your title here

your name here

February 4, 2023

Contents

1 Notation for scalars, vectors, matrices

Scalars: $a, b, \ldots, \alpha, \beta, \ldots$
Column vectors: $\mathbf{a}, \mathbf{b}, \ldots$
Matrices: $\mathbf{A}, \mathbf{B}, \ldots$
Natural numbers: $i, j, \ldots$

2 Math operators

$$\operatorname{tr} \mathbf{A} = \sum_i a_{ii}$$

$$\operatorname{argmax}_\sigma f(x, \sigma)$$

3 Expressions, equations

This is inline math: $x = 4$.
This is displayed math:

$$x = 4$$

This is align with equations numbers with one displayed equation:

$$x = 4 \tag{1}$$

This is align*:

$$\begin{aligned} x &= 4 \\ &= 3 + 1. \end{aligned}$$

This is align:

$$\begin{aligned} x &= 4 && (2) \\ &= 3 + 1. && (3) \end{aligned}$$

We can add comments:

$$\begin{aligned} x &= 4 && \text{by assumption} && (4) \\ &= 3 + 1. && && (5) \end{aligned}$$

Cases:

$$\delta_{ij} = \begin{cases} 1, & \text{if } i = j \\ 0, & \text{else.} \end{cases}$$

4 Arrays, entries math by default

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

$$\left[\begin{array}{cc|c} a & b & c \\ d & e & f \end{array}\right]$$

$$\left[\begin{array}{c|ccc|c} a & \ldots & b & c \\ \hline \vdots & \ddots & \vdots & \vdots \\ d & \ldots & e & f \end{array}\right]$$

	a	b
1		
2		
$\ldots$		

Figure 2: This may end up somewhere else.

5 Tabular, entries not math by default

this		that	
a	b	c	d
aa	bb	cc	dd
aaa	bbb	ccc	ddd

6 Figures

Figure 1: This will end up where you put it.

Refer to figure 1.
Here are figures all together.

Figure 3: A figure

Figure 4: Another figure

Figure 5: Another figure

Figure 6: A figure

Figure 7: Another figure

Figure 8: Another figure

7 Environments

Theorem 7.1. *This is a theorem.*

Reference to theorem, 7.1.

Proof This is a proof. ∎

Lemma 7.2. *This is a lemma.*

Proof This is a proof of a lemma. ∎

Example 7.1 This is an example.

Solution This is a solution.

foo This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition

This This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition This is a definition

That This

8 Pseudocode

Algorithm 8.1: CelsiusToFahrenheit(c)

$f \leftarrow 9c/5 + 32$
return (f)

Algorithm 8.2: IfThen(null)

if some condition is true
  then { some statement; another statement; yet another statement }
  else if some other condition is true
  then { some statement; another statement; yet another statement }
  else if some other other condition is true
  then do something else
  else do the default actions

This is a reference to pseudocode, Algorithm 8.1.

9 Referring to figures, equations, and tables

This is a reference to the figure, Figure 1. This is a reference to the table, Table 1.

heading 1	heading 2
y	2
z	3

Table 1: This is a table caption

This is a numbered equation:

$$y = mx + b. \tag{6}$$

This is a reference to the equation, Equation 6.

10 Creating an index

In machine learning a **task** is ...
Here is an expression that will end up in the index: E_{ij}
More math: x
More math, some extra information in index: x

11 Creating a bibliography

Let's cite some things: [GMS93, Knu] and [Ein05].

A This is an appendix

This is some stuff in the appendix.

References

[Ein05] Albert Einstein. Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]. *Annalen der Physik*, 322(10):891–921, 1905.

[GMS93] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The LaTeX Companion*. Addison-Wesley, Reading, Massachusetts, 1993.

[Knu] Donald Knuth. Knuth: Computers and typesetting.

Index