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Contents

file <- "/home/jim/code/publish_project/MATH/100_math_examles.md"

PURPOSE: Collect examples of math/latex here: vectors, equations, align, symbols etc.

This is markdown file. Using print_pdf.sh % out.pdf pandoc will produce .pdf files with appropriate latex packages.

use of grave symbol:

`'singlequote'`
`"doublequote"`

in latex:

`$\$10.25$`

\$10.25

$$x = \begin{cases} 0 & \text{if } x \text{ odd,} \\ 1 & \text{if } x \text{ even.} \end{cases}$$

Let V be vector space and B be basis.

$$\vec{p}$$

dot product

$$\vec{p} \cdot \vec{q} = |\vec{p}| |\vec{q}| \cos \theta$$

magnitude

$$|\vec{a}|$$

unit vector

$$\hat{a} = \frac{\vec{a}}{|\vec{a}|}$$

matrix:

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

matrix with subscripts

$$\begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$$

matrix with square brackets (bmatrix)

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad (1)$$

matrix with dots ...

$$\begin{bmatrix} a_1 \\ \vdots \\ a_n \end{bmatrix} \quad (2)$$

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \quad (3)$$

As we can see from eqn ~ (1) and ~ (3) ...

align equal signs

$$y = x^2 \quad (4)$$

$$z = y^2 \quad (5)$$

align left A

$$y = x^2 \quad (6)$$

$$z = y^2 \quad (7)$$

$$A = B = C \quad (8)$$

$$D = E = F \quad (9)$$

$$x - 1 = y \quad (10)$$

$$x = y + 1 \quad (11)$$

Still centered, but note alignment has changed.

$$x - 1 = y \quad (12)$$

$$x = y + 1 \quad (13)$$

inline

$$\frac{n!}{k!(n-k)!} = \binom{n}{k}$$

$$\frac{n!}{k!(n-k)!} = \binom{n}{k}$$

Independent Samples

$$\mu_{\bar{x}_1-\bar{x}_2} = \mu_1 - \mu_2$$

$$\sigma^2_{\bar{x}_1-\bar{x}_2} = \frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}$$

$$\mu_{\hat{p}_1-\hat{p}_2} = p_1 - p_2$$

$$\sigma^2_{\hat{p}_1-\hat{p}_2} = \frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}$$

$$\overbrace{a+b+c}^6 \cdot \overbrace{d+e+f}^7 = 42$$

some words

\mathbb{R}
abc abc

Example of newcommand

short cut to say vector
::: REF: see Michelle videos ::: latex ignores, but prints the line.
 \LaTeX

% SOFT vs HARD return
This is one line. \ That was a soft return, which is why this is NOT a new paragraph. And outdent is because it second line of paragraph.
% HARD But this is also one line. That was hard return. Difference?

$$\sqrt{2}$$

$$\sqrt[3]{2}$$

$$\ln x$$

Probability

$$X \in \mathcal{P}(A)$$

$$|\text{number of elements}| = 2^k$$

$$A \cup B$$

$$\cup_{i=1}^n A_i$$

$$\bigcup_{i=1}^n A_i$$

$$A \cap B$$

$$\bigcap_{i=1}^n A_i$$

$$N_h = N * P(H)$$

$$P(A \mid B)$$

$$p(\theta|D) = \frac{p(D|\theta)p(\theta)}{p(D)}$$

Let $\pi \in [0, 1]$ be a random variable. Then function $f(\pi)$ is probability density function (pdf) if

$$f(\pi) > 0 \forall \pi$$

(write P (a-b))

$$\int_{\pi} f = 1$$

One model for pdf of f is **Beta** which often used in **conjugacy** (same family of distributions for both prior and posterior, with only parameters varying)

Using Bayes,

$$P(F \mid E) = \frac{P(E \mid F)P(F)}{P(F)} \quad (14)$$