



Lars Imsland

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- Employment**
- ◇ NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY 2009–present
 Professor at Department of Engineering Cybernetics.
 - ◇ CYBERNETICA AS, TRONDHEIM 2008–2009
 Specialist. Nonlinear model predictive control, automatic control in offshore drilling.
 - ◇ SINTEF ICT, TRONDHEIM 2004–2008
 Research Scientist. Estimation in automotive applications, power processes with CO₂ capture.
 - ◇ NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY 2002–2004
 Post.Doc. Control of power processes with CO₂ capture.
 - ◇ NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY 1998–2002
 Doctoral Student. Nonlinear control, control and optimization.
 - ◇ UNIVERSITY OF STUTTGART, STUTTGART, GERMANY 2000–2000
 Visiting scholar.

- Education**
- ◇ NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY 1999–2002
 PhD at Department of Engineering Cybernetics.
 Thesis: “Topics in Nonlinear Control - Output Feedback Stabilization and Control of Positive Systems.”
 - ◇ NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY 1992–1997
 Silvingeniør (MSc equiv.) at Department of Engineering Cybernetics.
 Thesis: “Control and analysis of power production systems.” Final degree mark: 1.3 Outstanding.

Research grants

Period	Title	Research associate	Funding
2014–2018	Iceberg and sea ice drift estimation and prediction (PhD)	Leif Erik Andersson	Statoil/internal
2013–2014	Nonlinear Model Predictive Control (Post.Doc)	Ralf Hannemann-Tamás	ERCIM
2013–2017	Mission and path optimization for mobile sensor network operations (PhD)	Anders Albert	CAMOS (internal, strategic)
2012–2015	Embedded optimization for MPC (PhD)	Kwame Kufoalor	eMPC (RCN, Statoil)
2011–2015	Intelligent Drilling – Automated Underbalanced Drilling Operations (iUBD)	(Project manager)	RCN (210432/E30), Statoil (2.350 kEUR)
2013–2016	Intelligent Drilling (Post.Doc)	Agus Hasan	iUBD (RCN, Statoil)
2012–2015	Fault detection, fault tolerance and robust control in intelligent drilling (PhD)	Anders Willersrud	iUBD (RCN, Statoil)
2011–2015	MPC for smart grid balancing control (PhD)	Anne Mai Ersdal	IME Smart grid initiative (internal)
2010–2013	Ice observation system using UAS (PhD)	Joakim Haugen	ArcticDP (RCN, Kongsberg, Statoil, DNV)
2010–2014	Economic MPC (PhD)	Phillip Maree	Internal funding

Awards

2008: Arch T. Colwell Merit Award, from the Society of Automotive Engineers.
 2004: Automatica Outstanding Reviewer.
 1998: PhD Scholarship from the Research Council of Norway.
 1997: “Elf Studiepris.” Grant from Elf Aquitaine Norge A/S for “outstanding examination results.”

Miscellaneous

Co-chair of National Organizing Committee for 11th International IFAC Symposium on Dynamics and Control of Process and Bioprocess Systems (DYCOPS-CAB 2016), Trondheim, June 2016.
 Chair of National Organizing Committee for 1st IFAC Workshop on Automatic Control in Offshore Oil and Gas Production, Trondheim May 2012.
 Board member, Norwegian Society of Automatic Control, 2013 – .
 Reviewer for numerous journals and conferences, member of international program committee for conferences such as American Control Conference 2011, Mediterranean Conference on Control & Automation 2014 and 2015, IFAC Adchem 2015, IFAC ACOOG 2015.
 Member of 9 PhD adjudication committees in Norway and abroad.
 Board member, Board of Department of Engineering Cybernetics, NTNU, 1999–2001.

Publications

Snapshot from Google Scholar (2015-01-11):

Citation indices	All	Since 2010
Citations	1701	1008
h-index	20	16
i10-index	36	24

◇ JOURNAL ARTICLES

- [1] A. Willersrud, M. Blanke, and L. Imsland. Incident detection and isolation in drilling using analytical redundancy relations. *Control Engineering Practice*, 2015. Submitted.
- [2] J. Haugen and L. Imsland. Monitoring an advection-diffusion process using aerial mobile sensors. *Unmanned Systems*, 2015. Submitted.
- [3] A. M. Ersdal, L. Imsland, and K. Uhlen. Model predictive load-frequency control. *IEEE Transactions on Power Systems*, 2015. Submitted.
- [4] A. Willersrud, M. Blanke, L. Imsland, and A. Pavlov. Fault diagnosis of downhole drilling incidents using adaptive observers and statistical change detection. *J. Proc. Contr.*, 2014. Accepted.
- [5] J. P. Maree and L. Imsland. On multi-objective economic predictive control for cyclic process operation. *J. Proc. Contr.*, 2014. Accepted.
- [6] A. Willersrud, M. Blanke, L. Imsland, and A. Pavlov. Drillstring washout diagnosis using friction parameter estimation and statistical change detection. *IEEE Trans. Control Syst. Technol.*, 2014. Accepted.
- [7] D. K. M. Kufoalor, V. Aaker, T. A. Johansen, L. Imsland, and G. O. Eikrem. Automatically generated embedded model predictive control: Moving an industrial pc-based mpc to an embedded platform. *Optimal Control Applications and Methods*, 2014. Provisionally accepted.
- [8] J. P. Maree, L. Imsland, and J. Jouffroy. On convergence of the unscented kalman-bucy filter using contraction theory. *International Journal of Systems Science*, vv(nn):xx-yy, 2014.
- [9] J. Haugen and L. Imsland. Monitoring moving objects using aerial mobile sensors. *IEEE Trans. Control Syst. Technol.*, 2014. Provisionally accepted.
- [10] J. Møgster, J.-M. Godhavn, and L. Imsland. Using MPC for managed pressure drilling. *MIC—Model. Identif. Control*, 34(3):131–138, 2013.
- [11] A. Willersrud, L. Imsland, S. O. Hauger, and P. Kittilsen. Short-term production optimization of offshore oil and gas production using nonlinear model predictive control. *J. Proc. Contr.*, 23(2):215–223, 2013.
- [12] S. Kostova, I. Ivanov, L. Imsland, and N. Georgieva. Infinite horizon lqr problem of linear discrete time positive systems. *C. R. Acad. Bulg. Sci.*, 66(8):1167–1174, 2013.
- [13] G.-O. Kaasa, O. Stamnes, L. Imsland, and O. Aamo. Simplified hydraulics model used for intelligent estimation of downhole pressure for a managed-pressure-drilling control system. *SPE Drilling & Completion*, 27(1):127–138, 2012. SPE-143097-PA.

- [14] L. Imsland, P. Kittilsen, and T. Schei. Model-Based Optimizing Control and Estimation Using Modelica Models. *Modeling, Identification and Control*, 31(3):107–121, 2010.
- [15] H. F. Grip, T. A. Johansen, L. Imsland, and G.-O. Kaasa. Parameter estimation and compensation in systems with nonlinearly parameterized perturbations. *Automatica*, 46(1):19–28, 2010.
- [16] H. F. Grip, L. Imsland, T. A. Johansen, J. C. Kalkkuhl, and A. Suissa. Vehicle sideslip estimation design, implementation, and experimental validation. *IEEE Control Systems Magazine*, 29:36–52, 2009.
- [17] L. Imsland, J. A. Rossiter, B. Pluymers, and J. Suykens. Robust triple mode MPC. *Internat. J. Control*, 81(4):679–689, 2008.
- [18] H. F. Grip, L. Imsland, T. A. Johansen, T. I. Fossen, J. C. Kalkkuhl, and A. Suissa. Nonlinear vehicle side-slip estimation with friction adaptation. *Automatica*, 44(3):611–622, 2008.
- [19] K. E. Colombo, L. Imsland, O. Bolland, and S. Hovland. Dynamic modelling of an oxygen mixed conducting membrane and model reduction for control. *Journal of Membrane Science*, 336:50–60, 2009.
- [20] R. Kandepe, B. A. Foss, and L. Imsland. Applying the unscented Kalman filter for nonlinear state estimation. *J. Proc. Contr.*, 18(7–8):753–768, 2008.
- [21] L. Imsland, H. F. Grip, T. A. Johansen, and T. I. Fossen. On nonlinear unknown input observers – applied to lateral velocity vehicle velocity estimation on banked roads. *Internat. J. Control*, 80(11):1741–1750, 2007.
- [22] L. Imsland, T. A. Johansen, T. I. Fossen, H. F. Grip, J. Kalkkuhl, and A. Suissa. Vehicle velocity estimation using nonlinear observers. *Automatica*, 42(12):2091–2103, 2006.
- [23] R. Kandepe, L. Imsland, B. A. Foss, C. Stiller, B. Thorud, and O. Bolland. Modeling and control of a sofc-gt based autonomous power system. *Energy*, 32(4):406–417, 2007.
- [24] D. Snarheim, L. Imsland, B. A. Foss, R. Ulfesnes, and O. Bolland. Control design for a gas turbine cycle with co2 capture capabilities. *MIC—Model. Identif. Control*, 27:57–66, 2006.
- [25] R. Kandepe, L. Imsland, C. Stiller, B. A. Foss, and V. Kariwala. Control-relevant modeling and simulation of a sofc-gt hybrid system. *MIC—Model. Identif. Control*, 27:143–156, 2006.
- [26] C. Stiller, B. Thorud, O. Bolland, R. Kandepe, and L. Imsland. Control strategy for a solid oxide fuel cell and gas turbine hybrid system. *Journal of power sources*, 158(1):303–315, 2006.
- [27] L. Imsland, N. Bar, and B. A. Foss. More efficient predictive control. *Automatica*, 41(8), 2005.
- [28] L. Imsland, D. Snarheim, B. A. Foss, R. Ulfesnes, and O. Bolland. Control issues in the design of a gas turbine cycle for CO₂ capture. *International Journal of Green Energy*, 2(2), 2005.
- [29] L. Imsland, G. O. Eikrem, and B. A. Foss. A state feedback controller for a class of nonlinear positive systems applied to stabilization of gas-lifted oil wells. *Control Engineering Practice*, 2005. Accepted.
- [30] R. Findeisen, L. Imsland, F. Allgöwer, and B. A. Foss. State and output feedback nonlinear model predictive control: An overview. *European J. of Control*, 9(2-3):190–206, 2003.
- [31] L. Imsland, R. Findeisen, E. Bullinger, F. Allgöwer, and B. A. Foss. A note on stability, robustness and performance of output feedback nonlinear model predictive control. *J. Proc. Contr.*, 13:633–644, 2003.
- [32] L. Imsland, R. Findeisen, F. Allgöwer, and B. A. Foss. Output feedback stabilization with nonlinear predictive control: asymptotic properties. *MIC—Model. Identif. Control*, 24(3):169–179, 2003.
- [33] R. Findeisen, L. Imsland, F. Allgöwer, and B. A. Foss. Output feedback stabilization for constrained systems with nonlinear model predictive control. *Internat. J. Robust Nonlinear Control*, 13(3-4):211–227, 2003.
- [34] L. Imsland. Discussion on “Robust Controller Design for Uncertain Nonlinear Systems via Fuzzy Modelling Approach with Application to the Stabilization of Power Systems” by F. Zheng and P.M. Frank. *European J. of Control*, 8(6):551–552, 2002.
- [35] L. Imsland, O. Slupphaug, and B. A. Foss. Piecewise affine observer-based robust controllers for constrained nonlinear systems. *MIC—Model. Identif. Control*, 22(4):211–225, 2001.
- [36] O. Slupphaug, L. Imsland, and B. A. Foss. Uncertainty modelling and robust output feedback control of nonlinear discrete systems: a mathematical programming approach. *Internat. J. Robust Nonlinear Control*, 10(13):1129–1152, 2000.

◇ SELECTED CONFERENCE PUBLICATIONS

- [37] A. Albert and L. Imsland. Mobile sensor path planning for iceberg monitoring using a milp framework. In *Proc. 14th European Control Conference ECC'15*. 2015. Submitted.
- [38] A. Willersrud, L. Imsland, M. Blanke, and A. Pavlov. Early detection and localization of downhole incidents in managed pressure drilling. In *SPE/IADC Managed Pressure Drilling and Underbalanced Operations Conference and Exhibition held in Dubai, UAE, 13-14 April 2015*. 2015.
- [39] G. Frison, D. K. M. Kufoalor, L. Imsland, and J. B. Jrgensen. Efficient implementation of solvers for linear model predictive control on embedded devices. In *Proc. 2014 IEEE Multi-Conference on Systems and Control (MSC 2014)*. 2014.
- [40] A. Hasan and L. Imsland. Moving horizon estimation in managed pressure drilling using distributed models. In *Proc. 2014 IEEE Multi-Conference on Systems and Control (MSC 2014)*. 2014.
- [41] A. M. Ersdal, D. Fabozzi, L. Imsland, and N. F. Thornhill. Model predictive control for power system frequency control taking into account imbalance uncertainty. In *Proc. 19th IFAC World Congress, Cape Town, South Africa*. 2014.
- [42] J. P. Maree and L. Imsland. Performance and stability for combined economic and regulatory control in mpc. In *Proc. 19th IFAC World Congress, Cape Town, South Africa*. 2014.
- [43] D. K. M. Kufoalor, S. Richter, L. Imsland, T. A. Johansen, M. Morari, and G. O. Eikrem. Embedded model predictive control on a plc using a primal-dual first-order method for a subsea separation process. In *Proc. 22nd IEEE Mediterranean Conference on Control and Automation (MED'14), Palermo, Italy*. 2014.
- [44] R. Hannemann-Tamas and L. Imsland. Full algorithmic differentiation of a rosenbrock-type method for direct single shooting. In *Proc. 13th European Control Conference ECC'14*. Strassbourg, France, 2014.
- [45] T. T. Kristoffersen, D. Snarheim, L. Imsland, and M. S. Govatsmark. Optimal and robust production of high pressure steam. In *Proc. 13th European Control Conference ECC'14*. Strassbourg, France, 2014.
- [46] J. Haugen and L. Imsland. UAV path planning for multitarget tracking with experiments. In *Proc. 2nd Workshop Research, Develop. and Educ. Unmanned Aerial Syst. (RED-UAS 2013)*. Compiègne, France, 2013.
- [47] A. Willersrud, L. Imsland, A. Pavlov, and G.-O. Kaasa. A framework for fault diagnosis in managed pressure drilling applied to flow-loop data. In *Proc. 10th International IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS 2013)*. Mumbai, India, 2013.
- [48] A. M. Ersdal, I. M. Cecilio, D. Fabozzi, L. Imsland, and N. F. Thornhill. Mpc for power system frequency control, taking into account imbalance uncertainty. In *Proc. 4th European Innovative Smart Grid Technologies (ISGT) Conference*. Copenhagen, Denmark, 2013.
- [49] J. Haugen and L. Imsland. Optimization-based autonomous remote sensing of surface objects using an unmanned aerial vehicle. In *Proc. 12th European Control Conference ECC'13*. Zürich, Switzerland, 2013.
- [50] A. Willersrud and L. Imsland. Fault diagnosis in managed pressure drilling using nonlinear adaptive observers. In *Proc. 12th European Control Conference ECC'13*. Zürich, Switzerland, 2013.
- [51] J. P. Maree and L. Imsland. Multi-objective predictive control for non steady-state operation. In *Proc. 12th European Control Conference ECC'13*. Zürich, Switzerland, 2013.
- [52] J. P. Maree and L. Imsland. A convergence result for the unscented kalman-bucy filter using contraction theory. In *Proc. 12th European Control Conference ECC'13*. Zürich, Switzerland, 2013.
- [53] J. P. Maree and L. Imsland. On asymptotic closed-loop performance for linear mpc with terminalconstraints. In *Proc. 25th Chinese Control and Decison Conference*. Guiyang, China, 2013.
- [54] L. Imsland and G.-O. Kaasa. Adaptive approximation-based estimation of downhole pressure in managed pressure drilling. In *Proc. 2012 IEEE Multi-Conference on Systems and Control (MSC 2012)*. 2012.
- [55] J. Haugen, E. I. Grøtli, and L. Imsland. State estimation of ice thickness distribution using mobile sensors. In *Proc. 2012 IEEE Multi-Conference on Systems and Control (MSC 2012)*. 2012.
- [56] A. M. Ersdal, L. Imsland, and K. Uhlen. Coordinated control of multiple hvdc links using backstepping. In *Proc. 2012 IEEE Multi-Conference on Systems and Control (MSC 2012)*. 2012.
- [57] R. Holarek and L. Imsland. Nonlinear model predictive control of a benchmark nonlinear boiler. In *Proc. XXIII International Symposium on Information, Communication and Automation Technologies, Sarajevo*. 2011.

- [58] A. Willersrud, L. Imsland, S. O. Hauger, and P. Kittilsen. Short-term production optimization of offshore oil and gas production using nonlinear model predictive control. In *Proc. 18th IFAC World Congress, Milano, Italy*. 2011.
- [59] M. Paasche, T. A. Johansen, and L. Imsland. Estimation of bottomhole pressure during oil well drilling using regularized adaptive nonlinear moving horizon observer. In *Proc. 18th IFAC World Congress, Milano, Italy*. 2011.
- [60] J. Maree and L. Imsland. On combining economical performance with control performance in nmpc. In *Proc. 18th IFAC World Congress, Milano, Italy*. 2011.
- [61] J. Haugen, L. Imsland, S. Løset, and R. Skjetne. Ice observer system for ice management operations. In *Proc. 21st International Offshore (Ocean) and Polar Engineering Conference (ISOPE), Maui, Hawaii*. 2011.
- [62] G.-O. Kaasa, O. Stamnes, L. Imsland, and O. Aamo. Intelligent estimation of downhole pressure using simplified hydraulic model. In *2011 IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition, Denver, USA*. 2011.
- [63] A. Pavlov, G.-O. Kaasa, and L. Imsland. Experimental disturbance rejection on a full-scale drilling rig. In *Proc. of IFAC NOLCOS 2010, Bologna, Italy*. 2010.
- [64] R. Ringset, L. Imsland, and B. A. Foss. On gradient computation in single-shooting nonlinear model predictive control. In *Proc. of IFAC DYCOPS 2010, Leuven, Belgium*. 2010.
- [65] L. Imsland, P. Kittilsen, and T. S. Schei. Using Modelica models in real time dynamic optimization – gradient computation. In *Proc. of Modelica’2009, Como, Italy*. 2009.
- [66] H. F. Grip, L. Imsland, T. A. Johansen, J. C. Kalkkuhl, and A. Suissa. Estimation of road inclination and bank angle in automotive vehicles. In *Proc. Amer. Contr. Conf. St. Louis, Missouri, USA*, 2009.
- [67] D. Snarheim, L. Imsland, and B. A. Foss. Active control of oxy-fuel combustion using preflame co₂-injection. In *Proceedings of European Control Conference ECC’ 09*. Budapest, Hungary, 2009.
- [68] L. Imsland, P. Kittilsen, and T. S. Schei. Model-based optimizing control and estimation using modelica models. In *Proc. of Modelica’2008, Bielefeld, Germany*. 2008.
- [69] H. F. Grip, T. A. Johansen, and L. Imsland. Estimation and control for systems with nonlinearly parametrized perturbations. In *Proc. 17th IFAC World Congress, Seoul, Korea*. 2008.
- [70] R. Kandepe, L. Imsland, and B. A. Foss. Constrained state estimation using the unscented kalman filter. In *Proc. 16th Mediterranean Conference on Control and Automation*. Ajaccio, France, 2008.
- [71] L. Imsland, H. F. Grip, T. A. Johansen, T. I. Fossen, J. C. Kalkkuhl, and A. Suissa. Nonlinear observer for lateral velocity with friction and road bank adaptation – validation and comparison with an extended kalman filter. In *Proc. SAE World Congress*. 2007.
- [72] R. Kandepe, B. Huang, L. Imsland, and B. A. Foss. Comparative study of state estimation of fuel cell hybrid system using UKF and EKF. In *Proceedings of The Sixth IEEE Conference on Control and Automation (ICCA)*. Guangzhou, China, 2007.
- [73] D. Snarheim, L. Imsland, and B. A. Foss. Control-relevant modelling and linear analysis of instabilities in oxy-fuel combustion. In *Proceedings of European Control Conference ECC’ 07*. Kos, Greece, 2007.
- [74] G. Nygaard, L. Imsland, and E. Johannessen. Using NMPC based on a low-order model for controlling pressure during oil well drilling. In *Proceedings of 8th International Symposium on Dynamics and Control of Process Systems (DYCOPS)*. Cancun, Mexico, 2007.
- [75] R. Kandepe, B. Huang, B. A. Foss, and L. Imsland. State estimation of SOFC/GT hybrid system using UKF. In *Proceedings of 8th International Symposium on Dynamics and Control of Process Systems (DYCOPS)*. Cancun, Mexico, 2007.
- [76] H. F. Grip, L. Imsland, T. A. Johansen, T. I. Fossen, J. C. Kalkkuhl, and A. Suissa. Nonlinear vehicle velocity observer with road-tire friction adaptation. In *Proc. 45th IEEE Conf. Decision Contr.* San Diego, 2006.