

## Probability and Statistics

### Probability

1. Combinatorics. Elementary event, event space. Event algebra.
2. Probability definition (classical, geometrical, statistical).
3. Sum and multiplication theorem. Conditional probability. Independent event.
4. Total probability formula. Bayes formula.
5. Independent retesting. Poisson formula. Local and integral Laplace theorem.
6. Discrete random quantity. Distribution function and its properties.
7. Continuity random quantity. Distribution function, probability density.
8. Numerical characteristic random quantities.
9. Distribution laws of random quantity: binomial, Poisson, uniform, exponential, normal distribution.
10. Law of large numbers. Bernoulli and Chebyshev theorem. Limiting Lyapunov's theorem.
11. Two-dimensional random quantity. Distribution function, probability density. Distribution law.
12. Conditional distribution law of random quantity system. Conditional expectation value. Dependence and independence random quantity.
13. Covariation. Correlation. Linear regression.

### Mathematical Statistics

14. Parent population, sample. Variational series. Frequency bar chart (histogram). Empirical distribution function. Sample mean, dispersion.
15. Statistical estimation: biased and unbiased, efficient, consistent estimator. Confidence probability and interval. principle of maximum likelihood.
16. Functional dependence and regression. Correlation coefficient, correlation ratio and its properties.
17. Fitting criterion conception. Test of hypothesis.
18. Finale lecture.