ANALYSIS PRELIM TOPICS

Real Analysis:

Abstract measure spaces, Borel and Lebesgue measures, measurable functions, convergence theorems (Fatou's Lemma, monotone and dominated convergence theorems), Holder, Jensen, and Minkowski inequalities, L^p-spaces, L^p-convergence, and completeness, Egoroff's theorem, elementary Hilbert space theory, Radon Nikodym theorem, product measures, Fubini's and Tonelli's theorems, differentiation and the Fundamental Theorem of Calculus, if time permits.

Textbook suggestion:

1. Rudin: Real and Complex Analysis, Chapters 1, 3, 4, parts of 8, and supplementary notes.
2. Bass: Real Analysis for graduate students, Chapters 1-15, 17-19

Complex Analysis:

Holomorphic, meromorphic and harmonic functions, the Cauchy-Riemann equations, Taylor and Laurent series, conformality, homotopy and homology versions of Cauchy's Theorem, local properties of analytic functions, Liouville's and Morera's theorems, residues, Maximum Modulus Theorem, Schwarz's Lemma, normal families, Montel's theorem, Riemann mapping Theorem.

Textbook suggestion: Rudin also, but most introductory texts on graduate Complex Analysis would do.

May 2021