Lecture 32: Central limit theorem

Remember that a null-hypothesis is a probability space (Ω, P) and a random variable X with given distribution and so given mean and standard deviation.

> The P-**value** of an observation $X = c$ is the probability
> $$P[X \geq c] .$$

> A P-**value of less than 5 percent is called significant. The hypothesis is rejected.**

1   We throw a coin 5 times and observe 4 heads. What is the P-value of this experiment? Is the experiment significant?

Remember that the distribution of the random variable X showing the number of heads is the **Binomial distribution**

$$P[X = k] = \binom{5}{k} (\frac{1}{2})^k (\frac{1}{2})^{5-k} .$$

Solution:
$P[X = 4] + P[X = 5] = 0.18.$

2   We do an experiment and observe 5 heads. What is the P-value now? Is the experiment significant?

Solution:
$P[X = 5] = 0.03$ is significant.