Grade 12 Math of Data Management
MDM4U

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Contents

Chapter 2

Normal Distribution

2.1   Confidence Intervals

Theorem 2.1.1
Repeated sampling from a normally distributed population produces a normally distributed sample means. Hence, the probability of observing a single sample mean, $\bar{x}$, within $z\sigma_{\bar{x}}$ of $\mu_{\bar{x}}$ is $1 - \alpha$

As a result, we can get:

$$P(\mu_{\bar{x}} - z\sigma_{\bar{x}} < x < \mu_{\bar{x}} + z\sigma_{\bar{x}}) = 1 - \alpha$$

After rearrange, for a significance level of α, we can get this:

$$\bar{x} - z\frac{\sigma}{\sqrt{n}} < \mu_{\bar{x}} < \bar{x} + z\frac{\sigma}{\sqrt{n}}$$

Therefore, the boundaries for the interval estimate is $\bar{x} \pm z\frac{\sigma}{\sqrt{n}}$