LaTeX Equations in R Markdown

STAT 630, Fall 2021

LaTeX is a language for mathematical typesetting. LaTeX equations can be inserted into an R Markdown report.

You should be able to typeset LaTeX equations if you are using R Studio Cloud. If you are using the Desktop version of R Studio (installed on you computer), then you will need to to install LaTeX:

https://www.latex-project.org/get/

Note that learning how to typeset LaTeX equations in Markdown is not required for this class. But you might find it to be a useful skill, and the equations also look really nice.

Inline Equations

Inline equation go in between one dollar sign `$`. Inline equations are part of a paragraph that you write. For example:

The population mean is denoted with the Greek symbol mu: μ. The sample mean is denoted as an x with a bar on top: $\bar{x}$.

Display Equations

Display equations go in between two dollar signs `$$`. Display equations are not part of a paragraph, and are centered and put on a separate line. For example:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Example Mathematical Expressions

Fractions

$$\frac{1}{2}$$

Superscripts and subscripts

Superscripts and subscripts are created using the `^` and `_` symbols, respectively. For example:

$$a^2 + b^2 = c^2$$

$$y = x_1 + x_2$$

If the superscript or superscript is longer than one character, then it needs to be put in between curly braces `{}`. For example:

$$F_n = F_{n-1} + F_{n-2}$$

Square Roots

$$\sqrt{2} \approx 1.41$$

Summations

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$$

More Examples

Here are some examples of equations commonly used in statistics.

Standard Deviation

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

Confidence Interval for One Mean

$$\bar{x} \pm t_{\alpha/2;n-1}\frac{s}{\sqrt{n}}$$

Confidence Interval for One Proportion

$$\hat{p} \pm z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Simple Linear Regression Model

$$y_i = \beta_0 + \beta_1 x_i + \epsilon_i$$

References

Overleaf tutorial on mathematical expressions in LaTeX:

https://www.overleaf.com/learn/latex/Mathematical_expressions

List of Greek letters and math symbols:

https://www.overleaf.com/learn/latex/List_of_Greek_letters_and_math_symbols