

# Scientific Publications of Jochen M. Rieber

– sorted by topic –

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## Categories:

Control Theory                      Dynamic Simulation      Invited Talks  
Control Applications 1      Education                      Conf. and Other Talks  
Control Applications 2

## Control Theory: $\ell_1$ , $\mathcal{H}_\infty$ , $\mathcal{H}_2$ , Gain-Scheduling and Delays

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- [12] U. Münz, J. M. Rieber, and F. Allgöwer. Robust stabilization and  $H_\infty$  control of uncertain distributed delay systems. In J. J. Loiseau, W. Michiels, S.-I. Niculescu, and R. Sipahi, editors, *Topics in Time Delay Systems – Analysis, Algorithms and Control*, number 388 in Lecture Notes in Control and Information Sciences, pages 221–231. Springer, 2009.
- [11] J. M. Rieber, C. W. Scherer, and F. Allgöwer. Robust  $\ell_1$  performance analysis for linear systems with parametric uncertainties. *Int. J. Control*, 85(9):851–864, 2008.
- [10] U. Münz, J. M. Rieber, and F. Allgöwer. Robust stability of distributed delay systems. In *Proc. 17th IFAC World Congress*, pages 12354–12358, Seoul, Korea, July 2008.
- [9] W. Zhang, J. M. Rieber, and D. Gu. Optimal dead-time compensator design for stable and integrating processes with time delay. *J. Process Control*, 18(5):449–457, 2008.
- [8] J. M. Rieber. *Control of Uncertain Systems with  $\ell_1$  and Quadratic Performance Objectives*. Fortschritt-Berichte series 8, no. 1125. VDI Verlag, Düsseldorf, Germany (PhD thesis), 2007.
- [7] J. M. Rieber. *Control of Uncertain Systems with  $\ell_1$  and Quadratic Performance Objectives*. PhD Thesis, Institute for Systems Theory in Engineering, University of Stuttgart, Germany, Oct. 2006.
- [6] J. M. Rieber, C. W. Scherer, and F. Allgöwer. Robust  $\ell_1$  performance analysis in face of parametric uncertainties. In *Proc. 45th IEEE Conf. Decision and Control*, pages 5826–5831, San Diego, CA, USA, Dec. 2006.
- [5] J. M. Rieber and F. Allgöwer. From  $\mathcal{H}_\infty$  control to multiobjective control: an overview. *at - Automatisierungstechnik*, 54(9):437–449, 2006.
- [4] J. M. Rieber, C. W. Scherer, and F. Allgöwer. On complexity issues in multiobjective controller design using convex optimization. In *Proc. 5th IFAC Symp. Robust Control Design*, Toulouse, France, July 2006. On CD-ROM, paper no. 248.
- [3] J. M. Rieber, A. Fritsch, and F. Allgöwer. State-space formulas for gain-scheduled  $\ell_1$ -optimal controllers. In *Proc. 24th American Control Conf.*, pages 609–614, Portland, OR, USA, June 2005.
- [2] J. M. Rieber and F. Allgöwer. Mixed  $\ell_1/\mathcal{H}_\infty$  control of MIMO systems: a linear matrix inequality approach. Technical report, Institute for Systems Theory and Automatic Control, University of Stuttgart, Germany, Feb. 2005.
- [1] J. M. Rieber and F. Allgöwer. An approach to gain-scheduled  $\ell_1$ -optimal control of linear parameter-varying systems. In *Proc. 42nd IEEE Conf. Decision and Control*, pages 6109–6114, Maui, HI, USA, Dec. 2003.

## Control Applications: Nanotechnology, Robotics, Mechatronics

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- [10] A. Stemmer, G. Schitter, J. M. Rieber, and F. Allgöwer. Control strategies towards faster quantitative imaging in atomic force microscopy. *European J. Control*, 11(4-5):384–395, 2005.
- [9] J. M. Rieber, G. Schitter, A. Stemmer, and F. Allgöwer. Experimental application of  $\ell_1$ -optimal control in atomic force microscopy. In *Proc. 16th IFAC World Congress*, pages 664–669, Prague, Czech Republic, July 2005.
- [8] C. Hüttner, J. M. Rieber, F. Allgöwer, and J. Hugel. Compensation of time-varying harmonic disturbances on nonlinear bearingless slice motors. In *Proc. 16th IFAC World Congress*, pages 307–312, Prague, Czech Republic, July 2005.
- [7] J. M. Rieber, F. Allgöwer, and A. Stemmer. Schneller sehen durch Regelungstechnik – Moderne Bildgebung in der Nanotechnologie. In *Wechselwirkungen*, pages 100–108. University of Stuttgart, Germany, 2004.
- [6] J. Rieber and T. Meurer. Nonlinear Control Systems – Anwendungen in Automobiltechnik, Raumfahrt oder bei Internettechnologien. *Stuttgarter Unikurier, University of Stuttgart, Germany*, 94(2):85–86, 2004.
- [5] J. M. Rieber and D. G. Taylor. Integrated control system and mechanical design of a compliant two-axes mechanism. *Mechatronics*, 14(9):1069–1087, 2004.
- [4] J. M. Rieber and D. G. Taylor. Gain-scheduled  $L_2$ -gain based control of a flexible parameter-varying robot link. In *Proc. 27th Annual Conf. IEEE Industrial Electronics Society*, pages 552–557, Denver, CO, USA, Nov. 2001.
- [3] J. M. Rieber and D. G. Taylor. Combined control and design of a flexible parameter-varying robot link. In *Proc. 8th Int. Conf. Advances in Communications and Control*, pages 811–822, Rethymnon, Greece, Sep. 2001.
- [2] J. M. Rieber.  $L_2$ -gain based control of a flexible parameter-varying robot link. Diploma Thesis, Institute for Systems Theory in Engineering, University of Stuttgart, Germany, Aug. 2001.
- [1] J. M. Rieber.  $L_2$ -gain based control of a flexible parameter-varying robot link. MS Thesis, Department of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, USA, Aug. 2001.

## Control Applications: Aerospace

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- [13] A. Kornienko, T. Ott, J.M. Rieber, J. Levenhagen, R. T. Geshnizjani, and W. Fichter. Advanced AOCS/GNC technology demonstration using experimental testbed. In *Proc. 10th Int. ESA Conf. Guidance, Navigation, Control Systems*, Salzburg, Austria, June 2017.
- [12] A. Kornienko, J. M. Rieber, T. Ott, R. T. Geshnizjani, W. Fichter, J. Forshaw, and G. Aglietti. Experimental verification of attitude control system for agile spacecraft. In *Proc. 20th IFAC Symp. Automatic Control in Aerospace*, Sherbrooke, Quebec, Canada, Aug. 2016.
- [11] A. Kornienko and J. M. Rieber. Applying the dynamic inversion concept on agile spacecraft with control moment gyros. In *Proc. 9th Int. ESA Conf. Guidance, Navigation, Control Systems*, Porto, Portugal, June 2014.
- [10] G. Wiedermann, W. Gockel, S. Winkler, J. M. Rieber, B. Kraft, and D. Reggio. The Sentinel-2 satellite attitude control system: challenges and solutions. In *Proc. 9th Int. ESA Conf. Guidance, Navigation, Control Systems*, Porto, Portugal, June 2014.

- [9] J. M. Rieber. HOREOS 2012: Hochgenaue Regelung von optischen Satellitensystemen. Final report, DLR research study, EADS Astrium, Friedrichshafen, Germany, 2013.
- [8] J. M. Rieber. HOREOS 2011: Hochgenaue Regelung von optischen Satellitensystemen. Final report, DLR research study, EADS Astrium, Friedrichshafen, Germany, 2012.
- [7] J. M. Rieber, M. Vitelli, and S. Winkler. Spacecraft attitude and rate determination by Kalman filter-based hybridization of attitude and angular acceleration measurements. In *Proc. 1st CEAS EuroGNC Conf.*, Munich, Germany, April 2011.
- [6] J. M. Rieber. HOREOS 2010: Hochgenaue Regelung von optischen Satellitensystemen. Final report, DLR research study, EADS Astrium, Friedrichshafen, Germany, 2011.
- [5] J. M. Rieber. HOPAS 4: Hochpräzise Ausrichtung von Erdbeobachtungssatelliten. Final report, DLR research study, EADS Astrium, Friedrichshafen, Germany, 2010.
- [4] T. D. Krøvel, F. Dörfler, M. Berger, and J. M. Rieber. High-precision spacecraft attitude and manoeuvre control using electric propulsion. In *Proc. 60th Int. Astronautical Congress*, Daejeon, Korea, Oct. 2009.
- [3] J. M. Rieber. HOPAS 3: Hochpräzise Ausrichtung von Erdbeobachtungssatelliten. Final report, DLR research study, EADS Astrium, Friedrichshafen, Germany, 2009.
- [2] J. M. Rieber. HOPAS 2: Hochpräzise Ausrichtung von Erdbeobachtungssatelliten. Final report, DLR research study, EADS Astrium, Friedrichshafen, Germany, 2008.
- [1] J. M. Rieber and F. Allgöwer. Gain-scheduling in the  $\ell_1$  framework: a flight control example. In *Proc. 5th IFAC Symp. Robust Control Design*, Toulouse, France, July 2006. On CD-ROM, paper no. 250.

Additionally, there are an estimated more than 60 internal and project reports, which are not publicly accessible, on the topics

- Definition and analysis of satellite performance
- Modeling and linearization of satellite kinematics, dynamics, and mass properties
- Modeling of satellite equipment: reaction wheels, solar array drive mechanisms, accelerometers, electric propulsion
- Satellite sensor fusion
- Satellite attitude control with reaction wheels, control moment gyros, or thrusters
- Modeling and analysis of satellite disturbances: solar array drive jitter, reaction wheel microvibrations, propellant sloshing
- Lecture notes on robust analysis and control, attitude and orbit control systems, or presentations
- Project and research proposals

## Dynamic Simulation: Partial Differential Equations

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- [2] R. Köhler, J. Rieber, and M. Zeitz. Symbolic discretization of distributed parameter process models on self-adaptive moving grids. In *European Symp. Computer Aided Process Engineering 11*, pages 165–170, Kolding, Denmark, May 2001.
- [1] J. Rieber. Moving-Grid-Verfahren zur rechnerunterstützten Vorverarbeitung von partiellen Differentialgleichungen. Study Thesis, Institute of System Dynamics and Control Engineering, University of Stuttgart, Germany, July 2000.

## Education

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- [5] J. M. Rieber. Regelungstechnik. Lecture Notes, Duale Hochschule Baden-Württemberg Ravensburg/Friedrichshafen, Germany, 2019.
- [4] J. M. Rieber. Robust Control. Lecture Notes, Institute for Systems Theory and Automatic Control, University of Stuttgart, Germany, 2007.
- [3] J. M. Rieber and T. Ley. Identifikation und Regelung eines Torsionsschwingers. Technical report, Institute for Systems Theory and Automatic Control, University of Stuttgart, Germany, April 2005.
- [2] T. Meurer and J. M. Rieber. 6. IFAC-Symposium Nonlinear Control Systems in Stuttgart (NOLCOS 2004). *Automatisierungstechnik*, 53(1):44, 2005.
- [1] J. M. Rieber, H. Wehlan, and F. Allgöwer. The ROBORACE contest. *IEEE Control Systems Magazine*, 24(5):57–60, 2004.

## Invited Talks

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- [12] J. M. Rieber. Scharfe Bilder aus dem All – Dynamik-Simulation und Lage-Regelung in der Satellitentechnik. Lecture Introduction to Simulation Technology, University of Stuttgart, Germany, Jan. 2016.
- [11] J. M. Rieber. Around the world at a speed of 27000 km/h – control and estimation problems for satellites. Seminar at the Control Laboratory, Ecole Polytechnique Federale Lausanne, Switzerland, Sep. 2014.
- [10] J. M. Rieber. In 100 Minuten um die Erde - Regelungs- und Schätzaufgaben in der Satellitentechnik. EI Impulse Seminar, Applied University Constance, Germany, Dec. 2013.
- [9] J. M. Rieber. Around the world in 100 minutes – control and estimation problems for satellites. Colloquium in Engineering Cybernetics, University of Stuttgart, Germany, Nov. 2013.
- [8] J. M. Rieber. Mit 27000 km/h um die Erde - Bahn- und Lageregelung in der Satelliten-Entwicklung. Control Engineering Seminar, ZF, Friedrichshafen, Germany, Sep. 2013.
- [7] J. M. Rieber. Mit 27000 km/h um die Erde - Bahn- und Lageregelung in der Satelliten-Entwicklung. Cybernetics Alumni Seminar, University of Stuttgart, Germany, Jan. 2013.
- [6] J. M. Rieber. Novel concepts for high-precision attitude control of earth observation satellites. Systems and Control Seminar, University of Magdeburg, Germany, Dec. 2009.
- [5] J. M. Rieber. Control of uncertain systems: novel approaches for analysis and design. Colloquium in Engineering Cybernetics, University of Stuttgart, Germany, Nov. 2006.
- [4] J. M. Rieber. Model-based control in atomic force microscopy. Systems and Control Colloquium, Delft University of Technology, The Netherlands, Nov. 2005.
- [3] J. M. Rieber and F. Allgöwer. Studiengang Technische Kybernetik. Schüler-Ingenieur-Akademie, Sindelfingen, Germany, April 2004.
- [2] J. M. Rieber. Die Promotion und die Tätigkeit als wissenschaftlicher Mitarbeiter nach dem Kybernetik-Studium. Cybernetics Alumni Seminar, University of Stuttgart, Germany, April 2004.
- [1] J. M. Rieber. An approach to gain-scheduled  $\ell_1$ -optimal control of linear parameter-varying systems. Control Seminar, University of California, Santa Barbara, CA, USA, Dec. 2003.

## Conference and Other Talks

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- [19] J. M. Rieber. Spacecraft attitude and rate determination by kalman filter-based hybridization of attitude and angular acceleration measurements. 1st CEAS EuroGNC Conf., Munich, Germany, April 2011.
- [18] J. M. Rieber. Multi-objective LPV control and uncertain matrix inequalities. 4th Stuttgart System Theory Workshop, Hirschegg, Austria, Feb. 2007.
- [17] J. M. Rieber. Control of uncertain systems with  $\ell_1$  and quadratic performance objectives. PhD thesis presentation, Institute for Systems Theory and Automatic Control, University of Stuttgart, Germany, Dec. 2006.
- [16] J. M. Rieber. Robust  $\ell_1$  performance analysis in face of parametric uncertainties. 45th IEEE Conf. Decision and Control, San Diego, CA, USA, Dec. 2006.

- [15] J. M. Rieber. On complexity issues in multiobjective controller design using convex optimization. 5th IFAC Symp. Robust Control Design, Toulouse, France, July 2006.
- [14] J. M. Rieber. Gain-scheduling in the  $\ell_1$  framework: a flight control example. 5th IFAC Symp. Robust Control Design, Toulouse, France, July 2006.
- [13] J. M. Rieber. Advances in the control of uncertain systems. 3rd Stuttgart System Theory Workshop, Hirschegg, Austria, March 2006.
- [12] J. M. Rieber.  $\ell_1$ -optimal control: current perspective, advances and applications. Seminar on Fundamentals of Systems and Control, Delft University of Technology, The Netherlands, Sep. 2005.
- [11] J. M. Rieber. Experimental application of  $\ell_1$ -optimal control in atomic force microscopy. 16th IFAC World Congress, Prague, Czech Republic, July 2005.
- [10] J. M. Rieber. Compensation of time-varying harmonic disturbances on nonlinear bearingless slice motors. 16th IFAC World Congress, Prague, Czech Republic, July 2005.
- [9] J. M. Rieber. State-space formulas for gain-scheduled  $\ell_1$ -optimal controllers. 24th American Control Conf., Portland, OR, USA, June 2005.
- [8] J. M. Rieber.  $H_\infty$  control of descriptor systems in a differential inclusion setting. 24th American Control Conf., Portland, OR, USA, June 2005.
- [7] J. M. Rieber. Introduction to  $\ell_1$ -optimal control including new results. 2nd Stuttgart System Theory Workshop, Hirschegg, Austria, March 2005.
- [6] J. M. Rieber. Wie kann die  $\ell_1$ -optimale Regelung zu einer erfolgreichen Regelungsmethode werden? 39th Control Engineering Colloquium, Boppard, Germany, March 2005.
- [5] J. M. Rieber. Eine Methode zur  $\ell_1$ -optimalen Regelung von linearen parameter-veränderlichen Systemen mittels Gain-Scheduling. Joint Technical Committee of GAMM/VDI/VDE/GMA, University of Kassel, Germany, March 2004.
- [4] J. M. Rieber. An approach to gain-scheduled  $\ell_1$ -optimal control of linear parameter-varying systems. 42nd IEEE Conf. Decision and Control, Maui, HI, USA, Dec. 2003.
- [3] J. M. Rieber.  $\ell_1$ -optimal control and some connected problems. 1st Stuttgart System Theory Workshop, Hirschegg, Austria, March 2003.
- [2] J. M. Rieber. Gain-scheduled  $H_\infty$  control of a flexible robot link with varying parameters. Diploma thesis presentation, Institute for Systems Theory in Engineering, University of Stuttgart, Germany, Sep. 2001.
- [1] J. M. Rieber. Moving-Grid-Verfahren zur rechnerunterstützten Vorverarbeitung von partiellen Differentialgleichungen. Semester thesis presentation, Institute of System Dynamics and Control Engineering, University of Stuttgart, Germany, July 2000.