applicability of a Signal Matching Algorithm with Multidimensional Tolerance Specifications

Bibtex entry :

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@inproceedings {  TRR+18b,
    author = { Th{\"o}nnessen, David and Reinker, Niklas and Rakel,
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    title = { Correctness Properties and Exemplified Applicability of a
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        Specifications },
    booktitle = { 2018 IEEE 14th International Conference on Automation
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    organization = { 2018 IEEE 14th International Conference on
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        Science and Engineering, Munich (Germany), 2018-08-20 -
        2018-08-24 },
    doi = { 10.1109/COASE.2018.8560407 },
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    cin = { 122810 / 120000 },
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http://publications.rwth-aachen.de/record/752982/files/752982.pdf },
}
```

[TSN+16]
PDFBIB

Thönnessen, D., Schweigler, M., Ney, O., and Kugelmeier, M., "Conveying system with an automatic tethering function", 2016.

Conveying system with an automatic tethering function

Bibtex entry :

```
@techreport {  TSN+16,
    author = { Th{\"o}nnessen, David and Schweigler, Martin and Ney,
Oliver
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    pages = { 1-7 },
    year = { 2016 },
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    reportid = { RWTH-CONV-236287 },
    url = {
https://depatisnet.dpma.de/DepatisNet/depatisnet?action=bibdat&docid=US
020180081372A1 },
}
```

[KKO+15]
PDFBIB

Kowalewski, S., Kalkov, I., Obster, M., and Thönnessen, D., "Echtzeiterweiterung für Android: SPS inside", *IEE - Elektrische Automatisierung + Antriebstechnik*, pp. 58-61, 2015

Echtzeiterweiterung für Android: SPS inside

Bibtex entry :

```
@article {  KKO+15,
    author = { Kowalewski, Stefan and Kalkov, Igor and Obster, Mathias
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    title = { Echtzeiterweiterung f{\"u}r Android: SPS inside },
    journal = { IEE - Elektrische Automatisierung + Antriebstechnik },
    publisher = { IEE },
    pages = { 58-61 },
    year = { 2015 },
    issn = { 1434-2898 },
    typ = { PUB:(DE-HGF)16 },
    reportid = { RWTH-CONV-236305 },
    cin = { 122810 / 120000 },
    url = { http://publications.rwth-aachen.de/record/752275 },
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