

List of some publications and related work

International publications

1. Di Ruscio, D. and C. Dalen (2017a). Tuning PD and PID Controllers for Double Integrating Plus Time Delay Systems, *Modeling, Identification and Control*, Vol. 38, No. 2, pp. 95-110.
2. Dalen, C. and D. Di Ruscio. (2017b). PD/PID controller tuning based on model approximations: Model reduction of some unstable and higher order nonlinear models. *Modeling, Identification and Control*, Vol. 38, No. 4, pp. 185-197.
3. Dalen, C. and D. Di Ruscio. (2016a). On closed loop transient response system identification, *Modeling, Identification and Control*, Vol. 37, No. 4, pp. 213-223.
4. Dalen, C. and D. Di Ruscio. (2016b). Model-Free Predictive Anti-Slug Control of a Well-Pipeline-Riser, *Modeling, Identification and Control*, Vol. 37, No. 1, pp. 41-52.
5. Dalen, C. and Di Ruscio, D. and Nilsen, R. (2015). Model-free optimal anti-slug control of a well-pipeline-riser in the K-Spice/LedaFlow simulator, *Modeling, Identification and Control*, Vol. 36, No. 3, pp. 179-188.
6. Di Ruscio, D. (2013). Model Predictive Control with Integral Action: A simple MPC algorithm. *Modeling, Identification and Control*, Vol 34, No 3, pp. 119-129.
7. Di Ruscio, D. (2012a). Discrete LQ optimal control with integral action: A simple controller on incremental form for MIMO systems. *Modeling, Identification and Control*, Vol. 33, No. 2, pp. 35-44.
8. Di Ruscio, D. (2012b). PI Controller Tuning Based on Integrating Plus Time Delay Models: Performance Optimal tuning. In Proceedings of the *IASTED Control and Applications* Conference. Crete Greece June 18-21, 2012.
9. Di Ruscio, D. (2010). On Tuning PI Controllers for Integrating Plus Time Delay Systems. *Modeling, Identification and Control*, Vol. 31, No. 4, pp. 145-164.
10. Di Ruscio, D. (2009a). A Bootstrap Subspace Identification Method: Comparing Methods for Closed Loop Subspace Identification by Monte Carlo Simulations. *Modeling, Identification and Control*, Vol. 30, No. 4, pp. 203-222.
11. Di Ruscio, D. (2009b). Closed and Open Loop Subspace System Identification of the Kalman Filter. *Modeling, Identification and Control*, Vol. 30, No. 2, pp. 71-86.

12. Di Ruscio, D. (2008). Subspace system identification of the Kalman filter: open and closed loop systems. In Proceedings of the International Multi-Conference on Engineering and Technological Innovation. June 29th-July 2nd, Orlando, Florida, USA.
13. Di Ruscio, D. (2003). Subspace System Identification of the Kalman Filter. *Modeling, Identification and Control*, vol. 24, no.3, pp. 125-157.
14. Di Ruscio, D. (2000). A weighted view on the partial least-squares algorithm. *Automatica the journal of IFAC*, vol. 36, no. 6, pp. 831-850.
15. Di Ruscio, D. (2000). Subspace System Identification of Multiple Time Series and Different Sampling rates. In Proceedings for *the IFAC Symposium on System Identification*, Santa Barbara, California, U.S.A., June 21-23.
16. Di Ruscio, D. (2000). The conjugate gradient method and partial least squares: Dynamic systems, multivariate and errors in variables extensions. Proceedings of the *9th Nordic Process Control Workshop*, Lyngby, Denmark.
17. Di Ruscio, D. (1998). The partial least squares algorithm: a truncated Cayley-Hamilton series approximation used to solve the regression problem. *Modeling, Identification and Control*, vol. 19, no.3, pp. 117-140.
18. Di Ruscio, D. and B. Foss (1998). On Model Based Predictive Control. *The 5th IFAC Symposium on Dynamics and Control of Process Systems*, Corfu, Greece, June 8-10,1998.
19. Di Ruscio, D. (1997a). On Subspace Identification of the Extended Observability Matrix. In the proceedings of *the 36th Conference on Decision and Control 1997*, San Diego, California, December 6-14.
20. Di Ruscio, D. (1997b). Model Based Predictive Control: An extended state space approach. In proceedings of *the 36th Conference on Decision and Control 1997*, San Diego, California, December 6-14.
21. Di Ruscio, D. (1997c). Model Predictive Control and Identification: A linear state space model approach. In proceedings of *the 36th Conference on Decision and Control 1997*, San Diego, California, December 6-14.
22. Di Ruscio, D. (1997d). Model Predictive Control and Identification of a Thermo Mechanical Pulping Plant: A linear state space model approach. *Control 1997*, Sydney Australia, October 20-22, 1997.
23. Di Ruscio, D. (1997e). Model Based Predictive Control: An extended state space approach. *Control 1997*, Sydney Australia, October 20-22, 1997.
24. Di Ruscio, D. (1997f). A Method for Identification of Combined Deterministic Stochastic Systems. In *Applications of Computer Aided Time*

- Series Modeling*. Editor: Aoki. M. and A. Hevenner, Lecture Notes in Statistics Series, Springer Verlag, 1997, pp. 181-235.
25. Di Ruscio, D. (1997g). A State Space Model for the Wood Chip Refining Process. *Modeling, Identification and Control*, vol. 17, no.3.
 26. Di Ruscio, D. (1997h). Recursive Subspace System identification. Proceedings of the *7th Nordic Process Control Workshop*, Wadal, Norway.
 27. Di Ruscio, D. (1997i). Model Predictive Control. Proceedings of the *7th Nordic Process Control Workshop*, Wadal, Norway.
 28. Di Ruscio, D. (1996a). Combined Deterministic and Stochastic System Identification and Realization: DSR-a subspace approach based on observations. *Modeling, Identification and Control*, vol. 17, no.3.
 29. Di Ruscio, D. (1996b). A Dynamic Model for the Pressure and the Flow of Steam in a TMP Refiner. *Control Systems 1996*, Nova Scotia, Canada, April 30 - May 2, 1996.
 30. Di Ruscio, D. (1996c). Subspace Identification for Dynamic process Analysis and Modeling. *Control Systems 1996*, Nova Scotia, Canada, April 30 - May 2, 1996.
 31. Di Ruscio, D. (1995b). A method for identification of combined deterministic stochastic systems: robust implementation. The *Third European Control Conference ECC95*, September 5-8, Rome, Italy.
 32. Di Ruscio, D. (1995a). A method for the identification of state space models from input and output measurements. *Modeling, Identification and Control*, vol. 16, no.3.
 33. Di Ruscio, D. (1994). Methods for the identification of state space models from input and output measurements. *The 10 IFAC symposium on system identification SYSID'94*, Copenhagen, 4-6 July, 1994.
 34. Di Ruscio, D., Balchen J. G. and A. Holmberg (1994). Experiences with a nonlinear model based control strategy applied to a two stage TMP refiner line. *Control Systems 94*, Stockholm, May 31 - June 2, 1994.
 35. Di Ruscio, D., Henriksen, R. and J. G. Balchen (1994). A Solution to the Problem of Constructing a State Space Model from Time Series. *Modeling, Identification and Control*, vol. 15, no. 1, 55-63.
 36. Di Ruscio, D. (1993). Topics in model based control with application to the thermo mechanical pulping process. Dr. Ing. thesis. Report no. 93-46-W. (ISBN 82-7119-513-1, ISBN 0802-3271) Department of Engineering Cybernetics, Norwegian Institute of Technology, The University of Trondheim, N-7034 Trondheim Norway.

37. Di Ruscio, D., Henriksen, R. and J. G. Balchen (1993). A Solution to the Problem of Constructing a State Space Model from Time Series. *the 32nd IEEE Conference on Decision and Control*, San Antonio, Texas, December 15-17, 1993.
38. Di Ruscio, D. (1992a). A Method for the Identification of State Space Models. Report no. 92-116-W. Paper submitted for publication.
39. Di Ruscio, D. and D. Ljungquist (1992). State Space Model Realization from Input-Output Time Series. Report no. 92-106-W. Paper submitted for publication.
40. Di Ruscio, D. and J. G. Balchen (1992). A State Space Model for the TMP Process. *Control Systems '92*, Whistler, B. C., Canada, September 28 - October 1, 1992.
41. Di Ruscio, D. (1992b). A Method for the Stabilization of Linear Feedback Systems. *Proceedings of the 31st IEEE Conference on Decision and Control*, Tucson, Arizona, December 16-18, 1992.
42. Di Ruscio, D. (1992c). Measures for Stability Robustness in Linear Quadratic Systems. *Proceedings of the 31st IEEE Conference on Decision and Control*, Tucson, Arizona, December 16-18, 1992.
43. Di Ruscio, D. (1992d). On the Location of LQ-Optimal Closed Loop Poles. *Modeling, Identification and Control*, 1992, vol. 13, No. 1, 15-23.
44. Di Ruscio, D. (1991a). Maximal imaginary eigenvalues in optimal systems. *Modeling, Identification and Control*, 1991, vol. 12, No. 3, 149-158.
45. Di Ruscio, D. (1991b). Maximal imaginary eigenvalues in optimal systems. *Proceedings 1th ECC - European Control Conference*, Grenoble, July 2-5, 1991.
46. Di Ruscio, D., and J. G. Balchen (1991a). Design of Robust Suboptimal Controllers with a Specified Structure. *1th IFAC Symposium on Design Methods of Control Systems*, Zurich, September 4-6, 1991.
47. Di Ruscio, D., and J. G. Balchen (1991b). A Schur Method for Designing LQ-Optimal Systems with Prescribed Eigenvalues. *1th IFAC Symposium on Design Methods of Control Systems*, Zurich, September 4-6, 1991.
48. Di Ruscio, D. (1991c). On the Location of LQ-Optimal Closed Loop Poles. *30th IEEE Conference on Decision and Control*, Brighton, December 11-13, 1991.
49. Di Ruscio, D. (1990). A note on a necessary condition for optimality. *Modeling, Identification and Control*, vol. 11, no. 2.
50. Di Ruscio, D., and J. G. Balchen (1990a). A Schur method for designing LQ-optimal systems with prescribed eigenvalues. *Modeling, Identification and Control*, vol. 11, no. 1.

51. Di Ruscio, D and J.G. Balchen (1990b). An algorithm for design of decentralized suboptimal controllers with a specified structure. *Modeling, Identification and Control*, vol. 11, no. 3.
52. Di Ruscio, D. (1990). Adjustment of PID control parameters. *Modeling, Identification and Control*, vol. 13, no. 4, 189-197.
53. Di Ruscio, D. and J. G. Balchen (1996). A State Space Model for the Wood Chip Refining Process. *Journal of Pulp and Paper Science*, vol. 22, No. 3.

Software for Subspace Identification

- D-SR Toolbox for MATLAB Software for efficient subspace system identification based on open as well as closed loop data. The acronym DSR comes from the paper title "Combined **D**eterministic and **S**tochastic System Identification and **R**ealization: DSR-a subspace approach based on observations." by Di Ruscio (1996).

Toolbox licence bought by many major industrial companies in Norway, e.g. Hydro, Norske Skog, Statoil, Kongsberg, Borealis, Predictor etc.

D-SR is also found to give the best model on validation data in comparison with other subspace methods. This is documented in the following papers by:

- Sotomayor, O. A. Z , S. W. Park and C. Garca (2005) Model reduction and identification of wastewatertreatment plants - A subspace approach. *Lat. Am. Appl. Res.* v.33 n.2 Baha Blanca abr./jun. 2003
- Sotomayor, O. A. Z., Song Won Parka and Claudio Garcia (2003) Multi-variable identification of an activated sludge process with subspace-based algorithms

Publications as a co-author

1. Viumdal, Håkon and Mylvaganam, Saba and Di Ruscio, David (2014) System Identification of a Non-Uniformly Sampled Multi-Rate System in Aluminium Electrolysis Cells. *Modeling, Identification and Control*. Vol. 35, No. 3.
2. Sæther, A., Arakaki, C., Ratnayake, C. and D. Di Ruscio (2009). Prediction of Mass Flow Rate in Pneumatic Conveying using a System Identification Modeling Approach. *Particulate Science and Technology*. 27(4): In press.
3. Sæther, A., C. Arakaki, C. Ratnayake and D. Di Ruscio (2008). Mass flow rate measurement in a pneumatic conveyor using a system identification modeling approach. *Proceedings of the 4th International Symposium Reliable Flow of Particulate Solids, RELPOWFLO IV*, Troms, Norway.

4. Komperød, M., T. A. Hauge, D. Di Ruscio and B. Lie (2008). Empirical modelling: Approximating the DSR E Sub-Space System Identification Algorithm by a Two-Step ARX Algorithm In Proceedings of the 49th Scandinavian Conference on Simulation and Modeling.
5. Nilsen, G. W. and D. Di Ruscio (2005) Closed Loop Subspace Identification. *Modeling, Identification and Control*. Vol. 26, No. 3.
6. Nilsen, G. W. and D. Di Ruscio (2004a). Using a dithering signal in the signal in the reference to improve the estimates from subspace identification methods on closed loop data. *The 7th International Conference on Dynamics and Control of Process Systems*. DYCOPS 7 - 2004, Boston, USA.
7. Nilsen, G. W. and D. Di Ruscio (2004b) Using a dithering signal in the signal in the reference to improve the estimates from subspace identification methods on closed loop data. *The 8th World Multi-Conference on Systemics, Cybernetics and Informatics*. SCI 2004, Orlando, Florida, USA.
8. Nilsen, G. W. and D. Di Ruscio (2003). On the Total Least Squares and Ridge Regression Problems. *Nordic Process Control Workshop 11*, Trondheim, Norway, 2003.
9. Nilsen, G. W. and D. Di Ruscio (2004c) A comparison of the estimates from subspace identification methods used on closed loop data. *Nordic process Control Workshop 12*. Gothenburg, Sweden 2004.
10. Ergon, R. and D. Di Ruscio (1997) Dynamic System calibration by System Identification Methods. *European Control Conference 1997*, Brussels, Belgium.
11. Henriksen, R. and D. Di Ruscio (1992). Construction of minimal realizations from arbitrary time series. Twelfth IASTED International Conference, Modeling, Identification and Control. Innsbruck, February 15-17, 1993
12. Valderhaug, AA., D. Di Ruscio and J. G. Balchen (1990). Synthesis of Robust LQ-controllers. *11th IFAC World Congress*, Tallin, USSR, August 13-17, 1990.
13. Balchen, J. G., Telnes, K. and D. Di Ruscio (1989). Frequency response adaptive control of a refrigeration cycle. *Modeling, Identification and Control*, vol. 10, no. 1, pp. 3-11.
14. Balchen, J. G., Telnes, K. and D. Di Ruscio (1989). Frequency response adaptive control of a refrigeration cycle. Preprints for *IFAC international symposium on adaptive Control of Chemical Systems (ADCHEM)*, Copenhagen, Denmark, August 17-19.

Commercial Reports

1. Di Ruscio, D. (1997). Vurdering av modell prediktiv regulering (MPC) basert styringssystem for nytt blekeri ved Union Bruk. (In progress.)
2. Di Ruscio, D. (1997). Advanced Process and Quality Control. Report for Norse Hydro, Forskningscenteret. Project PR7-1272.01
3. Di Ruscio, D. (1997). Optimal Bakvannsregulering. Report for Union Bruk, Skien. (In Norwegian).
4. Holmberg, A. and Di Ruscio, D. (1995a). Modellbasert styring av TMP prosessen. Praktiske løsninger og resultater. Report-nr:215. Norske Skog Teknikk, N-7620 Skogn.
5. Di Ruscio, D. (1995b). Model based control of the TMP process. Theoretical foundations. Report-nr:214. Norske Skog Teknikk, N-7620 Skogn.
6. Di Ruscio, D. (1995b). Topics in modeling and model based control of a two stage thermo mechanical pulping refiner line. Norske Skog Teknikk, N-7620 Skogn.
7. Di Ruscio, D. (1995c). A program for state space model identification of time series. Version 1.0, version 1.1. Fantoft Prosess AS., P.O. Box 306, N-1301 Sandvika.
8. Di Ruscio, D. (1994a). Time series modeling of a distillation column. (the Nynäshamn raw oil distillation column). Fantoft Prosess AS., P.O. Box 306, N-1301 Sandvika.
9. Di Ruscio, D. (1994b). Analyse av data fra en roterovn ved Hydro magnesium.. Fantoft Prosess AS., P.O. Box 306, N-1301 Sandvika.
10. Di Ruscio, D. (1987). Dynamic mathematical models for a binary distillation process. (In Norwegian). Report 87-64-U. Dept. of Engineering Cybernetics, The Norwegian Institute of Technology, Trondheim.
11. Di Ruscio, D. (1987). A quasi dynamical optimal control strategy applied to a distillation column. (In Norwegian). Report 87-65-U. Dept. of Engineering Cybernetics, The Norwegian Institute of Technology, Trondheim.

Lecture notes (lærebøker og kompendium)

Only a part of the lecture notes is listed as follows:

- Di Ruscio, D. (2009). Model Predictive Control and Optimization. Lecture notes used in master MPC course. TF, HiT.
- Di Ruscio, D. (1999)-(2008). Optimal model based control: System analysis and design. Bibsys rapport PA, TF, HIT. 203 sider.
- Di Ruscio, D. (1999)-(2008). Subspace system identification: Theory and applications. Bibsys rapport PA, TF, HIT. 230 sider.

- Di Ruscio, D. (1999)-(2008). Systemteori, tilstandsromanalyse og prosessregulering. Bibsys rapport PA, TF, HIT. 85 sider.