The normal distribution

In this lecture important features of the the **normal probability distribution** are explained and methods to use it for making probability statements about a normally distributed random variable are demonstrated.

The first video explains the functional form of the normal distribution and and the role of the two **parameters** in determining **location (the mean)** and the **spread (the standard deviation)** of the distribution. In addition it shows how the normal distribution not only exists as a statistical equation but is also a function that describes the outcome of many processes where some form of diffusion is important.

The next video shows how the probability that a normally distributed random variable falls within a given range can be expressed in units of standard deviations (sigma) around the mean: the **probability values of 0.68, 0.95 and almost 1** correspond with **intervals of 1, 2 and 3 sigma around the mean** respectively.

And the third video further generalizes this by applying a **z-transformation to a normally distributed variable**. **Probability statements** can then be made for **any value of the random variable** (not just 1, 2 or 3 sigma around the mean) on the basis of the resulting z-scores, by using a table that lists cumulative probabilities with the corresponding z-values. It is shown how a cumulative probability can be found and interpreted for a given value of the random variable, and (reversely) how a threshold value of the random variable is found and interpreted for a given cumulative probability.

At the end of this lecture you have a good understanding of the normal distribution and are able to use it effectively for probability calculations on normally distributed random variables.