TSINGHUA MATHCAMP 2017 COURSE: PROBABILITY AND STATISTICS COURSE DESCRIPTION

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When first encountering probability and statistics, random and unpredictable seem like the same thing. If that is what you believe, understanding randomness and probability seems impossible because it seeks to understand something which cannot be predicted.

In this course, we?ll discover that the opposite is often the case: that random events are often easier to understand than their deterministic brethren. It is this fact that allows statisticians to derive highly significant findings from relatively small data sets. We will learn some of the theory behind this: the basic ideas of discrete and continuous probability, and about random events and random variables. We will see how limit theorems and concentration inequalities lead naturally to the fundamental ideas of statistics. Finally, we will learn some of the backbone of statistics: how we can use our knowledge of probability to understand how to build statistical tests and use data to infer information about where the data came from. Along the way we will encounter some examples and puzzles that will help us challenge and form our intuition.