

Plan

1. Probability space
 - Outcomes
 - Sample space U
 - Probability is a function $P : U \rightarrow [0, 1]$
 - Uniform probability space (all outcomes have the same probability $\frac{1}{|U|}$)
2. Examples: probability spaces for tossing one coin, tossing 5 coins, throwing one dice, throwing two dices.
3. Events. Probability of an event.
4. Examples
 - Probability of getting at least 9 points as a result of throwing two dices
 - Probability of the event «The third coin's side is head» after tossing 5 coins
 - Probability of getting exactly 3 heads as a result of tossing five coins
 - Probability of getting at least 3 heads as a result of tossing five coins
5. Probability of union: $P[A \cup B] = P[A] + P[B]$ if $A \cap B = \emptyset$.
6. Example: probability of getting at least one even number after throwing two dices
7. Inclusion-exclusion principle for probabilities. Application for upper and lower bounds.
8. Using symmetry in the case of uniform probability space
9. Trees and subsequent choices. Formal computation of probability of the event «The k -th coin's side is head after tossing n coins».
10. Permutations
 - Example: students are passing exam with the tickets. The probability of getting the first element for the first student is the same as for the last student.

References

The books are listed on the wiki-page.

[4]: Sections 10.1, 10.2

[8]: Chapter 14

[7]: Sections 7.1, 7.2

[1]: Sections 5.1

[2]: Sections 5.1, 5.2

[3]: Section 8.5