

## Mathematical Modeling of Biological Networks, Fall 2004

D. Swigon

### List of papers for presentation

Papers listed in blue have been already presented. You may present a paper of your choice after consulting the seminar leader.

#### Multistability

- J.S. Griffith, Mathematics of cellular control processes I. Negative feedback to one gene, *J. Theor. Biol.* **20**, 202-208 (1968).
- J.S. Griffith, Mathematics of cellular control processes II. Positive feedback to one gene, *J. Theor. Biol.* **20**, 209-216 (1968).
- J.L. Cherry & F.R. Adler, How to make a biological switch, *J. Theor. Biol.*, **203**, 117-133 (2000).
- F.J. Isaacs, J. Hasty, C.R. Cantor, & J.J. Collins, Prediction and measurement of an autoregulatory genetic module, *Proc. Nat. Acad. Sci. USA*, **100**, 7714-7719 (2003).

#### Chemical reaction networks

- F. Horn, Necessary and sufficient conditions for complex balancing in chemical kinetics, *Arch. Rational Mech. Anal.* **49**, 172-186 (1972).
- M. Feinberg, The existence and uniqueness of steady states for a class of chemical reaction networks, *Arch. Rational Mech. Anal.* **132**, 311-370 (1995).
- B.D. Aguda & B. Clarke, Dynamic elements of chaos in the Willamowski-Rossler network, *J. Chem. Phys.* **89**, 7428-7434 (1988).

#### Piecewise linear ODEs

- R. Edwards, Analysis of continuous-time switching networks, *Physica D* **146**, 165-199 (2000).

#### Design of engineered networks

- M.B. Elowitz & S. Liebler, A synthetic oscillatory network of transcriptional regulators, *Nature* **403**, 335-338 (2000).
- T.S. Gardner, C.R. Cantor, J.J. Collins, Construction of a genetic toggle switch in *Escherichia coli*, *Nature* **403**, 339-342 (2000).

#### Synchronization of genetic oscillators

- D. McMillen, N. Kopell, J. Hasty, & J.J. Collins, Synchronizing genetic relaxation oscillators by intercell signaling, *Proc. Nat. Acad. Sci. USA*, **99**, 679-684 (2002).
- J. Garcia-Ojalvo, M.B. Elowitz, & S.H. Strogatz, Modeling a synthetic multicellular clock: Repressilators coupled by quorum sensing, *Proc. Nat. Acad. Sci. USA*, **101**, 10955-10960 (2004).

#### Drosophila development

- Von Dassow, E. Meir, E.M. Munro & G.M. Odell, The segment polarity network is a robust developmental module, *Nature* **406**, 188-192 (2000).
- R. Albert & H.G. Othmer, The topology of the regulatory interactions predicts the expression pattern of the segment polarity genes in *Drosophila melanogaster*, *J. Theor. Biol.* **223**, 1-18 (2003).
- J. Jaeger, S. Surkova, M. Blagov, H. Janssens, D. Kosman, K.N. Kozlov, Manu, E. Myasnikova, C.E. Vanario-Alonso, M. Samsonova, D.H. Sharp, & J. Reinitz, Dynamic control of positional information in the early *Drosophila* embryo, *Nature* **430**, 368-371 (2004).

#### Stochasticity in gene expression

- P.S. Swain, M.B. Elowitz, & E.D. Siggia, Intrinsic and extrinsic contributions to stochasticity in gene expression, *Proc. Nat. Acad. Sci. USA*, **99**, 12795-12800 (2002).
- M.B. Elowitz, A. J. Levine, E.D. Siggia, & P.S. Swain, Stochastic gene expression in a single cell, *Science*, **297**, 1183-1186 (2002).
- M. Thattai & A. van Oudenaarden, Intrinsic noise in gene regulatory networks, *Proc. Nat. Acad. Sci. USA*, **98**, 8614-8619 (2001).

- T.B. Kepler & T.C. Elston, Stochasticity in transcriptional regulation: origins, consequences, and mathematical representations, *Biophys. J.* **81**, 3116-3136 (2001).
- J.M.G. Vilar, H.Y. Kueh, N. Barkai, & S. Leibler, Mechanisms of noise-resistance in genetic oscillators, *Proc. Nat. Acad. Sci. USA*, **99**, 5988-5992 (2002).