

Publications of Dr. Yi Cao

January 2009

Book

- Z. Hu, B. Zou, D. Lin, and Y. Cao, *Principles and Application of Optimal Control*, Zhejiang University Publishing House, Hangzhou, P.R.China, 1988

Journal Papers

1. Y. Cao and Z. Hu, "Model Identification and Energy Saving Control of Box Annealers", *ACTA AUTOMATICA SINICA*, Vol. 13, No. 4 July, 1987, pp. 249—256.
2. Y. Cao, "Corrections of the Minimum ITAE Standard Forms for Zero-Displacement-Error System", *Journal of Zhejiang University (Natural Science)*, Vol. 23, No. 4 July, 1989, pp. 550—559.
3. Y. Cao, "Programming on Self-Maintainable Software", *Journal of Zhejiang University (Natural Science)*, Vol. 25, No. 5 Oct, 1991.
4. Y. Cao, and D. Owens, "An Algorithm for Multivariable System Closed-loop Performance Assessment Using Step Data", *IMA Journal of Mathematical Control and Information*, Vol.10, No.2, 1993, pp.97—111.
5. K. J. Smyth, Y. Cao, E. Rogers, and D. H. Owens, "Signal-processing-based Performance-measures for Differential Linear Repetitive Processes", *International Journal of Adaptive Control and Signal Processing*, Vol.8, No.6, 1994, pp.553—572.
6. Y. Cao, D. Biss, and J. D. Perkins, "Assessment of Input-Output Controllability in the Presence of Control Constraints", *Computers and Chemical Engineering*, Vol. 20 No. 4, 1996 pp. 337—346.
7. Y. Cao, D. Biss, "An Extension of Singular Value analysis for Assessing Manipulated Variable Constraints", *Journal of Process Control*, Vol. 6, No. 1, 1996, pp. 37—48.
8. Y. Cao, and D. Biss, "An Input Pre-Screening Technique for Control Structure Selection", *Computers and Chemical Engineering*, Vol. 21 No. 6, 1997 pp. 563—569.
9. Y. Cao, D. Rossiter, and D. H. Owens, "Input Selection for Disturbance Rejection under Manipulated Variable Constraints", presented in *PSE'97*, Trondheim, Norway and published in *Computers and Chemical Engineering*, Vol. 21 Suppl.,1997, pp. S403—S408 .
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11. Y. Cao, and D. Rossiter "Input Selection and Localized Disturbance Rejection", *Journal of Process Control*, Vol. 8, No. 3, 1998 pp. 175—183.
12. Y. Cao, D. Rossiter, and D. H. Owens, "Output Effectiveness and Scaling Sensitivity for Secondary Measurement Selection", *Transaction of IChemE*, Vol.76, Part A, 1998, pp. 849—854.
13. Y. Cao, D. Rossiter, and D. H. Owens, "Performance Factorization and Measurement Selection for Partially Controlled Systems", *International Journal of Control*, Vol. 72, No. 6, 1998, pp. 512—516.
14. Y. Cao, D. Rossiter, and D. H. Owens, "Performance Limitation Improvement for a Highly Integrated Chemical Process", *Computers and Chemical Engineering*, Vol. 23, Suppl., 1999, pp. S245—S248.
15. Y. Cao, W. J. Yan, "Multi-objective optimisation of restricted complexity controllers", *European Journal of Control*, Vol. 9, No. 1, 2003, pp. 61—65.
16. Y. Cao, Z. J. Yang, "Multiobjective process controllability analysis", *Computers and Chemical Engineering*, Vol. 28, No.1—2, pp.83—90, 2004.
17. Y. Cao, "Direct and Indirect Gradient Control for Static Optimisation", *International Journal of Automation and Computing*, Vol. 2, No. 1, pp. 13—19, 2005.
18. Y. Cao and P. Saha, "Improved branch and bound method for control structure screening", *Chemical Engineering Science*, Vol. 60, No. 6, pp. 1555-1564, 2005.
19. Y. Cao, "A Formulation of Nonlinear Model Predictive Control using Automatic Differentiation", *Journal of Process Control*, Vol. 15, No. 8, pp. 851—858, 2005
20. R K Al-Seyab, Y. Cao, and S. H. Yang, "Predictive Control for the ALSTOM Gasifier Problem" *IEE Proceedings D, Control Theory and Applications*, Vol. 153, No. 3, pp. 293—301, 2006

21. R K Al-Seyab, and **Y. Cao**, "Nonlinear Model Predictive Control for the ALSTOM Gasifier" *Journal of Process Control*, Vol. 16, No. 8, pp. 795—808, 2006
22. V. Kariwala and **Y. Cao**, "Local Self-Optimizing Control with Average Loss Minimization", *Industrial and Engineering Chemistry Research*, Vol. 47, pp. 1150—1158, 2008.
23. R K Al-Seyab, and **Y. Cao**, "Nonlinear System Identification for Predictive Control using Continuous Time Recurrent Neural Networks and Automatic Differentiation", *Journal of Process Control*, Vol. 18, No. 6, pp. 568—581, 2008
24. R K Al-Seyab, and **Y. Cao**, "Differential Recurrent Neural Network based Predictive Control", *Computers and Chemical Engineering*, Vol. 32, No. 7, pp. 1533—1545, 2008
25. **Y. Cao** and V. Kariwala, "Bidirectional branch and bound for control variable selection", *Computers and Chemical Engineering*, Vol. 32, No. 10, pp. 2306—2319, 2008.
26. S.H., Yang and **Y. Cao**, Guest Editorial, Networked control systems and wireless sensor networks: theories and applications, *International Journal of Systems Science*, Vol. 39, No. 11, pp. 1041—1044, 2008.
27. V. Kariwala and **Y. Cao**, "Bidirectional branch and bound for control variable selection, Part II", submitted to *Computers and Chemical Engineering*, 2008.
28. V. Kariwala and **Y. Cao**, "Branch and bound method for multiobjective pairing selection", submitted to *Automatica*, 2008.
29. P.P. Odiwei and **Y. Cao**, "Nonlinear Dynamic Process Monitoring using Canonical Variate Analysis and Kernel Density Estimations", submitted to *IEEE Transactions on Industrial Informatics*, 2009.
30. V. Kariwala and **Y. Cao**, "Bidirectional branch and bound for control variable selection, Part III: Local Average Loss Minimization", submitted to *IEEE Transactions on Industrial Informatics*, 2009.

Conference Papers (Refereed)

1. **Y. Cao** and Z. Hu, "Optimal Energy Saving Control of Box Annealers", presented at the 5th National Academic Conference of Control Theory and Its Application, Tunqi, Anhui, P.R.China, Oct. 1985.
2. W. Zhou, Z. Hu and **Y. Cao**, "The Development of EEG Feedback-Control System" in *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Vol. 14, Part 7 1992, p.2553
3. **Y. Cao** and D. H. Owens, "An Algorithm for Multivariable System Closed-loop Performance Assessment Using Step Data", in *Proceedings of the 31st IEEE Conference on Decision and Control*, vol. 4 1992 pp.167-172.
4. **Y. Cao** and D. H. Owens, "Closed-loop Performance Assessment for Mismatched Smith Control Schemes Using Step Data", in *Proceedings of the 2nd European Control Conference*, 1993, pp.1273-1277
5. K. J. Smyth, **Y. Cao** and E. Rogers, "Computer Aided Stability tests for Differential Non-unit Memory Linear Repetitive Process", in *Proceedings of the 2nd European Control Conference*, 1993, pp.1495-1498
6. K. J. Smyth, **Y. Cao** and E. Rogers, "Computable Performance Bounds for Linear Repetitive Processes", Presented in *IEEE Mediterranean Symposium on New Directions in Control Theory and Applications*, Crete, Greece, June 1993.
7. **Y. Cao**, D. Biss and J. D. Perkins, "Assessing the effect of manipulated variable constraints on controllability using nonlinear optimisation", in *Proceedings of the Fifth International Symposium on Process Systems Engineering*, 1994, pp. 1037--1049
8. **Y. Cao**, D. Biss and J. D. Perkins, "Comparison of two techniques for assessing input-output controllability in the presence of manipulated variable constraints", in IFAC Workshop on Integration of Process Design and Control, Baltimore, Maryland, USA, July 1994, pp. 35--40.
9. **Y. Cao**, D. Biss, "An Extension of Singular Value analysis for Assessing Manipulated Variable Constraints", in *Proceedings of the 3rd European Control Conference*, Vol. 3, Part 1, pp.2321--2326, Rome, Italy, 1995
10. **Y. Cao**, and D. Biss, "Selection of Manipulated Variables Using Generalised Relative Gain Array", Presented in *ICHEME 1996 Research Event*, Leeds, 1996.
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12. **Y. Cao**, and D. Rossiter, "Input Screening Method for Disturbance Rejection", in *Proceedings of Control'96*, 1996, vol. 1, pp.497--502.
13. **Y. Cao**, D. Rossiter, and D. H. Owens, "Screening Criteria for Input and Output Selection", in *ECC'97 CDROM*, paper number 773, 1997, Brussels, Belgium.
14. D. Rossiter and **Y. Cao**, "Application of an Input Pre-Screening Technique to an Industrial Air-Conditioning System", in *IChemE 1997 Jubilee Research Event*, pp. 713-716, Nottingham, 1997.
15. **Y. Cao**, D. Rossiter and D. Owens, "Partial Control and Measurement Selection", in *Proceedings of the 36th IEEE Conference on Decision and Control*, vol. 1, pp.66-71, 1997.
16. **Y. Cao**, D. Rossiter, D. Edward, J. Knechtel and D. Owens, "Modelling Issues for Control Structure Selection in a Chemical Process", *ESCAPE'8*, 1998.
17. **Y. Cao**, D. Rossiter and D. Owens, "Globally Optimal Control Structure Selection Using Branch and Bound Method", *Preprints of DYCOPS'5*, 1998, pp. 183—188.
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20. **Y. Cao**, D. Rossiter, and D. Owens, "Performance Limitation Improvement for a Highly Integrated Chemical Process", *ESCAPE'9*, 1999
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23. W. Browne, **Y. Cao**, *et al*, "Design Of A Knowledge-Based Intelligent Supervisory Control System For An Aluminium Hot Reversing Mill", *Control'2000*, Cambridge, 2000.
24. **Y. Cao** and Z.J. Yang. "Multiobjective controllability analysis", *European Symposium on Computer Aided Process Engineering – 12*, pp. 451—456, The Hague, The Netherlands, May 2002.
25. **Y. Cao**, "Self-Optimizing Control Structure Selection via Differentiation", *European Control Conference'2003*, Cambridge, UK, September 2003.
26. **Y. Cao** and R.Al-Seyab., "Nonlinear model predictive control using automatic differentiation", *European Control Conference' 2003*, Cambridge, UK, September 2003.
27. **Y. Cao** and P. Saha. "Control structure selection for unstable processes using Hankel singular value", *13th European Symposium on Computer Aided Process Engineering*, pp. 383—388, Lappeenranta, Finland, June 2003.
28. **Y. Cao** and W.J. Yan. "Low-order controller design using multiobjective optimization", *Proceedings of the International Workshop on Design and Optimisation of Restricted Complexity Controllers*, pp. 132—138, Grenoble, France, January 2003.
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32. **Y. Cao**, "Constrained Self-Optimizing Control via Differentiation", Semi-plenary Lecture, *Preprints of the 7th International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, pp. 63—70, Hong Kong, January 2004.
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35. **Y. Cao** and S. H. Yang, "Self-Optimising Control for Economic Variation", *Control 2004*, Bath, UK, September 2004
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37. R K Al-Seyab, and **Y. Cao**, "Nonlinear Model Predictive Control For The ALSTOM Gasifier Benchmark Problem" *16th IFAC World Congress*, Prague, 2005
38. **Y. Cao**, "A Formulation of Nonlinear Model Predictive Control using Automatic Differentiation", the *16th IFAC World Congress*, Prague, 2005
39. R K Al-Seyab, and **Y. Cao**, "Differential Recurrent Neural Network based Predictive Control", *PSE2006 and ESCAPE16*, Garmisch-Partenkirchen, Germany, July 2006
40. W-H Chen and **Y. Cao**, "New stability conditions for nonlinear model predictive control", the *IFAC Workshop on Nonlinear Model Predictive Control for Fast Systems*, October 2006.
41. H.Yeung, **Y.Cao** and A.G.Adebigha, "The importance of downstream conditions on riser behaviour", *5th North American Conference on Multiphase Technology*, Banff, Canada: 31 May – 2 June 2006.
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44. **Y. Cao** and V. Kariwala,, "Bidirectional Branch and Bound Approaches for Controlled Variable Selection", presented at *the 18th European Symposium on Computer Aided Process Engineering*, Lyon, France, 1—4 June, 2008.
45. V. Kariwala, and **Y. Cao**, "Near-Optimal Operator of an Evaporator using Self-Optimizing Control", presented at *the 18th European Symposium on Computer Aided Process Engineering*, Lyon, France, 1—4 June, 2008
46. V. Kariwala, and **Y. Cao**, "Efficient Branch and Bound Methods for Pairing Selection", presented at *the 17th IFAC World Congress*, Seoul, Korea, 6—11 July, 2008
47. H. Yeung, **Y. Cao** and L. Lao, "Comparisons between severe slug mitigation methods by increasing backpressure and throttling riser outlet valve", presented at *6th North American Conference on Multiphase Technology*, Banff, Canada: 4 – 6 June 2008.
48. **Y. Cao**, Y. Jin, M. Kowalczykiewicz and B. Sendhoff, "Design performance prediction using differential recurrent neural networks", presented at the *2008 International Joint Conference on Neural Networks*, 1—6 June 2008, Hong Kong.
49. JC Atuonwu, **Y. Cao**, GP Rangaiah and MO Tade, "Nonlinear model predictive control of a multistage evaporator system using recurrent neural networks", submitted to ICIEA2009.
50. V. Kariwala, and **Y. Cao**, "Branch and bound method for multiobjective control structure design", submitted to ICIEA2009.
51. **Y. Cao** and W-H Chen, "Automatic differentiation based nonlinear model predictive control of satellite using magneto-torquers", submitted to ICIEA2009.
52. V. Kariwala, and **Y. Cao**, "Bidirectional Branch and Bound Method for Selecting Controlled Variables", submitted to ADCHEM 2009.

Conference Presentations (Non-refereed)

1. D. Rossiter, **Y. Cao**, and D. Owens, "Control Structure Selection for Plantwide Chemical Processes", Presented at *IEE Colloquium Choosing The Right Control Structure For Your Process*, London, 1998
2. **Y. Cao**, "Nonlinear Model Predictive Control using Automatic Differentiation", *Workshop on Automatic Differentiation*, Hatfield, November 2004
3. **Y. Cao**, "Nonlinear Model Predictive Control using Automatic Differentiation", presented at *Colloquium on Predictive Control*, Sheffield, April 2005
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Others

- Solutions to exercises in the book *Multivariable Feedback Control* by S.Skogestad and I.Postlethwaite. Published on : <http://www.chembio.ntnu.no/users/skoge/book/solutions.html>
- More than 60 applications published in MATLAB Central: http://www.mathworks.com/matlabcentral/fileexchange/authors/my_fileexchange.