

In this lecture, we start our discussion of continuous random variables. We will focus on the case of a single continuous random variable, and we'll describe its distribution using a so-called probability density function, an object that will replace the PMFs from the discrete case. We will then proceed to define the expectation and the variance of a continuous random variable, and we'll see that their basic properties remain unchanged.

There will be one new concept-- the cumulative distribution function, which will allow us to describe, in a unified manner, both discrete and continuous random variables, even so-called mixed random variables that have both a discrete and a continuous component. In the course of this lecture, we will also introduce some of the most common continuous random variables-- uniform, exponential, and normal. We will pay special attention to the normal distribution and the ways that we can calculate the associated probabilities.