

**Physics 7653: Statistical Physics**  
<http://www.physics.cornell.edu/sethna/teaching/653/>  
Material for Week 3  
Exercises due Tuesday Sep 11  
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Pre-class Preparation

**Thursday**

Read: <http://www.lassp.cornell.edu/sethna/pubPDF/SloppyEverywhere.pdf> Universally Sloppy Parameter Sensitivities in Systems Biology, Ryan N. Gutenkunst, Joshua J. Waterfall, Fergal P. Casey, Kevin S. Brown, Christopher R. Myers, James P. Sethna, *PLoS Comput Biol* **3**, e189 (2007).

Do: EOPC Exercise 1.11 Emergence vs. fundamental. Do the systems biology models in the reading exhibit emergence?

Submit electronically by 8:30 Thursday morning.

**Tuesday**

Read: <http://www.lassp.cornell.edu/sethna/pubPDF/ChallengingFits.pdf> Why are non-linear fits to data so challenging?, Mark K. Transtrum, Benjamin B. Machta, and James P. Sethna, *Phys. Rev. Lett.* **104**, 060201 (2010).

**Exercises**

1.14: Nonlinear fits

For those who did not take the 2018 final exam in Statistical Mechanics:

1.13: Width of the height distribution

For those who did not do these exercises in a previous year:

12.22: Period doubling and the onset of chaos

12.9: Period doubling and the renormalization group

12.11: The renormalization group and the central limit theorem