

## Introduction to the Probabilistic Method

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The probabilistic method has recently become one of the most powerful and widely used tools applied in combinatorics. Not only it was found that the role of randomness plays a great role in a development of Theoretical Computer Science, but also there are many theorems which can be proved in a very clever and a simple way if we use a probabilistic argument. The great example is a constructive method, in a graph theory, being not always the most optimal way of solving a problem.

I am going to divide my presentation into two parts. Firstly, I introduce the basic method called the first moment method and more advanced-the second moment method. In those tools we apply probabilistic arguments, including the basic techniques that use expectation and variance. Moreover, I will show a few applications of the presented methods, including such fields as combinatorics, graph theory and number theory.

The second part of my presentation will be devoted to the applications of the probabilistic methods in the Ramsey and Turán numbers theories.