Lab 5 - LaTex Equation

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February 3, 2019

Abstract

In this lab, we use LaTex to do mathematical typesetting.

1 Basics

In this section we demonstrate some mathematical typsetting features of LaTex.

1.1 In-line Expressions

Algebra relies on variables and expressions, such as $z = x + y$.

1.2 Super and Subscripts

Here are some superscript and subscript examples:
X^3, X^{Y^2}
Y_1, Y_{Z_i}
X_j^i, X_j^i

1.3 Fraction Examples

Half of N is $N/2$, but N over $N+1$ is:
$$\frac{n}{N+1}$$

1.4 Root Examples

The square root of 2 is $\sqrt{2}$, but the cube root of 2 is $\sqrt[3]{2}$.

1.5 Ellipsis Examples

Gauss's famous equation is"
$$\frac{N(N+1)}{2} = 1 + 2 + 3 + \cdots + N$$

A sum of terms is $x_1, x_2, \ldots, x_N$.

1.6 Greek Letter Examples

Here are some upper case Greek letters: $A, B, \Gamma, \Delta, \Upsilon$.
Here are some lower case Greek letters: $\alpha, \beta, \gamma, \delta, \upsilon$.

1.7 Operator Examples

Here are some mathematical operators: $5 \leq 8; 3 \geq 2; 6 \neq 8; 10 \ll 1000$.

1.8 Summation Example

Here is a summation operator:

$$\sum_{i=0}^{i=10} x_i^2 = 385$$

1.9 Integral Example

Here is an integration operator:

$$\int_{-\infty}^{+\infty} \cos(x)dx = \sin(x) + C$$

1.10 Trig Function Examples

Here is a log operator:

$$f(x) = k \log(x)$$

Here are some trig functions:

sin	sec	exp	min
cos	cot	inf	max
tan	csc	gcd	lim

1.11 Array Examples

Here is an array environment showing a 4x4 identity matrix I:

$$\begin{array}{cccc} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}$$

Here is an example of an equation array, called an eqnarray environment:

$$
\begin{eqnarray}
x &=& (y+2)(y-3) \\
x &=& y^2 + (2y - 3y) - 6 \\
x &=& y^2 - y - 6
\end{eqnarray}
$$