My First LaTeX Document

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April 20, 2015

Exercise 1

This is my first LaTeX document. Here are some forbidden characters:

$$\#,\ \$,\ \%,\ \hat{},\ \&,\ \_,\ \{,\ \},\ \tilde{},\ \backslash$$

Now for some styles: this text is **bold**, this text is *slanted*, this text is *italicised*, this text is `teletype`, and this text is *emphasized*. `\textit` will *always make things italic*, so nesting has no additional effect. `\emph`, on the other hand, *will make specific pieces of text* stand out *from the surrounding text*, *even* when *nested.*

Exercise 2

The quadratic equation $ax^2 + bx + c = 0$ has solution

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

Let $x \in \mathbb{R}^n$ be n-dimensional vector. We write x_i for the i-th element of x. The Euclidean distance between two n-dimensional vectors is

$$\|x - y\| = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2} \tag{1}$$

Let $\lambda \in \mathbb{R}$ be a scalar. We define the absolute value of λ as

$$|\lambda| = \begin{cases} \lambda & \text{if } \lambda \geq 0 \\ -\lambda & \text{otherwise.} \end{cases} \tag{2}$$

The determinant of the 2×2 matrix

$$M = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \tag{3}$$

is $|M| = ad - bc$.

$$f(x) = \frac{1}{2\pi} \exp\left\{ -\frac{(x-\mu)^2}{2\sigma^2} \right\}$$

Exercise 3

3.1 The Quadratic Equation

The quadratic equation is $ax^2 + bx + c = 0$.

3.2 Solution

The solution of the quadratic equation defined in Section 3.1 is

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

The term under the square root in Equation 4 is known as the discriminant.

Exercise 4

Compare

> The standard reference for LaTeX is Lamport [1994]. Many scientific articles are written using LaTeX [Lamport, 1994].

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I'm citing Brubaker et al. [2013] and Velaga et al. [2012]. `authoryear` has made `\citet` include both the author and the year of publication for these papers.

Exercise 5

The `twocolumn` option gives us a nice two-column layout. The `book` class makes a number of changes, including giving the title and bibliography pages of their own and shifting other pages to the right or left depending on page number parity.

References

M. A. Brubaker, A. Geiger, and R. Urtasun. Lost! leveraging the crowd for probabilistic visual self-localization. In *Computer Vision and Pattern Recognition (CVPR), 2013 IEEE Conference on*, pages 3057–3064. IEEE, 2013.

L. Lamport. *LaTeX: A Document Preparation System*. Adison Wesley, 1994.

N. R. Velaga, M. A. Quddus, and A. L. Bristow. Improving the performance of a topological map-matching algorithm through error detection and correction. *Journal of Intelligent Transportation Systems*, 16(3):147–158, 2012.