LaTex Crash Course

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Abstract

The abstract will be written here

1 Introduction

Introduction paragraph

1.1 subsection

subsection work

1.1.1 subsub work

for really detailed work

- bullet point one
- bullet point two

1. problem 1
2. problem 2 which has subproblem
   (a) subproblem 1
   (b) subproblem 2
      i. a b c?

2 paragraphs

A double space creates a patagraph

This is now goin to be indented. here is the rest of the paragraph bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla blabla blabla blabla blabla blabla bla bla bla

This will not be indented

Neither will this This will appear on the same line

Text emphasis:

you can **bold**, *italics*, underline, or a ***combo***. You can also use **bolding** and *italicize*.

Or you may need to write in `typewriter`

Referencing is great! Like for Section 1

We can make our textred or blue or messing with people you can green

We can also try out the new command and edit text

3 Math Mode

LaTex is pretty amazing with math!

We'll start with a sum:

$$f(x) = a_0 + a_1x + a_2x^2 + \cdots + a_nx^n = \sum_{i=0}^{n} a_ix^i \ \forall \ x \in \mathbb{R} \tag{1}$$

Another math great thing is matrices

$$\boldsymbol{r} = \begin{bmatrix} x \\ y \\ z \end{bmatrix} \tag{2}$$

and

$$\bar{\boldsymbol{P}} = \begin{pmatrix} \sigma_x^2 & \rho_{xy}\sigma_x\sigma_y \\ \rho_{xy}\sigma_x\sigma_y & \sigma_y^2 \end{pmatrix} \tag{3}$$

We can reference Equation 1.

$$\underbrace{Group\ of\ terms}_{} \tag{4}$$

We also can use inline equation format $[x,\ y,\ z]^T$ is my vector and ΔV is my velocity. The kronecker-delta is written as δ_{ij}

$$x = -b \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

Sometimes we want to align our equations,

$$\dot{\boldsymbol{x}} = [A]\boldsymbol{x} \tag{5}$$

$$\boldsymbol{y} = \tilde{H}\boldsymbol{x} + \boldsymbol{\epsilon} \tag{6}$$

Math Notation	Code Var	Summary
n_{en}	nshg	shape function gradient
	ndof	Degrees of Freedom at a given node
$\vec{Y}_B$	Y(nshg,ndof)	Solution variable vector
$\vec{Y}_{A,t}$	ac	Time derivative of the solution vector
N_a	shp	shape function
$N_{a,\xi}$	shgl	local gradient of shape function
e	npro	Number of elements in a computational block
n_{en}	nshl	number of local shape functions