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Integrating Bond Graph-Based Fault Diagnosis and Fault Accommodation Through Inverse Simulation

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Abstract

This chapter addresses active fault tolerant control (FTC) of engineering systems represented by a mode switching linear time-invariant model. The presented approach integrates bond graph-based fault diagnosis and inverse simulation through solving a differential algebraic (DAE) system in order to reconstruct a system input after a severe fault has occurred.In this chapter, bond graph (BG) representations of hybrid models use switches. The standard causality assignment procedure (SCAP) is used to assign fixed causalities disregarding switch modes. Equations deduced from a BG are formulated in the declarative modelling language Modelica®; as a hybrid DAE system. Causality changes at switch ports are taken into account by the Modelica implementation of switches.As to fault detection, it is known that residuals of analytical redundancy relations (ARRs) deduced offline from a diagnostic bond graph (DBG) can serve as fault indicators. It is shown that they can also be used for estimating the magnitude of parametric faults in some simple cases.Moreover, ARR residuals can also be used in the reconstruction of a system input that compensates a severe fault. To that end, the forward model of the healthy system with nominal parameters derived from a BG is considered a DAE system of the inverse model. The output of the forward model of the healthy system in response to the initial known system input serving as the desired system output of the faulty system and the ARR residuals are inputs into the inverse model. Based on these inputs the DAE system then determines the input into the faulty system required for fault accommodation. As ARR residuals are used, fault isolation and estimation are not needed for input reconstruction. Alternatively, if isolation and estimation of the faulty parameter have been performed it can replace the nominal

parameter in the inverse model and ARRs as inputs can be omitted.Computation of the forward model of the healthy system, the inverse model and the evaluation of the ARRs can be performed in parallel. Advantages of the presented approach based on ARRs and inverse simulation are that neither ARRs nor the reconstructed input are needed in closed analytical form. If constitutive equations of some elements do not permit an elimination of unknown variables, a DAE system deduced from a DBG has to be solved numerically in order to determine the ARR residuals used in the process of input reconstruction. The latter one also means to solve a DAE system numerically.

Keywords

Hybrid models Bond graphs Modelica®; Fault diagnosis Fault accommodation Input reconstruction Inverse simulation Power electronic systems Fault simulation

References

1. Acary, V., Bremond, M., Huber, O., Perignon, F., & Pissard-Gibollet, R. (2016). *Siconos*. http://siconos.gforge.inria.fr/users_guide/lcp_solvers.html (http://siconos.gforge.inria.fr/users_guide/lcp_solvers.html)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Siconos&author=V..%20Acary&author=M..%20Bremond&author=O..%20Huber&author=F..%20Perignon&author=R..%20Pissard-Gibollet&publication_year=2016)

2. Allous, M., & Zanzouri, N. (2014). Active fault tolerant control based on bond graph approach. *Advances in Electrical Engineering*. Article ID 216153. http://dx.doi.org/10.1155/2014/216153 (http://dx.doi.org/10.1155/2014/216153)

3. Alvari, M., Luo, M., Wang, D., & Zhang, D. (2011). Fault diagnosis for power electronic inverters: A model-based approach. In *Proceedings of 2011 IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives (SDEMPED)* (pp. 221–228). Bologna, Italy: IEEE. doi:10.1109/DEMPED.2011.6063627 (http://dx.doi.org/10.1109/DEMPED.2011.6063627).
Google Scholar (http://scholar.google.com/scholar_lookup?title=Fault%20diagnosis%20for%20power%20electronic%20inverters%3A%20A%20model-based%20approach&author=M..%20Alvari&author=M..%20Luo&author=D..%20Wang&author=D..%20Zhang&pages=221-228&publication_year=2011)

4. Alwi, H., Edwards, C., & Pin Tan, C. (2011). *Fault detection and fault-tolerant control using sliding mode*. New York: Springer. http://www.springer.com/978-0-85729-649-8 (http://www.springer.com/978-0-85729-649-8)
CrossRef (https://doi.org/10.1007/978-0-85729-650-4)
MATH (http://www.emis.de/MATH-item?1237.93002)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Fault%20detection%20and%20fault-tolerant%20control%20using%20sliding%20mode&author=H..%20Alwi&author=C..%20Edwards&author=C..%20Pin%20Tan&publication_year=2011)

5. Arogeti, S. A., Wang, D., & Low, C. B. (2010). Mode identification of hybrid systems in the presence of fault. *IEEE Transactions on Industrial Electronics, 57*(4), 1452–1467.
CrossRef (https://doi.org/10.1109/TIE.2009.2030213)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Mode%20identification%20of%20hybrid%20systems%20in%20the%20presence%20of%20fault&author=S.%20A..%20Arogeti&author=D..%20Wang&author=C.%20B..%20Low&journal=IEEE%20Transactions%20on%20Industrial%20Electronics&volume=57&issue=4&pages=1452-1467&publication_year=2010)

6. Baïkeche, H., Marx, B., Maquin, D., & Ragot, J. (2006). On parametric and nonparametric fault detection in linear closed-loop systems. In *Workshop on Advanced Control and Diagnosis, ACD'2006, Nancy, France, CDROM*.
Google Scholar (https://scholar.google.com/scholar?q=Ba%C3%AFkeche%2C%20H.%2C%20Marx%2C%20B.%2C%20Maquin%2C%20D.%2C%20%26%20Ragot%2C%20J.%20%282006%29.%20On%20parametric%20and%20nonparametric%20fault%20detection%20in%20linear%20closed-loop%20systems.%20In%20Workshop%20on%20Advanced%20Control%20and%20Diagnosis%2C%20ACD%E2%80%992006%2C%20Nancy%2C%20France%2C%20CDROM.)

7. Battle, C., Fossas, E., Merrillas, I., & Miralles, A. (2005). Generalized discontinuous conductionmodes in the complementarity formalism. *IEEE Transactions on Circuits and Systems, 52*(8), 447–451.
CrossRef (https://doi.org/10.1109/TCSII.2005.849010)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Generalized%20discontinuous%20conductionmodes%20in%20the%20complementarity%20formalism&author=C..%20Battle&author=E..%20Fossas&author=I..%20Merrillas&author=A..%20Miralles&journal=IEEE%20Transactions%20on%20Circuits%20and%20Systems&volume=52&issue=8&pages=447-451&publication_year=2005)

8. Bergero, F., Floros, X., Fernández, J., Kofman, E., & Cellier, F. E. (2012). Simulating modelica models with a stand-alone quantized state systems solver. In *Proceedings of 9th International Modelica Conference, Munich, Germany* (pp. 237–246).
Google Scholar (https://scholar.google.com/scholar?q=Bergero%2C%20F.%2C%20Floros%2C%20X.%2C%20Fern%C3%A1ndez%2C%20J.%2C%20Kofman%2C%20E.%2C%20%26%20Cellier%2C%20F.%20E.%20%282012%29.%20Simulating%20modelica%20models%20with%20a%20stand-alone%20quantized%20state%20systems%20solver.%20In%20Proceedings%20of%209th%20International%20Modelica%20Conference%2C%20Munich%2C%20Germany%20%28pp.%C2%A0237%E2%80%93246%29.)

9. Blanke, M., Frei, C., Kraus, F., Patton, R., & Staroswiecki, M. (2000). What is fault-tolerant control? Aalborg University, Department of Control Engineering. http://www.iau.dtu.dk/secretary/pdf/safeprocess_02h.pdf (http://www.iau.dtu.dk/secretary/pdf/safeprocess_02h.pdf)
Google Scholar (http://scholar.google.com/scholar_lookup?title=What%20is%20fault-tolerant%20control%3F&author=M..%20Blanke&author=C..%20Frei&author=F..

%20Kraus&author=R..%20Patton&author=M..%20Staroswiecki&publication_year=2000)

10. Blanke, M., Kinnaert, M., Lunze, J., & Staroswiecki, M. (2006). *Diagnosis and fault-tolerant control*. Berlin: Springer.
MATH (http://www.emis.de/MATH-item?1126.93004)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Diagnosis%20and%20fault-tolerant%20control&author=M..%20Blanke&author=M..%20Kinnaert&author=J..%20Lunze&author=M..%20Staroswiecki&publication_year=2006)

11. Borutzky, W. (2010). Bond graph methodology – Development and analysis of multidisciplinary dynamic system models. London, UK: Springer. ISBN: 978-1-84882-881-0 (print).
Google Scholar (https://scholar.google.com/scholar?q=Borutzky%2C%20W.%20%282010%29.%20Bond%20graph%20methodology%20%E2%80%93%20Development%20and%20analysis%20of%20multidisciplinary%20dynamic%20system%20models.%20London%2C%20UK%3A%20Springer.%20ISBN%3A%20978-1-84882-881-0%20%28print%29.)

12. Borutzky, W. (Ed.). (2011). Bond graph modelling of engineering systems – Theory, applications and software support. New York, NY, USA: Springer.
MATH (http://www.emis.de/MATH-item?1220.05002)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Bond%20graph%20modelling%20of%20engineering%20systems%20%E2%80%93%20Theory%2C%20applications%20and%20software%20support&publication_year=2011)

13. Borutzky, W. (2015). *Bond graph model-based fault diagnosis of hybrid systems*. Switzerland: Springer International Publishing.
CrossRef (https://doi.org/10.1007/978-3-319-11860-4)
MATH (http://www.emis.de/MATH-item?1298.93124)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Bond%20graph%20model-based%20fault%20diagnosis%20of%20hybrid%20systems&author=W..%20Borutzky&publication_year=2015)

14. Borutzky, W. (2015). Fault accommodation by inverse simulation through solving a differential algebraic system obtained from a bond graph. In A. Bruzzone, G. Dauphin-Tanguy, S. Junco, & F. Longo (Eds.), *Proceedings of the 8th International Conference on Integrated Modelling and Analysis in Applied Control and Automation (IMAACA 2015), part of the I3M Multiconference, Bergeggi, Italy* (pp. 29–38).
Google Scholar (https://scholar.google.com/scholar?q=Borutzky%2C%20W.%20%282015%29.%20Fault%20accommodation%20by%20inverse%20simulation%20through%20solving%20a%20differential%20algebraic%20system%20obtained%20from%20a%20bond%20graph.%20In%20A.%20Bruzzone%2C%20G.%20Dauphin-Tanguy%2C%20S.%20Junco%2C%20%26%20F.%20Longo%20%28Eds.%29%2C%20Proceedings%20of%20the%208th%20International%20Conference%20on%20Integrated%20Modelling%20and%20Analysis%20in%20Applied%20Control%20and%20Automation%20%28IMAACA%202015%29%2C%20part%20of%20the

%20I3M%20Multiconference%2C%20Bergeggi%2C%20Italy%20%28pp.%C2%A029%E2%80%9338%29.)

15. Borutzky, W., & Cellier, F. E. (1996). Tearing algebraic loops in bond graphs. *Transactions of the SCS, 13*(2), 102–115.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Tearing%20algebraic%20loops%20in%20bond%20graphs&author=W..%20Borutzky&author=F.%20E..%20Cellier&journal=Transactions%20of%20the%20SCS&volume=13&issue=2&pages=102-115&publication_year=1996)

16. Buchholz, J. J., & von Grünhagen, W. (2008). *Inversion impossible?* Tech. rep., Bremen University of Applied Sciences and DLR Braunschweig, Germany.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Inversion%20impossible%3F&author=J.%20J..%20Buchholz&author=W..%20Gr%C3%BCnhagen&publication_year=2008)

17. Camlibel, K., Iannelli, L., & Vasca, F. (2004). Modelling switching power converters as complementarity systems. In *IEEE Conference on Decision and Control* (pp. 2328–2333). Piscataway: IEEE.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Modelling%20switching%20power%20converters%20as%20complementarity%20systems&author=K..%20Camlibel&author=L..%20Iannelli&author=F..%20Vasca&pages=2328-2333&publication_year=2004)

18. Cellier, F. E., & Kofman, E. (2006). *Continuous system simulation*. New York: Springer.
MATH (http://www.emis.de/MATH-item?1112.93004)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Continuous%20system%20simulation&author=F.%20E..%20Cellier&author=E..%20Kofman&publication_year=2006)

19. Cellier, F. E., & Krebs, M. (2007). Analysis and simulation of variable structure systems using bond graphs and inline integration. In *Proceedings of ICBGM 07, 8th SCS International Conference on Bond Graph Modeling and Simulation, San Diego, CA, USA* (pp. 29–34).
Google Scholar (https://scholar.google.com/scholar?q=Cellier%2C%20F.%20E.%2C%20%26%20Krebs%2C%20M.%20%282007%29.%20Analysis%20and%20simulation%20of%20variable%20structure%20systems%20using%20bond%20graphs%20and%20inline%20integration.%20In%20Proceedings%20of%20ICBGM%2007%2C%208th%20SCS%20International%20Conference%20on%20Bond%20Graph%20Modeling%20and%20Simulation%2C%20San%20Diego%2C%20CA%2C%20USA%20%28pp.%C2%A029%E2%80%9334%29.)

20. Cellier, F. E., & Nebot, A. (2005). The Modelica bond graph library. In *Proceedings of 4th International Modelica Conference, Hamburg, Germany* (Vol. 1, pp. 57–65).
Google Scholar (https://scholar.google.com/scholar?q=Cellier%2C%20F.%20E.%2C%20%26%20Nebot%2C%20A.%20%282005%29.%20The%20Modelica%20bond%20graph%20library.%20In%20Proceedings%20of%204th%20International%20Modelica%20Conference%2C%20Hamburg%2C%20Germany%20%28Vol.%C2%A01%2C%20pp.%C2%A057%E2%80%9365%29.)

21. Chen, J., Patton, R., & Zhang, H. (1996). Design of unknown input observers and robust fault detection filters. *Journal of Control, 63*(1), 85–105. doi:10.1080/00207179608921833 (https://doi.org/10.1080/00207179608921833)
MathSciNet (http://www.ams.org/mathscinet-getitem?mr=1650539)
CrossRef (https://doi.org/10.1080/00207179608921833)
MATH (http://www.emis.de/MATH-item?0844.93020)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Design%20of%20unknown%20input%20observers%20and%20robust%20fault%20detection%20filters&author=J..%20Chen&author=R..%20Patton&author=H..%20Zhang&journal=Journal%20of%20Control&volume=63&issue=1&pages=85-105&publication_year=1996&doi=10.1080%2F00207179608921833)

22. Controllab Products. (n.d.). *20-sim the power in modeling*. http://www.20sim.com (http://www.20sim.com)

23. Cormerais, H., Buisson, J., Leirens, S., & Richard, P. Y. (2002). Calcul symbolique de l'ensemble des équations d'état pour les graphs en commutation. In *Personnel of CIFA 2002, Nantes, France*.
Google Scholar (https://scholar.google.com/scholar?q=Cormerais%2C%20H.%2C%20Buisson%2C%20J.%2C%20Leirens%2C%20S.%2C%20%26%20Richard%2C%20P.%20Y.%20%282002%29.%20Calcul%20symbolique%20de%20l%E2%80%99ensemble%20des%20%C3%A9quations%20d%E2%80%99%C3%A9tat%20pour%20les%20graphs%20en%20commutation.%20In%20Personnel%20of%20CIFA%202002%2C%20Nantes%2C%20France.)

24. Dauphin-Tanguy, G., & Kam, C. (1999). How to model parameter uncertainties in a bond graph framework. In G. Horton, D. Möller, & U. Rüde (Eds.), *Simulation in Industry, 11th European Simulation Symposium, ESS'99, Erlangen, Germany* (pp. 121–125).
Google Scholar (https://scholar.google.com/scholar?q=Dauphin-Tanguy%2C%20G.%2C%20%26%20Kam%2C%20C.%20%281999%29.%20How%20to%20model%20parameter%20uncertainties%20in%20a%20bond%20graph%20framework.%20In%20G.%20Horton%2C%20D.%20M%C3%B6ller%2C%20%26%20U.%20R%C3%BCde%20%28Eds.%29%2C%20Simulation%20in%20Industry%2C%2011th%20European%20Simulation%20Symposium%2C%20ESS%E2%80%9999%2C%20Erlangen%2C%20Germany%20%28pp.%C2%A0121%E2%80%93125%29.)

25. de la Calle, A., Cellier, F., Yebra, L., & Dormido, S. (2013). Improvements in bondlib, the modelica bond graph library. In *Proceedings of the 8th EUROSIM Congress on Modelling and Simulation* (pp. 282–287). Cardiff: IEEE.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Improvements%20in%20bondlib%2C%20the%20modelica%20bond%20graph%20library&author=A..%20Calle&author=F..%20Cellier&author=L..%20Yebra&author=S..%20Dormido&pages=282-287&publication_year=2013)

26. Djeziri, M., Merzouki, R., Ould Bouamama, B., & Dauphin-Tanguy, G. (2007). Bond graph model based for robust fault diagnosis. In *Proceedings of the 2007 American Control Conference* (pp. 3017–3022). New York City, USA: IEEE.
CrossRef (https://doi.org/10.1109/ACC.2007.4282195)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Bond%20graph%20model%20based%20for%20robust%20fault%20diagnos

is&author=M..%20Djeziri&author=R..%20Merzouki&author=B..%20Ould%20Bouamama&author=G..%20Dauphin-Tanguy&pages=3017-3022&publication_year=2007)

27. Djeziri, M. A. (2007). Diagnostic des Systèmes Incrementains par l'Approche Bond Graph. Ph.D. thesis, Ecole Centrale de Lille, France. http://hal.archives-ouvertes.fr/docs/00/20/00/30/PDF/These-Djeziri-07-12-2007.pdf (http://hal.archives-ouvertes.fr/docs/00/20/00/30/PDF/These-Djeziri-07-12-2007.pdf)

28. Djeziri, M. A., Ould Bouamama, B., & Merzouki, R. (2009). Modelling and robust FDI of steam generator using uncertain bond graph model. *Journal of Process Control, 19*, 149–162.
CrossRef (https://doi.org/10.1016/j.jprocont.2007.12.009)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Modelling%20and%20robust%20FDI%20of%20steam%20generator%20using%20uncertain%20bond%20graph%20model&author=M.%20A..%20Djeziri&author=B..%20Ould%20Bouamama&author=R..%20Merzouki&journal=Journal%20of%20Process%20Control&volume=19&pages=149-162&publication_year=2009)

29. Ducreux, J., Dauphin-Tanguy, G., & Rombaut, C. (1993). Bond graph modelling of commutation phenomena in power electronic circuits. In J. Granda & F. Cellier (Eds.), *International Conference on Bond Graph Modeling, ICBGM'93, Proceedings of the 1993 Western Simulation Multiconference. Simulation Series* (Vol. 25, No. 2, pp. 132–136). San Diego, CA, USA: SCS Publishing. ISBN: 1-56555-019-6.
Google Scholar (https://scholar.google.com/scholar?q=Ducreux%2C%20J.%2C%20Dauphin-Tanguy%2C%20G.%2C%20%26%20Rombaut%2C%20C.%20%281993%29.%20Bond%20graph%20modelling%20of%20commutation%20phenomena%20in%20power%20electronic%20circuits.%20In%20J.%20Granda%20%26%20F.%20Cellier%20%28Eds.%29%2C%20International%20Conference%20on%20Bond%20Graph%20Modeling%2C%20ICBGM%E2%80%9993%2C%20Proceedings%20of%20the%201993%20Western%20Simulation%20Multiconference.%20Simulation%20Series%20%28Vol.%C2%A025%2C%20No.%C2%A02%2C%20pp.%C2%A0132%E2%80%93136%29.%20San%20Diego%2C%20CA%2C%20USA%3A%20SCS%20Publishing.%20ISBN%3A%201-56555-019-6.)

30. Elmqvist, H., Cellier, F. E., & Otter, M. (1993). Object-oriented modeling of hybrid systems. In *Proceedings of the 1993 European Simulation Symposium, Ghent* (pp. xxxi–xli).
Google Scholar (https://scholar.google.com/scholar?q=Elmqvist%2C%20H.%2C%20Cellier%2C%20F.%20E.%2C%20%26%20Otter%2C%20M.%20%281993%29.%20Object-oriented%20modeling%20of%20hybrid%20systems.%20In%20Proceedings%20of%20the%201993%20European%20Simulation%20Symposium%2C%20Ghent%20%28pp.%C2%A0xxxi%E2%80%93xli%29.)

31. Elmqvist, H., Otter, M., & Cellier, F. E. (1995). A new mixed symbolic/numeric approach for solving differential-algebraic equations systems. In *Proceedings of European Simulation Multiconference, ESM'95, Prag* (pp. xxiii–xxxiv).

Google Scholar (https://scholar.google.com/scholar?q=Elmqvist%2C%20H.%2C%20Otter%2C%20M.%2C%20%26%20Cellier%2C%20F.%20E.%20%281995%29.%20A%20new%20mixed%20symbolic%2Fnumeric%20approach%20for%20solving%20differential-algebraic%20equations%20systems.%20In%20Proceedings%20of%20European%20Simulation%20Multiconference%2C%20ESM%E2%80%9995%2C%20Prag%20%28pp.%C2%A0xxiii%E2%80%93xxxiv%29.)

32. Fritzson, P. (2004). *Principles of object-oriented modeling and simulation with Modelica 2.1*. Hoboken: Wiley. ISBN: 0-471-47163-1.
Google Scholar (http://scholar.google.com/scholar_lookup?title=%0APrinciples%20of%20object-oriented%20modeling%20and%20simulation%20with%20Modelica%202.1.&author=P..%20Fritzson&publication_year=2004)

33. Gawthrop, P. (1995). Bicausal bond graphs. In F. Cellier & J. Granda (Eds.), *ICBGM'95, International Conference on Bond Graph Modeling and Simulation: Vol. 27(1). Simulation series* (pp. 83–88). San Diego: SCS Publishing.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Bicausal%20bond%20graphs&author=P..%20Gawthrop&pages=83-88&publication_year=1995)

34. Ghoshal, S., Samantaray, A., & Mukherjee, A. (2005). Improvements to single fault isolation using estimated parameters. In J. Granda, & F. Cellier (Eds.) *Proceeding of the International Conference on Bond Graph Modeling, ICBGM'05, SCS Publishing, New Orleans, LA, USA: Vol. 37. Simulation series* (No. 1, pp. 301–306). ISBN: 1-56555-287-3.
Google Scholar (https://scholar.google.com/scholar?q=Ghoshal%2C%20S.%2C%20Samantaray%2C%20A.%2C%20%26%20Mukherjee%2C%20A.%20%282005%29.%20Improvements%20to%20single%20fault%20isolation%20using%20estimated%20parameters.%20In%20J.%20Granda%2C%20%26%20F.%20Cellier%20%28Eds.%29%20Proceeding%20of%20the%20International%20Conference%20on%20Bond%20Graph%20Modeling%2C%20ICBGM%E2%80%9905%2C%20SCS%20Publishing%2C%20New%20Orleans%2C%20LA%2C%20USA%3A%20Vol.%C2%A037.%20Simulation%20series%20%28No.%C2%A01%2C%20pp.%C2%A0301%E2%80%93306%29.%20ISBN%3A%201-56555-287-3.)

35. Hairer, E., & Wanner, G. (1996). *Solving ordinary differential equations II, stiff and differential-algebraic problems* (2nd ed.). Berlin: Springer-Verlag.
CrossRef (https://doi.org/10.1007/978-3-642-05221-7)
MATH (http://www.emis.de/MATH-item?0859.65067)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Solving%20ordinary%20differential%20equations%20II%2C%20stiff%20and%20differential-algebraic%20problems&author=E..%20Hairer&author=G..%20Wanner&publication_year=1996)

36. Hao-Yuan Chou, H. (2000). Fault diagnosis of a heat exchanger system using unknown input observers. Master's thesis, University of Toronto, Graduate Department of Electrical and Cornputer Engineering.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Fault%20diagnosis%20of%20a%20heat%20exchanger%20system%20using

%20unknown%20input%20observers&author=H..%20Hao-Yuan%20Chou&publication_year=2000)

37. Heemels, W. P. M. H., Lehmann, D., Lunze, J., & De Schutter, B. (2009). Chapter: Introduction to hybrid systems. In *Handbook of hybrid systems control: Theory, tools, applications*. Cambridge: Cambridge University Press (pp. 4–30).
Google Scholar (https://scholar.google.com/scholar?q=Heemels%2C%20W.%20P.%20M.%20H.%2C%20Lehmann%2C%20D.%2C%20Lunze%2C%20J.%2C%20%26%20De%20Schutter%2C%20B.%20%282009%29.%20Chapter%3A%20Introduction%20to%20hybrid%20systems.%20In%20Handbook%20of%20hybrid%20systems%20control%3A%20Theory%2C%20tools%2C%20applications.%20Cambridge%3A%20Cambridge%20University%20Press%20%28pp.%C2%A04%E2%80%9330%29.)

38. HighTec Consultants. (n.d.). SYMBOLS Sonata™ . http://www.htcinfo.com/ (http://www.htcinfo.com/)

39. Isermann, R., & Ballé, P. (1997). Trends in the application of model-based fault detection and diagnosis of technical processes. *Control Engineering Practice, 5*(5), 709–719.
CrossRef (https://doi.org/10.1016/S0967-0661(97)00053-1)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Trends%20in%20the%20application%20of%20model-based%20fault%20detection%20and%20diagnosis%20of%20technical%20processes&author=R..%20Isermann&author=P..%20Ball%C3%A9&journal=Control%20Engineering%20Practice&volume=5&issue=5&pages=709-719&publication_year=1997)

40. Kofman, E. (2004). Discrete event simulation of hybrid systems. *SIAM Journal on Scientific Computing, 25*(5), 1771–1797. doi:10.1137/S1064827502418379 (https://doi.org/10.1137/S1064827502418379).
http://dx.doi.org/10.1137/S1064827502418379 (http://dx.doi.org/10.1137/S1064827502418379)

41. Levy, R., Arogeti, S., & Wang, D. (2013). Improving mode-change and fault isolation of hybrid systems using instantaneous sensitivity matrices. In *Proceeding of the 1st International and 16th National Conference on Machines and Mechanisms (iNaCoMM2013)* (pp. 116–123).
Google Scholar (https://scholar.google.com/scholar?q=Levy%2C%20R.%2C%20Arogeti%2C%20S.%2C%20%26%20Wang%2C%20D.%20%282013%29.%20Improving%20mode-change%20and%20fault%20isolation%20of%20hybrid%20systems%20using%20instantaneous%20sensitivity%20matrices.%20In%20Proceeding%20of%20the%201st%20International%20and%2016th%20National%20Conference%20on%20Machines%20and%20Mechanisms%20%28iNaCoMM2013%29%20%28pp.%C2%A0116%E2%80%93123%29.)

42. Loureiro, R. (2012). Bond graph model based on structural diagnosability and recoverability analysis: Application to intelligent autonomous vehicles. Ph.D. thesis, L' Université Lille 1.
Google Scholar (https://scholar.google.com/scholar?q=Loureiro%2C%20R.%20%282012%29.%20Bond%20graph%20model%20based%20on%20structural%20diagnosability%20and%20recoverability%20analysis%

3A%20Application%20to%20intelligent%20autonomous%20vehicles.%20Ph.D.%20thesis%2C%20L%E2%80%99%20Universit%C3%A9%20Lille%201.)

43. Lundvall, H., Fritzson, P., & Bachmann, B. (2008). *Event handling in the OpenModelica compiler and runtime system*. Tech. rep., Linköping University, Department of Computer and Information Science, PELAB - Programming Environment Laboratory, Series: Technical reports in Computer and Information Science. ISSN 1654-7233; 2.
Google Scholar (https://scholar.google.com/scholar?q=Lundvall%2C%20H.%2C%20Fritzson%2C%20P.%2C%20%26%20Bachmann%2C%20B.%20%282008%29.%20Event%20handling%20in%20the%20OpenModelica%20compiler%20and%20runtime%20system.%20Tech.%20rep.%2C%20Link%C3%B6ping%20University%2C%20Department%20of%20Computer%20and%20Information%20Science%2C%20PELAB%20-%20Programming%20Environment%20Laboratory%2C%20Series%3A%20Technical%20reports%20in%20Computer%20and%20Information%20Science.%20ISSN%201654-7233%3B%202.)

44. Lunze, J. (2004). Control reconfiguration. In *Control systems, robotics and automation* (Vol. XVI, pp. 320–333). Oxford, UK: Eolss Publishers [Encyclopedia of Life Support Systems (EOLSS) edn.].
Google Scholar (https://scholar.google.com/scholar?q=Lunze%2C%20J.%20%282004%29.%20Control%20reconfiguration.%20In%20Control%20systems%2C%20robotics%20and%20automation%20%28Vol.%20XVI%2C%20pp.%C2%A0320%E2%80%93333%29.%20Oxford%2C%20UK%3A%20Eolss%20Publishers%20%5BEncyclopedia%20of%20Life%20Support%20Systems%20%28EOLSS%29%20edn.%5D.)

45. Lunze, J., & Richter, H. (2008). Reconfigurable fault-tolerant control: A tutorial introduction. *European Journal of Control, 5*, 359–386.
MathSciNet (http://www.ams.org/mathscinet-getitem?mr=2477705)
CrossRef (https://doi.org/10.3166/ejc.14.359-386)
MATH (http://www.emis.de/MATH-item?1293.93248)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Reconfigurable%20fault-tolerant%20control%3A%20A%20tutorial%20introduction&author=J..%20Lunze&author=H..%20Richter&journal=European%20Journal%20of%20Control&volume=5&pages=359-386&publication_year=2008)

46. Margetts, R. (2013). Modelling and analysis of hybrid dynamic systems using a bond graph approach. Ph.D. thesis, University of Bath, UK.
Google Scholar (https://scholar.google.com/scholar?q=Margetts%2C%20R.%20%282013%29.%20Modelling%20and%20analysis%20of%20hybrid%20dynamic%20systems%20using%20a%20bond%20graph%20approach.%20Ph.D.%20thesis%2C%20University%20of%20Bath%2C%20UK.)

47. Modelica Association. (n.d.). *Modelica and the modelica association*. http://www.modelica.org (http://www.modelica.org)

48. Murray-Smith, D. (2012). *Modelling and simulation of integrated systems in engineering – Issues of methodology, quality, test and application*. Cambridge, UK: Woodhead Publishing.
CrossRef (https://doi.org/10.1533/9780857096050)

Google Scholar (http://scholar.google.com/scholar_lookup?title=Modelling%20and%20simulation%20of%20integrated%20systems%20in%20engineering%20%E2%80%93%20Issues%20of%20methodology%2C%20quality%2C%20test%20and%20application&author=D..%20Murray-Smith&publication_year=2012)

49. Murray-Smith, D. J. (2011). Feedback methods for inverse simulation of dynamic models for engineering systems applications. *Mathematical and Computer Modelling of Dynamic Systems, 17*(5), 515–541.
MathSciNet (http://www.ams.org/mathscinet-getitem?mr=2842728)
CrossRef (https://doi.org/10.1080/13873954.2011.584323)
MATH (http://www.emis.de/MATH-item?1302.93033)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Feedback%20methods%20for%20inverse%20simulation%20of%20dynamic%20models%20for%20engineering%20systems%20applications&author=D.%20J..%20Murray-Smith&journal=Mathematical%20and%20Computer%20Modelling%20of%20Dynamic%20Systems&volume=17&issue=5&pages=515-541&publication_year=2011)

50. Nacusse, M., & Junco, S. J. (2011). Passive fault tolerant control: A bond graph approach. In: A. Bruzzone, G. Dauphin-Tanguy, S. Junco, & M. A. Piera (Eds.), *Proceedings of the 5th International Conference on Integrated Modelling and Analysis in Applied Control and Automation (IMAACA 2011), DIPTEM Università di Genova, Rome, Italy* (pp. 75–82).
Google Scholar (https://scholar.google.com/scholar?q=Nacusse%2C%20M.%2C%20%26%20Junco%2C%20S.%20J.%20%282011%29.%20Passive%20fault%20tolerant%20control%3A%20A%20bond%20graph%20approach.%20In%3A%20A.%20Bruzzone%2C%20G.%20Dauphin-Tanguy%2C%20S.%20Junco%2C%20%26%20M.%20A.%20Piera%20%28Eds.%29%2C%20Proceedings%20of%20the%205th%20International%20Conference%20on%20Integrated%20Modelling%20and%20Analysis%20in%20Applied%20Control%20and%20Automation%20%28IMAACA%202011%29%2C%20DIPTEM%20Universit%C3%A0%20di%20Genova%2C%20Rome%2C%20Italy%20%28pp.%C2%A075%E2%80%9382%29.)

51. Ngwompo, R., Scavarda, S., & Thomasset, D. (1996). Inversion of linear time-invariant SISO systems modelled by bond graph. *Journal of the Franklin Institute, 333*(B)(2), 157–174.
Google Scholar (https://scholar.google.com/scholar?q=Ngwompo%2C%20R.%2C%20Scavarda%2C%20S.%2C%20%26%20Thomasset%2C%20D.%20%281996%29.%20Inversion%20of%20linear%20time-invariant%20SISO%20systems%20modelled%20by%20bond%20graph.%20Journal%20of%20the%20Franklin%20Institute%2C%20333%28B%29%282%29%2C%20157%E2%80%93174.)

52. Ngwompo, R., Scavarda, S., & Thomasset, D. (2001). Physical model-based inversion in control systems design using bond graph representation part 1: Theory. *Proceedings of the IMechE Part I Journal of Systems and Control Engineering, 215*(2), 95–103.
CrossRef (https://doi.org/10.1243/0959651011540888)

Google Scholar (http://scholar.google.com/scholar_lookup?title=Physical%20model-based%20inversion%20in%20control%20systems%20design%20using%20bond%20graph%20representation%20part%201%3A%20Theory&author=R..%20Ngwompo&author=S..%20Scavarda&author=D..%20Thomasset&journal=Proceedings%20of%20the%20IMechE%20Part%20I%20Journal%20of%20Systems%20and%20Control%20Engineering&volume=215&issue=2&pages=95-103&publication_year=2001)

53. Ngwompo, R., Scavarda, S., & Thomasset, D. (2001). Physical model-based inversion in control systems design using bond graph representation part 2: Applications. *Proceedings of the IMechE Part I Journal of Systems and Control Engineering, 215*(2), 105–112.
CrossRef (https://doi.org/10.1243/0959651011540897)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Physical%20model-based%20inversion%20in%20control%20systems%20design%20using%20bond%20graph%20representation%20part%202%3A%20Applications&author=R..%20Ngwompo&author=S..%20Scavarda&author=D..%20Thomasset&journal=Proceedings%20of%20the%20IMechE%20Part%20I%20Journal%20of%20Systems%20and%20Control%20Engineering&volume=215&issue=2&pages=105-112&publication_year=2001)

54. Niemann, H., & Stoustrup, J. (1997). Robust fault detection in open loop vs. closed loop. In *Proceedings of the 36th IEEE Conference on Decision and Control* (Vol. 5, pp. 4496–4497).
Google Scholar (https://scholar.google.com/scholar?q=Niemann%2C%20H.%2C%20%26%20Stoustrup%2C%20J.%20%281997%29.%20Robust%20fault%20detection%20in%20open%20loop%20vs.%20closed%20loop.%20In%20Proceedings%20of%20the%2036th%20IEEE%20Conference%20on%20Decision%20and%20Control%20%28Vol.%C2%A05%2C%20pp.%C2%A04496%E2%80%934497%29.)

55. Noura, H., Sauter, D., Hamelin, F., & Theilliol, D. (2000). Fault-tolerant control in dynamic systems: Application to a winding machine. *Control Systems 20*(1), 33–49. doi:10.1109/37.823226 (https://doi.org/10.1109/37.823226).
CrossRef (https://doi.org/10.1109/37.823226)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Fault-tolerant%20control%20in%20dynamic%20systems%3A%20Application%20to%20a%20winding%20machine&author=H..%20Noura&author=D..%20Sauter&author=F..%20Hamelin&author=D..%20Theilliol&journal=Control%20Systems&volume=20&issue=1&pages=33-49&publication_year=2000&doi=10.1109%2F37.823226)

56. OpenModelica Consortium. (n.d.). *OpenModelica*. https://www.openmodelica.org/ (https://www.openmodelica.org/)

57. Otter, M., Elmqvist, H., & Mattson, S. E. (1999). Hybrid modeling in modelica based on the synchronous data flow principle. In *Proceedings of the 1999 IEEE Symposium on Computer-Aided Control System Design, CACSD'99, IEEE Control Systems Society, HI, USA*
Google Scholar (https://scholar.google.com/scholar?q=Otter%2C%20M.%2C%20Elmqvist%2C%20H.%2C%20%26%20Mattson%2C%

20S.%20E.%20%281999%29.%20Hybrid%20modeling%20in%20modelica%20based%20on%20the%20synchronous%20data%20flow%20principle.%20In%20Proceedings%20of%20the%201999%20IEEE%20Symposium%20on%20Computer-Aided%20Control%20System%20Design%2C%20CACSD%E2%80%9999%2C%20IEEE%20Control%20Systems%20Society%2C%20HI%2C%20USA%0A)

58. Otter, M., Elmqvist, H., & Mattsson, S. E. (1999). *Modeling of mixed continuous/discrete systems in modelica*. Tech. rep.
Google Scholar (http://scholar.google.com/scholar_lookup?title=Modeling%20of%20mixed%20continuous%2Fdiscrete%20systems%20in%20modelica&author=M..%20Otter&author=H..%20Elmqvist&author=S.%20E..%20Mattsson&publication_year=1999)

59. Pantelides, C. (1988). The consistent initialization of differential-algebraic systems. *SIAM, Journal of Scientific and Statistical Computation, 9*, 213–231.
MathSciNet (http://www.ams.org/mathscinet-getitem?mr=930042)
CrossRef (https://doi.org/10.1137/0909014)
MATH (http://www.emis.de/MATH-item?0643.65039)
Google Scholar (http://scholar.google.com/scholar_lookup?title=The%20consistent%20initialization%20of%20differential-algebraic%20systems&author=C..%20Pantelides&journal=SIAM%2C%20Journal%20of%20Scientific%20and%20Statistical%20Computation&volume=9&pages=213-231&publication_year=1988)

60. Provan, G. (2009). Model abstractions for diagnosing hybrid systems. In *Proceedings of the 20th International Workshop on Principles of Diagnosis, DX-09, Stockholm, Sweden* (pp. 321–328). http://www.cs.ucc.ie/ccsl/GP-papers/2009/Provan_DX_2009_2.pdf (http://www.cs.ucc.ie/ccsl/GP-papers/2009/Provan_DX_2009_2.pdf)

61. Rahmani, A., Sueur, C., & Dauphin-Tanguy, G. (1992). Formal determination of controllability/observability matrices for multivariable systems modelled by bond graph. In *Proceeding of IMACS/SICE International Symposium of Robotics, Mechatronics and Manufacturing, System'92* (pp. 573–580)
Google Scholar (https://scholar.google.com/scholar?q=Rahmani%2C%20A.%2C%20Sueur%2C%20C.%2C%20%26%20Dauphin-Tanguy%2C%20G.%20%281992%29.%20Formal%20determination%20of%20controllability%2Fobservability%20matrices%20for%20multivariable%20systems%20modelled%20by%20bond%20graph.%20In%20Proceeding%20of%20IMACS%2FSICE%20International%20Symposium%20of%20Robotics%2C%20Mechatronics%20and%20Manufacturing%2C%20System%E2%80%9992%20%28pp.%C2%A0573%E2%80%93580%29)

62. Samantaray, A., Medjaher, K., Ould Bouamama, B., Staroswiecki, M., & Dauphin-Tanguy, G. (2006). Diagnostic bond graphs for online fault detection and isolation. *Simulation Modelling Practice and Theory, 14*(3), 237–262.
CrossRef (https://doi.org/10.1016/j.simpat.2005.05.003)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Diagnostic%20bond%20graphs%20for%20online%20fault%20detection%20and%20isolation&author=A..%20Samantaray&author=K..%20Medjaher&author=B..%20Ould%20Bouamama&author=M..%20Staroswiecki&author=G..%20Dauphin-

Tanguy&journal=Simulation%20Modelling%20Practice%20and%20Theory&volume=14&issue=3&pages=237-262&publication_year=2006)

63. Samantaray, A., & Ould Bouamama, B. (2008). *Model-based process supervision – A bond graph approach. Advances in industrial control*. London: Springer. Google Scholar (http://scholar.google.com/scholar_lookup?title=Model-based%20process%20supervision%20%E2%80%93%20A%20bond%20graph%20approach.%20Advances%20in%20industrial%20control&author=A..%20Samantaray&author=B..%20Ould%20Bouamama&publication_year=2008)

64. Staroswiecki, M. (n.d.). Fault tolerant systems. In *Control systems, robotics and automation* (Vol. XVI). Oxford, UK: Eolss Publishers [Encyclopedia of Life Support Systems (EOLSS) edn.]. Google Scholar (https://scholar.google.com/scholar?q=Staroswiecki%2C%20M.%20%28n.d.%29.%20Fault%20tolerant%20systems.%20In%20Control%20systems%2C%20robotics%20and%20automation%20%28Vol.%20XVI%29.%20Oxford%2C%20UK%3A%20Eolss%20Publishers%20%5BEncyclopedia%20of%20Life%20Support%20Systems%20%28EOLSS%29%20edn.%5D.)

65. Tan, S., & Vandewalle, J. (1988). Inversion of singular systems. *IEEE Transactions on Circuits and Systems, 35*(5), 583–587. CrossRef (https://doi.org/10.1109/31.1788) MATH (http://www.emis.de/MATH-item?0653.93014) Google Scholar (http://scholar.google.com/scholar_lookup?title=Inversion%20of%20singular%20systems&author=S..%20Tan&author=J..%20Vandewalle&journal=IEEE%20Transactions%20on%20Circuits%20and%20Systems&volume=35&issue=5&pages=583-587&publication_year=1988)

66. Thümmel, M., Looye, G., Kurze, M., Otter, M., & Bals, J. (2005). Nonlinear inverse models for control. In *Proceedings of the 4th International Modelica Conference, Hamburg, Germany* (pp. 267–279). Google Scholar (https://scholar.google.com/scholar?q=Th%C3%BCmmel%2C%20M.%2C%20Looye%2C%20G.%2C%20Kurze%2C%20M.%2C%20Otter%2C%20M.%2C%20%26%20Bals%2C%20J.%20%282005%29.%20Nonlinear%20inverse%20models%20for%20control.%20In%20Proceedings%20of%20the%204th%20International%20Modelica%20Conference%2C%20Hamburg%2C%20Germany%20%28pp.%C2%A0267%E2%80%93279%29.)

67. Tiller, M. (2001). *Introduction to physical modeling with modelica*. Boston, MA: Kluwer Academic Publishers. ISBN: 0-7923-7367-7. CrossRef (https://doi.org/10.1007/978-1-4615-1561-6) Google Scholar (http://scholar.google.com/scholar_lookup?title=Introduction%20to%20physical%20modeling%20with%20modelica&author=M..%20Tiller&publication_year=2001)

68. Touati, Y., Merzouki, R., & Ould Bouamama, B. (2011). Fault detection and isolation in presence of input and output uncertainties using bond graph approach. In A. Bruzzone, G. Dauphin-Tanguy, S. Junco, & M. Piera (Eds.), *Proceedings of the 5th International Conference on Integrated Modeling and Analysis in Applied Control and Automation (IMAACA 2011), DIPTEM University of Genoa* (pp. 221–227). Google Scholar (https://scholar.google.com/scholar?q=Touati%2C%20Y.%2C%20Merzouki%2C%20R.%2C%20%26%20Ould%20Bou

amama%2C%20B.%20%282011%29.%20Fault%20detection%20and%20isolation%20in%20presence%20of%20input%20and%20output%20uncertainties%20using%20bond%20graph%20approach.%20In%20A.%20Bruzzone%2C%20G.%20Dauphin-Tanguy%2C%20S.%20Junco%2C%20%26%20M.%20Piera%20%28Eds.%29%2C%20Proceedings%20of%20the%205th%20International%20Conference%20on%20Integrated%20Modeling%20and%20Analysis%20in%20Applied%20Control%20and%20Automation%20%28IMAACA%202011%29%2C%20DIPTEM%20University%20of%20Genoa%20%28pp.%C2%A0221%E2%80%93227%29.)

69. Touati, Y., Merzouki, R., Ould Bouamama, B., & Loureiro, R. (2012). Detectability and isolability conditions in presence of measurement and parameter uncertainties using bond graph approach. In *8th IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes (SAFEPROCESS), Mexico City, Mexico* (pp. 958–963).
Google Scholar (https://scholar.google.com/scholar?q=Touati%2C%20Y.%2C%20Merzouki%2C%20R.%2C%20Ould%20Bouamama%2C%20B.%2C%20%26%20Loureiro%2C%20R.%20%282012%29.%20Detectability%20and%20isolability%20conditions%20in%20presence%20of%20measurement%20and%20parameter%20uncertainties%20using%20bond%20graph%20approach.%20In%208th%20IFAC%20Symposium%20on%20Fault%20Detection%2C%20Supervision%20and%20Safety%20of%20Technical%20Processes%20%28SAFEPROCESS%29%2C%20Mexico%20City%2C%20Mexico%20%28pp.%C2%A0958%E2%80%93963%29.)

70. van der Schaft, A. J., & Schuhmacher, M. (1998). Complementarity modeling of hybrid systems. *IEEE Transactions on Automatic Control, 43*(4), 483–490.
MathSciNet (http://www.ams.org/mathscinet-getitem?mr=1617571)
CrossRef (https://doi.org/10.1109/9.664151)
MATH (http://www.emis.de/MATH-item?0899.93002)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Complementarity%20modeling%20of%20hybrid%20systems&author=A.%20J..%20Schaft&author=M..%20Schuhmacher&journal=IEEE%20Transactions%20on%20Automatic%20Control&volume=43&issue=4&pages=483-490&publication_year=1998)

71. Venkatasubramanian, V., Rengaswamy, R., Yin, K., & Kavuri, S. (2003). A review of process fault detection and diagnosis, part I: Quantitative model-based methods. *Computers and Chemical Engineering, 27*, 293–311.
CrossRef (https://doi.org/10.1016/S0098-1354(02)00160-6)
Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20review%20of%20process%20fault%20detection%20and%20diagnosis%2C%20part%20I%3A%20Quantitative%20model-based%20methods&author=V..%20Venkatasubramanian&author=R..%20Rengaswamy&author=K..%20Yin&author=S..%20Kavuri&journal=Computers%20and%20Chemical%20Engineering&volume=27&pages=293-311&publication_year=2003)

72. Venkatasubramanian, V., Rengaswamy, R., Yin, K., & Kavuri, S. (2003). A review of process fault detection and diagnosis, part II: Qualitative models and search strategies. *Computers and Chemical Engineering, 27*, 313–326.
CrossRef (https://doi.org/10.1016/S0098-1354(02)00161-8)

Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20review%20of%20process%20fault%20detection%20and%20diagnosis%2C%20part%20II%3A%20Qualitative%20models%20and%20search%20strategies&author=V..%20Venkatasubramanian&author=R..%20Rengaswamy&author=K..%20Yin&author=S..%20Kavuri&journal=Computers%20and%20Chemical%20Engineering&volume=27&pages=313-326&publication_year=2003)

73. Venkatasubramanian, V., Rengaswamy, R., Yin, K., & Kavuri, S. (2003). A review of process fault detection and diagnosis, part III: Process history based methods. *Computers and Chemical Engineering, 27*, 327–346.
CrossRef (https://doi.org/10.1016/S0098-1354(02)00162-X)
Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20review%20of%20process%20fault%20detection%20and%20diagnosis%2C%20part%20III%3A%20Process%20history%20based%20methods&author=V..%20Venkatasubramanian&author=R..%20Rengaswamy&author=K..%20Yin&author=S..%20Kavuri&journal=Computers%20and%20Chemical%20Engineering&volume=27&pages=327-346&publication_year=2003)

74. Wainer, G. A. (2009). *Discrete-event modeling and simulation – A practitioner's approach*. Boca Raton, FL, USA: CRC Press, Taylor and Francis Group.
CrossRef (https://doi.org/10.1201/9781420053371)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Discrete-event%20modeling%20and%20simulation%20%E2%80%93%20A%20practitioner%E2%80%99s%20approach&author=G.%20A..%20Wainer&publication_year=2009)

75. Wang, D., Yu, M., Low, C., & Arogeti, S. (2013). *Model-based health monitoring of hybrid systems*. New York: Springer.
CrossRef (https://doi.org/10.1007/978-1-4614-7369-5)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Model-based%20health%20monitoring%20of%20hybrid%20systems&author=D..%20Wang&author=M..%20Yu&author=C..%20Low&author=S..%20Arogeti&publication_year=2013)

76. Wolfram, S. (2003). *The mathematica book* (5th ed.). Champaign: Wolfram Media, Inc.
MATH (http://www.emis.de/MATH-item?0924.65002)
Google Scholar (http://scholar.google.com/scholar_lookup?title=The%20mathematica%20book&author=S..%20Wolfram&publication_year=2003)

77. Young, P. C. (1981). Parameter estimation for continuous-time models – A survey. *Automatica, 17*(1), 23–39.
MathSciNet (http://www.ams.org/mathscinet-getitem?mr=607192)
CrossRef (https://doi.org/10.1016/0005-1098(81)90082-0)
MATH (http://www.emis.de/MATH-item?0451.93052)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Parameter%20estimation%20for%20continuous-time%20models%20%E2%80%93%20A%20survey&author=P.%20C..%20Young&journal=Automatica&volume=17&issue=1&pages=23-39&publication_year=1981)

78. Zimmer, D. (2010). Equation-based modeling of variable-structure systems. Ph.D. dissertation no. 18924, ETH Zürich.

Google Scholar (https://scholar.google.com/scholar?q=Zimmer%2C%20D.%20%282010%29.%20Equation-based%20modeling%20of%20variable-structure%20systems.%20Ph.D.%20dissertation%20no.%C2%A018924%2C%20ETH%20Z%C3%BCrich.)

79. Zimmer, D. (2013). A new framework for the simulation of equation-based models with variable structure. *Simulation, 89*(8), 935–963.
CrossRef (https://doi.org/10.1177/0037549713484077)
Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20new%20framework%20for%20the%20simulation%20of%20equation-based%20models%20with%20variable%20structure&author=D..%20Zimmer&journal=Simulation&volume=89&issue=8&pages=935-963&publication_year=2013)

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