What is Probabilty

Shang-Yuan Shiu

Department of Mathematics
National Central University

Oct 25, 2016

Mathematics

- Algebra.

Mathematics

- Algebra.
- Analysis.

Mathematics

- Algebra.
- Analysis.
- Differential Equations.

Mathematics

- Algebra.
- Analysis.
- Differential Equations.
- Geometry.

Mathematics

- Algebra.
- Analysis.
- Differential Equations.
- Geometry.
- Numerical.

Mathematics

- Algebra.
- Analysis.
- Differential Equations.
- Geometry.
- Numerical.
- Probability.

Mathematics

- Algebra.
- Analysis.
- Differential Equations.
- Geometry.
- Numerical.
- Probability.
- Statistics?

Probability

- Uncertainty.

Probability

- Uncertainty.
- Biology.

Probability

- Uncertainty.
- Biology.
- Physics.

Probability

- Uncertainty.
- Biology.
- Physics.
- Finance.

Probability

- Uncertainty.
- Biology.
- Physics.
- Finance.
- Actuarial Science

Probability

- Uncertainty.
- Biology.
- Physics.
- Finance.
- Actuarial Science
- Economics and Business.

Probability

- Uncertainty.
- Biology.
- Physics.
- Finance.
- Actuarial Science
- Economics and Business.
- Lottery?

Random Walk

- Brownian Motion.

Random Walk

- Brownian Motion.
- Random Walk on the Lattice.

Random Walk

- Brownian Motion.
- Random Walk on the Lattice.
- Transience and Recurrence.

Random Walk

- Brownian Motion.
- Random Walk on the Lattice.
- Transience and Recurrence.
- Random Walk on a Graph.

Random Walk

- Brownian Motion.
- Random Walk on the Lattice.
- Transience and Recurrence.
- Random Walk on a Graph.
- Voltage and Resistance.

Random Walk

- Brownian Motion.
- Random Walk on the Lattice.
- Transience and Recurrence.
- Random Walk on a Graph.
- Voltage and Resistance.
- Self-Avoiding Random Walks. (Polymer.)

Random Walk

- Brownian Motion.
- Random Walk on the Lattice.
- Transience and Recurrence.
- Random Walk on a Graph.
- Voltage and Resistance.
- Self-Avoiding Random Walks. (Polymer.)
- Approximate Brownian Motion by Random Walks.

Branching Processes

- Birth and Death.

Branching Processes

- Birth and Death.
- Population Size.

Branching Processes

- Birth and Death.
- Population Size.
- Die out or last forever?

Branching Processes

- Birth and Death.
- Population Size.
- Die out or last forever?
- Distinction or Growth to infinity.

Branching Processes

- Birth and Death.
- Population Size.
- Die out or last forever?
- Distinction or Growth to infinity.
- What is the distinction probability?

Branching Processes

- Birth and Death.
- Population Size.
- Die out or last forever?
- Distinction or Growth to infinity.
- What is the distinction probability?
- How fast does the population grow?

Mathematical Finance

- Insurance.

Mathematical Finance

- Insurance.
- Option Pricing.

Mathematical Finance

- Insurance.
- Option Pricing.
- Brownian Motion.

Mathematical Finance

- Insurance.
- Option Pricing.
- Brownian Motion.
- Strong Mathematical Background:

Mathematical Finance

- Insurance.
- Option Pricing.
- Brownian Motion.
- Strong Mathematical Background: Probability.

Mathematical Finance

- Insurance.
- Option Pricing.
- Brownian Motion.
- Strong Mathematical Background:
  Probability. Stochastic Differential Equation.

Mathematical Finance

- Insurance.
- Option Pricing.
- Brownian Motion.
- Strong Mathematical Background:
  Probability. Stochastic Differential Equation. Stochastic Control.

Thank you