

## Reading and Reference List

### Applying Ideas from Control Systems Engineering to Behavioral Interventions

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*An excellent introduction to the topic of adaptive interventions:*

[1] Collins, L.M., S.A. Murphy, and K.L. Bierman, “A conceptual framework for adaptive preventive interventions,” *Prevention Science*, **5**, No. 3, pgs. 185-196, 2004.

*A paper inspired by [1] that is the basis for much of the content in this presentation:*

[2] Rivera, D.E., M.D. Pew, and L.M. Collins, “Using engineering control principles to inform the design of adaptive interventions: a conceptual introduction,” *Drug and Alcohol Dependence*, **88**, Suppl. 2, May 2007, pgs. S31 - S40.

*A report that describes the technical content in [2] in more detail:*

[3] Rivera, D.E., M.D. Pew, L.M. Collins and S.A. Murphy, “Engineering control approaches for the design and analysis of adaptive, time-varying interventions,” Technical Report 05-73, The Methodology Center, Penn State University, available from <http://methcenter.psu.edu/> or <http://csel.asu.edu/adaptiveintervention> (select item 4).

*Recent work from our laboratory showing how Model Predictive Control can be used for decision-making in adaptive behavioral interventions:*

[4] Nandola, N. and D.E. Rivera, “A robust Model Predictive Control formulation for hybrid systems with application to adaptive behavioral interventions,” *Proceedings of the 2010 American Control Conference*, Baltimore, MD, June 30 - July 2, 2010, in press. Preprint available from <http://csel.asu.edu/adaptiveintervention> (select item 8).

*Two tutorials on engineering control theory; the one at SPR was presented recently, while the SAMSI one focuses on mechanistic modeling issues.*

[5] Rivera, D.E., “Engineering control theory: can it impact adaptive interventions?” tutorial presentation at the pre-conference workshop on systems science methodologies in prevention, 18th Annual Mtg. of the Society for Prevention Research, Denver, CO, June 1, 2010. Can be downloaded from <http://csel.asu.edu/adaptiveintervention> (select item 10).

[6] Rivera, D.E., “An introduction to mechanistic models and control theory,” tutorial presentation at the SAMSI Summer 2007 Program on Challenges in Dynamic Treatment Regimes and Multistage Decision-Making, June 18 - 29, 2007. Can be downloaded from <http://csel.asu.edu/controleducation> (select item 9).

*Some good process modeling and control texts; these focus on mechanistic models of engineering systems, and require prior working knowledge of differential equations:*

[7] B.A. Ogunnaike and W.H. Ray, **Process Dynamics, Modeling, and Control**, Oxford University Press, 1994, ISBN 0-19-509119-1.

[8] Seborg, D.E., T.E. Edgar, and D.A. Mellichamp, **Process Dynamics and Control**, 1989, Wiley, ISBN 0-471-86389-0; (2nd Edition released in 2004, ISBN 0-471-00077-9).

[9] Bequette, B.W. **Process Dynamics: Modeling, Analysis, and Simulation**. Prentice-Hall, 1998. ISBN 0-13-206889-3.

*A good web-based reference for introductory control engineering theory:*

[10] Åström, K. J. and R. M. Murray, **Feedback systems: an introduction for scientists and engineers**,” <http://www.cds.caltech.edu/~murray/amwiki>.

*Some good references on Internal Model Control and Model Predictive Control:*

[11] Rivera, D.E., M. Morari, and S. Skogestad, “Internal Model Control 4. PID controller design,” *Ind. Eng. Chem. Proc. Des. and Dev.*, **25**, 252, 1986.

[12] Morari, M. and E. Zafiriou. **Robust Process Control**. Englewood Cliffs, New Jersey: Prentice Hall, 1989.

[13] García, C. E., D. M. Prett, and M. Morari, “Model Predictive Control: Theory and Practice- a Survey.” *Automatica* 25(3), 335–348, 1989.

[14] Camacho, E. F. and C. Bordons. **Model Predictive Control in the Process Industry. Advances in Industrial Control**. London: Springer, 2004.

*A tutorial on system identification (i.e., dynamic modeling from data):*

[15] Rivera, D.E., “A Brief Introduction to System Identification,” Penn State Methodology Center Brown Bag presentation, March 20, 2008. Can be downloaded from <http://csel.asu.edu/controleducation> (select item 10).

*System identification and feedback control, presented from a primarily statistical perspective:*

[16] Box, Jenkins, and Reinsel, **Time Series Analysis: Forecasting and Cntrl**, Third Edition, Prentice-Hall, 1994 (2nd edition is also useful, Box and Jenkins, Holden-Day, 1976).

*Some system identification texts written (or co-authored) by Lennart Ljung, an eminent scholar in the field and developer of Matlab’s System Identification Toolbox:*

[17] Ljung, L. and T. Glad, **Modeling of Dynamic Systems**, Prentice-Hall, 1994, (ISBN 0-13-597097-0).

[18] Ljung, L. **System Identification: Theory for the User**, 2nd Edition, Prentice-Hall, 1999 (ISBN 0-13-656695-2).

*This paper shows how to represent the Theory of Planned Behavior as a dynamical system:*

[19] Navarro-Barrientos, J.E., D.E. Rivera, and L.M. Collins, “A dynamical systems model for understanding behavioral interventions for weight loss,” S.-K. Chai, J.J. Salerno, and P.L. Mabry (Eds.): *2010 International Conference on Social Computing, Behavioral Modeling, and Prediction (SBP 2010)*, LNCS 6007, pp. 170-179. Springer, Heidelberg (2010). Preprint available from <http://csel.asu.edu/adaptiveintervention> (select item 7).