FM 262 - Part 1: Introduction to Large Deviations

Course description: The study of probabilities of very rare events falls under the rubric of Large deviations. In this introductory course we will cover some basic definitions in large deviation theory and techniques used in obtaining large deviation results. For the most part, we will restrict ourselves to the finite dimensional setting. Some applications in Finance will be discussed.

Topics:

1.Introduction (Lecture 1)
- 1.1 Motivation
- 1.2 Defintions
- 1.3 Large Deviation Principle (LDP)

2. Key Theorems (Lectures 2 and 3)
- 2.1 Cramér's Theorem
- 2.3 Sanov's Theorem
- 2.4 Gärtner Ellis Theorem

3. Applications to Option Pricing (Lecture 4)
- 3.1 Short maturity, Out-of-the-Money Call Option pricing

Textbook: "Large Deviations Techniques and Applications" by Amir Dembo and Ofer Zeitouni