

Probability Theory: GR 6303

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1 Topics to be covered

- **Stein's method for Normal Approximation:**

Stein's Lemma;

Dependency graphs;

Exchangeable pairs.

- **Concentration Inequalities**

Efron-Stein inequality;

Exchangeable pairs;

Functions with bounded differences;

Convex/Lipschitz functions of Bernoullis/Gaussians;

Poincare and Log-Sobolev inequalities.

2 References

- Sourav Chatterjee's notes on Stein's method (Lectures 1-12).
- The textbook "Concentration Inequalities" by Boucheron, Massart and Lugosi (Chapters 3-6).

3 Course Information

1. Tuesday, Thursday 2:40-3:55 pm at Room 1025 SSW.
2. Office hours by appointment (email:sm3949@columbia.edu)
3. Grading: Roughly midway during the semester, each enrolled student will be assigned a research paper, that they have to present at the end of the course. The students are also free to choose a paper related to the theme above on their own, but they will have to get it approved.