Syllabus for Math 284, Topics in Stochastic Analysis

- Office hours: Mon and Wed 11:45-12:45, SC 240. email: htyau@g.harvard.edu

- Main Textbook (LSG) : Lectures on Spin Glasses - Erwin Bolthausen, `http://www.kurims.kyoto-u.ac.jp/~kumagai/EB-LN_Kyoto_finaL.pdf`

  Reference: Mean Field Models for Spin Glasses, Volume I: Basic Examples. by Michel Talagrand,

  Reference for concentration inequalities: Section 13.1-13.3 of the book: Dynamical Approach To Random Matrix Theory `http://people.math.harvard.edu/~htyau/`.

- You will need basic probability theory for this class, but no previous backgrounds on Gibbs measures are needed.

- The lecture will start slowly until week 4 when we start Chap 3 of LSG. The following outline is only approximately correct.

- Week 1 and 2: Concentration inequalities. Section 13.1-13.3 of the book Dynamical Approach.

- Week 3: The Curie-Weiss model, Appendix of LSG

- Week 4: Section 2.2 and 2.5 of LSG

- Week 5: Section 3.1-3.3 of LSG.

- Week 6: Section 3.4-3.5 of LSG

- Week 7: Section 4.1-4.2 of LSG

- Week 8: Section 5.1 of LSG

- Week 9: Section 5.2 of LSG

- Week 10: Chap 6 of LSG

- Week 11 and 12: We will do either Chap 7 and 8 of LSG or spectral gap of spin glass models.