

Dr. Ing. Ibtissem Ben Makhoulf

Kontakt

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Interessen

- Erreichbarkeitsanalyse hybrider Systeme

Projekte

- [Sicherheitsanalyse und Regelung von Fahrzeugkolonnen](#)

Veröffentlichungen

[BHK17]

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

Ben Makhoulf, I., Hansen, N., and Kowalewski, S., "HyReach: A Reachability Tool for Linear Hybrid Systems Based on Support Functions", in *Proc. ARCH16. 3rd International Workshop on Applied Verification for Continuous and Hybrid Systems / Editors: Goran Frehse and Matthias Althoff*, 2017 in EPIc Series in Computing, pp. 68-79.

HyReach: A Reachability Tool for Linear Hybrid Systems Based on Support Functions

Bibtex entry :

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@inproceedings { BHK17,  
  author = { Ben Makhoulf, Ibtissem and Hansen, Norman and  
            Kowalewski,  
            Stefan },  
  title = { HyReach: A Reachability Tool for Linear Hybrid Systems  
Based  
            on Support Functions },  
  booktitle = { ARCH16. 3rd International Workshop on Applied  
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            for Continuous and Hybrid Systems / Editors: Goran Frehse  
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pages = { 68-79 },
series = { EPiC Series in Computing },
year = { 2017 },
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for
    Continuous and Hybrid Systems, Vienna (Austria), 2016-04-12
    - 2016-04-12 },
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cin = { 122810 / 120000 },
url = { https://easychair.org/publications/paper/334327 },
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[SAB+17]

PDFBIB

Schupp, S., Ábrahám, E., Ben Makhoulf, I., and Kowalewski, S., "HyPro : A C++ Library of State Set Representations for Hybrid Systems Reachability Analysis", in *Proc. NASA formal methods : 9th international symposium, NFM 2017, Moffett Field, CA, USA, May 16-18, 2017 : proceedings / Clark Barrett, Misty Davies, Temesghen Kahsai (eds.)*, Cham, 2017 in Lecture Notes in Computer Science, Springer, pp. 288-294.

HyPro : A C++ Library of State Set Representations for Hybrid Systems Reachability Analysis

Bibtex entry :

```
@inproceedings { SAB+17,
  author = { Schupp, Stefan and Ábrahám, Erika and Ben Makhoulf,
    Ibtissem and Kowalewski, Stefan },
  title = { HyPro : A C++ Library of State Set Representations for
    Hybrid Systems Reachability Analysis },
  booktitle = { NASA formal methods : 9th international symposium,
    NFM 2017,
    Moffett Field, CA, USA, May 16-18, 2017 : proceedings /
    Clark Barrett, Misty Davies, Temesghen Kahsai (eds.) },
  publisher = { Springer },
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  year = { 2017 },
  address = { Cham },
  organization = { NASA Formal Methods (NFM) Symposium, Moffett
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    (USA), 2017-05-16 - 2017-05-18 },
  doi = { 10.1007/978-3-319-57288-8_20 },
  typ = { PUB:(DE-HGF)7 },
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  url = { http://publications.rwth-aachen.de/record/696076 },
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[Ben16]

[PDFBIB](#)

Ben Makhoulf, I., "Comparative evaluation and improvement of computational approaches to reachability analysis of linear hybrid systems", PhD Thesis, Aachen, 2016.

Comparative evaluation and improvement of computational approaches to reachability analysis of linear hybrid systems

Bibtex entry :

```
@phdthesis { Ben16,  
  author = { Ben Makhoulf, Ibtissem },  
  othercontributors = { Kowalewski, Stefan and Frehse, Goran },  
  title = { Comparative evaluation and improvement of computational  
    approaches to reachability analysis of linear hybrid systems },  
  publisher = { Shaker Verlag },  
  school = { RWTH Aachen },  
  pages = { viii, 221 Seiten : Illustrationen, Diagramme },  
  series = { Aachener Informatik-Berichte },  
  year = { 2016 },  
  address = { Aachen },  
  isbn = { 978-3-8440-4376-1 },  
  typ = { PUB:(DE-HGF)3 },  
  reportid = { RWTH-2016-02174 },  
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http://publications.rwth-aachen.de/record/571624/files/571624.pdf },  
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[BGK15]

[PDFBIB](#)

Ben Makhoulf, I., Gan, J., and Kowalewski, S., "A Study on Solving Guard and Invariant Set Intersection in Zonotope-based Reachability of Linear Hybrid Systems", *IFAC-PapersOnLine*, vol. 48, iss. 27, pp. 13-20, 2015

A Study on Solving Guard and Invariant Set Intersection in Zonotope-based Reachability of Linear Hybrid Systems

Bibtex entry :

```
@article { BGK15,  
  author = { Ben Makhoulf, Ibtissem and Gan, Jonathan and Kowalewski,  
    Stefan },  
  title = { A Study on Solving Guard and Invariant Set Intersection  
in  
    Zonotope-based Reachability of Linear Hybrid Systems },
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journal = { IFAC-PapersOnLine },
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address = { Laxenburg },
issn = { 2405-8963 },
organization = { Analysis and Design of Hybrid Systems, Atlanta, GA
(USA),
    2015-10-14 - 2015-10-16 },
doi = { 10.1016/j.ifacol.2015.11.146 },
typ = { PUB:(DE-HGF)8 },
reportid = { RWTH-2015-07851 },
cin = { 122810 / 120000 },
url = { http://publications.rwth-aachen.de/record/565384 },
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[BK15]

PDFBIB

Ben Makhlouf, I. and Kowalewski, S., "Networked Cooperative Platoon of Vehicles for Testing Methods and Verification Tools", in *Proc. [ARCH14-15. 1st and 2nd International Workshop on Applied verification for Continuous and Hybrid Systems / Goran Frehse and Matthias Althoff (editors)]*, 2015 in EPiC Series in Computer Science, EasyChair, pp. 37-42.

Networked Cooperative Platoon of Vehicles for Testing Methods and Verification Tools

Bibtex entry :

```
@inproceedings { BK15,
  author = { Ben Makhlouf, Ibtissem and Kowalewski, Stefan },
  title = { Networked Cooperative Platoon of Vehicles for Testing
    Methods and Verification Tools },
  booktitle = { [ARCH14-15. 1st and 2nd International Workshop on
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      verification for Continuous and Hybrid Systems / Goran
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  pages = { 37-42 },
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atoon_of_Vehicles_for_Testing_Methods_and_Verification_Tools },
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```

[BK15a]

[PDFBIB](#)

Ben Makhoulf, I. and Kowalewski, S., "Optimizing Safe Control of a Networked Platoon of Trucks Using Reachability", in *Proc. [ARCH14-15. 1st and 2nd International Workshop on Applied verification for Continuous and Hybrid Systems / Goran Frehse and Matthias Althoff (editors)]*, 2015 in EPiC Series in Computing, EasyChair, pp. 169-179.

Optimizing Safe Control of a Networked Platoon of Trucks Using Reachability

Bibtex entry :

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@inproceedings { BK15a,
  author = { Ben Makhoulf, Ibtissem and Kowalewski, Stefan },
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  booktitle = { [ARCH14-15. 1st and 2nd International Workshop on
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      verification for Continuous and Hybrid Systems / Goran
      Frehse and Matthias Althoff (editors)] },
  publisher = { EasyChair },
  pages = { 169-179 },
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  year = { 2015 },
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    verification
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  reportid = { RWTH-CONV-207910 },
  cin = { 122810 / 120000 },
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}
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[CSB+15]

[PDFBIB](#)

Chen, X., Schupp, S., Ben Makhoulf, I., Ábrahám, E., Frehse, G., and Kowalewski, S., "A Benchmark Suite for Hybrid Systems Reachability Analysis", in *Proc. NASA Formal Methods ; 7th International Symposium, NFM 2015, Pasadena, Calif., USA, April 27-29, 2015, Proceedings / edited by Klaus Havelund, Gerard Holzmann, Rajeev Joshi*, Cham, 2015 in Lecture Notes in Computer Science, Springer, pp. 408-414.

A Benchmark Suite for Hybrid Systems Reachability Analysis

Bibtex entry :

```
@inproceedings { CSB+15,
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```
author = { Chen, Xin and Schupp, Stefan and Ben Makhlouf, Ibtissem  
and  
    Ábrahám, Erika and Frehse, Goran and Kowalewski, Stefan },  
title = { A Benchmark Suite for Hybrid Systems Reachability  
Analysis },  
booktitle = { NASA Formal Methods ; 7th International Symposium,  
NFM 2015,  
    Pasadena, Calif., USA, April 27-29, 2015, Proceedings /  
    edited by Klaus Havelund, Gerard Holzmann, Rajeev Joshi },  
publisher = { Springer },  
pages = { 408-414 },  
series = { Lecture Notes in Computer Science },  
year = { 2015 },  
address = { Cham },  
organization = { 7. International Symposium Formal Methods,  
Pasadena, Calif.  
    (Germany), 2015-04-27 - 2015-04-29 },  
doi = { 10.1007/978-3-319-17524-9_29 },  
typ = { PUB:(DE-HGF)7 },  
reportid = { RWTH-CONV-207695 },  
cin = { 123420 / 120000 / 122810 },  
url = { http://publications.rwth-aachen.de/record/541100 },  
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[SAC+15]

[PDFBIB](#)

Schupp, S., Ábrahám, E., Chen, X., Ben Makhlouf, I., Frehse, G., Sankaranarayanan, S., and Kowalewski, S., "Current Challenges in the Verification of Hybrid Systems", in *Proc. Cyber physical systems : design, modeling, and evaluation ; 5th international workshop, CyPhy 2015, Amsterdam, The Netherlands, October 8, 2015 ; proceedings / Christian Berger ... (eds.)*, Cham, 2015 in Lecture Notes in Computer Science, Springer International Publishing, pp. 8-24.

Current Challenges in the Verification of Hybrid Systems

Bibtex entry :

```
@inproceedings { SAC+15,  
    author = { Schupp, Stefan and Ábrahám, Erika and Chen, Xin and Ben  
        Makhlouf, Ibtissem and Frehse, Goran and Sankaranarayanan,  
        Sriram and Kowalewski, Stefan },  
    title = { Current Challenges in the Verification of Hybrid Systems  
},  
    booktitle = { Cyber physical systems : design, modeling, and  
evaluation ;  
        5th international workshop, CyPhy 2015, Amsterdam, The  
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        Berger ... (eds.) },  
    publisher = { Springer International Publishing },  
    pages = { 8-24 },  
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year = { 2015 },
address = { Cham },
organization = { 5. Workshop on Design, Modeling, and Evaluation of
Cyber
Physical Systems, Amsterdam (Netherlands), 2015-10-08 -
2015-10-08 },
doi = { 10.1007/978-3-319-25141-7_2 },
typ = { PUB:(DE-HGF)7 },
reportid = { RWTH-2015-07355 },
cin = { 121310 / 120000 / 123420 / 121330 / 122810 },
url = { http://publications.rwth-aachen.de/record/564375 },
}

```

[BK14]

[PDFBIB](#)

Ben Makhoulf, I. and Kowalewski, S., "Networked Cooperative Platoon of Vehicles for Testing Methods and Verification Tools", in *Proc. ARCH14 CPSWeek 2014 : Berlin, Germany, April 14 - 17, 2014*, [s.l.], 2014, p. 6.

Networked Cooperative Platoon of Vehicles for Testing Methods and Verification Tools

Bibtex entry :

```

@inproceedings { BK14,
author = { Ben Makhoulf, Ibtissem and Kowalewski, Stefan },
title = { Networked Cooperative Platoon of Vehicles for Testing
Methods and Verification Tools },
booktitle = { ARCH14 CPSWeek 2014 : Berlin, Germany, April 14 - 17,
2014 },
pages = { 6 Seiten },
year = { 2014 },
address = { [s.l.] },
organization = { ARCH14 CPSWeek 2014, Berlin (Germany),
2014-04-14-2014-04-17 },
typ = { PUB:(DE-HGF)8 },
reportid = { RWTH-CONV-205606 },
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url = { http://cps-vo.org/node/12115 },
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```

[BDK13]

[PDFBIB](#)

Ben Makhoulf, I., Diab, H., and Kowalewski, S., "Reachability Analysis for Managing Platoons at Intersections", in *Proc. 2013 21st Mediterranean Conference on Control & Automation (MED 2013) : [Platanias], Chania, Crete, Greece, 25 - 28 June 2013 ; [conference proceedings] / [sponsor: Mediterranean Control Association. Technical co-sponsors: IEEE Control Systems Society; IEEE Robotics & Automation Society ... Ed. by Panos Antsaklis ...]. - 1-2, Piscataway, NJ, 2013, IEEE, pp. 1141-1147.*

Reachability Analysis for Managing Platoons at Intersections

Bibtex entry :

```
@inproceedings { BDK13,  
  author = { Ben Makhlouf, Ibtissem and Diab, Hilal and Kowalewski,  
            Stefan },  
  title = { Reachability Analysis for Managing Platoons at  
Intersections },  
  booktitle = { 2013 21st Mediterranean Conference on Control &  
Automation  
(MED 2013) : [Platanias], Chania, Crete, Greece, 25 - 28  
June 2013 ; [conference proceedings] / [sponsor:  
Mediterranean Control Association. Technical co-sponsors:  
IEEE Control Systems Society; IEEE Robotics & Automation  
Society ... Ed. by Panos Antsaklis ...]. - 1-2 },  
  publisher = { IEEE },  
  pages = { 1141-1147 },  
  year = { 2013 },  
  address = { Piscataway, NJ },  
  organization = { 21. Mediterranean Conference on Control &  
Automation,  
Chania, Crete (Greece), 2013-06-25 - 2013-06-28 },  
  doi = { 10.1109/MED.2013.6608864 },  
  typ = { PUB:(DE-HGF)8 },  
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  url = { http://publications.rwth-aachen.de/record/226951 },  
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[BHK13]

[PDFBIB](#)

Ben Makhlouf, I., Hänsch, P., and Kowalewski, S., "Comparison of Reachability Methods for Uncertain Linear Time-Invariant Systems", in *Proc. Proceedings of the 12th European Control Conference (ECC) : July 17 -19, 2013, Zuerich, Switzerland, Zürich, 2013*, Omnipress, pp. 1101-1106.

Comparison of Reachability Methods for Uncertain Linear Time-Invariant Systems

Bibtex entry :

```
@inproceedings { BHK13,  
  author = { Ben Makhlouf, Ibtissem and H{"a"}nsch, Paul and  
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booktitle = { Proceedings of the 12th European Control Conference
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organization = { 12. European Control Conference (ECC), Zuerich
    (Switzerland), 2013-07-17 - 2013-07-19 },
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url = { http://publications.rwth-aachen.de/record/225184 },
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```

[HDB+13]

[PDFBIB](#)

Hänsch, P., Diab, H., Ben Makhoul, I., and Kowalewski, S., "Reachability Analysis of Linear Systems with Stepwise Constant Inputs", *Electronic notes in theoretical computer science : ENTCS*, vol. 297, pp. 61-74, 2013

Reachability Analysis of Linear Systems with Stepwise Constant Inputs

Bibtex entry :

```

@article { HDB+13,
    author = { H{\a}nsch, Paul and Diab, Hilal and Ben Makhoul,
Ibtissem
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ENTCS },
    publisher = { Elsevier },
    pages = { 61-74 },
    volume = { 297 },
    year = { 2013 },
    address = { Amsterdam },
    issn = { 1571-0661 },
    organization = { 1. workshop on Hybrid Autonomous Systems },
    doi = { 10.1016/j.entcs.2013.12.005 },
    typ = { PUB:(DE-HGF)16 },
    reportid = { RWTH-CONV-088053 },
    cin = { 120000 / 122810 },
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```

[BDK12]

[PDFBIB](#)

Ben Makhlouf, I., Diab, H., and Kowalewski, S., "Safety Verification of a Controlled Cooperative Platoon Under Loss of Communication Using Zonotopes", in *Proc. Inproceeding of the 4th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS 12)*, Eindhoven, NL, 2012, pp. 333-338.

Safety Verification of a Controlled Cooperative Platoon Under Loss of Communication Using Zonotopes

Bibtex entry :

```
@inproceedings { BDK12,  
  author = { Ben Makhlouf, Ibtissem and Diab, Hilal and Kowalewski,  
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Hybrid Systems,  
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[DBK12]

[PDFBIB](#)

Diab, H., Ben Makhlouf, I., and Kowalewski, S., "A Platoon of Vehicles Approaching an Intersection: A Testing Platform for Safe Intersections", in *Proc. 2012 15th International IEEE Conference on Intelligent Transportation Systems (ITSC) : 16 - 19 Sept. 2012, Anchorage, Alaska, USA, Piscataway, NJ*, 2012, IEEE, pp. 1918-1923.

A Platoon of Vehicles Approaching an Intersection: A Testing Platform for Safe Intersections

Bibtex entry :

```
@inproceedings { DBK12,  
  author = { Diab, Hilal and Ben Makhlouf, Ibtissem and Kowalewski,  
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Testing  
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  booktitle = { 2012 15th International IEEE Conference on
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Intelligent

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Transportation Systems (ITSC) : 16 - 19 Sept. 2012,
Anchorage, Alaska, USA },
publisher = { IEEE },
pages = { 1918-1923 },
year = { 2012 },
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organization = { 15. International IEEE Conference on Intelligent
Transportation Systems, Anchorage (USA), 16-09-2012 -
19-09-2012 },
doi = { 10.1109/ITSC.2012.6338822 },
typ = { PUB:(DE-HGF)8 },
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url = { http://publications.rwth-aachen.de/record/197725 },
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```

[BMH+11]

[PDFBIB](#)

Ben Makhoulf, I., Maschuw, J. P., Hänsch, P., Diab, H., Kowalewski, S., and Abel, D., "Safety Verification of a Cooperative Vehicle Platoon with Uncertain Inputs Using Zonotopes", in *Proc. Proceedings of the 18th IFAC World Congress, 2011 : August 28 - September 2, 2011, Università Cattolica del Sacro Cuore, Milano Italy / Ed.: Sergio Bittanti ...*, Milano, Italy, 2011 in IFAC-PapersOnLine, Curran, pp. 9769-9774.

Safety Verification of a Cooperative Vehicle Platoon with Uncertain Inputs Using Zonotopes

Bibtex entry :

```

@inproceedings { BMH+11,
  author = { Ben Makhoulf, Ibtissem and Maschuw, Jan P. and
H{"a"}nsch,
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  title = { Safety Verification of a Cooperative Vehicle Platoon
with Uncertain Inputs Using Zonotopes },
  booktitle = { Proceedings of the 18th IFAC World Congress, 2011 :
August
    28 - September 2, 2011, Università Cattolica del Sacro
Cuore, Milano Italy / Ed.: Sergio Bittanti ... },
  publisher = { Curran },
  pages = { 9769-9774 },
  series = { IFAC-PapersOnLine },
  year = { 2011 },
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2011-08-28 -
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[CBD+10]

[PDFBIB](#)

Chávez Grunewald, M. G., Ben Makhlouf, I., Diab, H., Abel, D., and Kowalewski, S., "On the Effects of Network Delays on an Energy-based Controller", , TuPO11.1, 2010.

On the Effects of Network Delays on an Energy-based Controller

Bibtex entry :

```
@techreport { CBD+10,  
  author = { Chávez Grunewald, Martin Guillermo and Ben Makhlouf,  
            Ibtissem and Diab, Hilal and Abel, Dirk and Kowalewski,  
            Stefan },  
  title = { On the Effects of Network Delays on an Energy-based  
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  booktitle = { NecSys'10 : 2nd IFAC Workshop on Distributed  
Estimation and  
            Control in Networked Systems ; 13-14 September, 2010, Centre  
            de Congrès de L'Impérial Palace, Annecy, France },  
  pages = { 169-174 },  
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  year = { 2010 },  
  organization = { 2. IFAC Workshop on Distributed Estimation and  
Control in  
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  typ = { PUB:(DE-HGF)8 },  
  reportid = { RWTH-CONV-009571 },  
  cin = { 122810 / 416610 / 120000 },  
  url = { http://publications.rwth-aachen.de/record/118448 },  
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[CBD+10a]

[PDFBIB](#)

Chávez Grunewald, M. G., Ben Makhlouf, I., Diab, H., Mut, V., Kowalewski, S., and Abel, D., "Regelung und Sicherheitsanalyse einer Gruppe Massenpunktfahrzeuge mit Hilfe energiebasierter Methoden", in *Proc. Automatisierungstechnik : at*, München, 2010, vol. 58, Oldenbourg, pp. 227-235.

Regelung und Sicherheitsanalyse einer Gruppe Massenpunktfahrzeuge mit Hilfe energiebasierter

Methoden

Bibtex entry :

```
@inproceedings { CBD+10a,  
  author = { Chávez Grunewald, Martin Guillermo and Ben Makhoulf,  
            Ibtissem and Diab, Hilal and Mut, Vicente and Kowalewski,  
            Stefan and Abel, Dirk },  
  title = { Regelung und Sicherheitsanalyse einer Gruppe  
            Massenpunktfahrzeuge mit Hilfe energiebasierter Methoden },  
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  publisher = { Oldenbourg },  
  pages = { 227-235 },  
  volume = { 58 },  
  number = { 4 },  
  year = { 2010 },  
  address = { M{"u"}nchen },  
  issn = { 0178-2312 },  
  doi = { 10.1524/auto.2010.0829 },  
  typ = { PUB:(DE-HGF)16 },  
  reportid = { RWTH-CONV-002157 },  
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  url = { http://publications.rwth-aachen.de/record/133927 },  
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[DCB+10]

[PDFBIB](#)

Diab, H., Chávez Grunewald, M. G., Ben Makhoulf, I., Abel, D., and Kowalewski, S., "A testing platform for cooperative vehicle platoon controllers", in *Proc. 13th International IEEE Conference on Intelligent Transportation Systems : ITSC 2010 ; 19 - 22 September, 2010, Madeira Island, Portugal ; conference proceedings / IEEE*, Piscataway, NJ, 2010, IEEE, pp. 1718-1723.

A testing platform for cooperative vehicle platoon controllers

Bibtex entry :

```
@inproceedings { DCB+10,  
  author = { Diab, Hilal and Chávez Grunewald, Martin Guillermo and Ben  
            Makhoulf, Ibtissem and Abel, Dirk and Kowalewski, Stefan },  
  title = { A testing platform for cooperative vehicle platoon  
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  booktitle = { 13th International IEEE Conference on Intelligent  
            Transportation Systems : ITSC 2010 ; 19 - 22 September,  
            2010, Madeira Island, Portugal ; conference proceedings /  
            IEEE },  
  publisher = { IEEE },  
  pages = { 1718-1723 },  
  year = { 2010 },
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typ = { PUB:(DE-HGF)8 },
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[BKC+09]

[PDFBIB](#)

Ben Makhlouf, I., Kowalewski, S., Chávez Grunewald, M. G., and Abel, D., "Safety assessment of networked vehicle platoon controllers : practical experiences with available tools", in *Proc. ADHS'09: 3rd IFAC Conference on Analysis and Design of Hybrid : September 16, 17 - 18, University of Zaragoza, Spain / Aragón Institute for Engineering Research, Zaragoza, Spain, 2009*, University of Zaragoza.

Safety assessment of networked vehicle platoon controllers : practical experiences with available tools

Bibtex entry :

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@inproceedings { BKC+09,
  author = { Ben Makhlouf, Ibtissem and Kowalewski, Stefan and Chávez
    Grunewald, Martin Guillermo and Abel, Dirk },
  title = { Safety assessment of networked vehicle platoon
    controllers :
      practical experiences with available tools },
  booktitle = { ADHS'09: 3rd IFAC Conference on Analysis and Design
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      Hybrid : September 16, 17 - 18, University of Zaragoza,
      Spain / Aragón Institute for Engineering Research },
  publisher = { University of Zaragoza },
  year = { 2009 },
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  organization = { 3. IFAC Conference on Analysis and Design of
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Diab, H., Ben Makhlouf, I., Kowalewski, S., Chávez, M., and Abel, D., "Control and Safety Analysis of a Platoon under Communication Constraints", in *Proc. NE[*S/T*]COC, Sept. 28/29, Stuttgart*,

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Control and Safety Analysis of a Platoon under Communication Constraints

Bibtex entry :

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@inproceedings { DBK+09,  
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[BK06]

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An evaluation of two recent reachability analysis tools for hybrid systems

Bibtex entry :

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@inproceedings { BK06,  
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    Università di Cagliari. Ed.: C. G. Cassandras ... },
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