Hello, LaTeX

2026-10-16

Abstract

A sample post compiled from a real `.tex` file. It exercises macros, theorems, numbered equations, cross-references, footnotes, tables, code, citations and TikZ, so you can see how each one renders on the site.

1 Why write in LaTeX?

Because the source is the document. Every post on this site starts as a `.tex` file and is compiled with LaTeXML,[1] so custom macros like $\|x\|$ and $\mathbb{R}^n$ just work.

Definition 1. A function $f\colon \mathbb{R}^n \to \mathbb{R}$ is *convex* if for all x, y and $t \in [0,1]$,

$$f\big(tx + (1-t)y\big) \le t f(x) + (1-t) f(y). \tag{1}$$

Theorem 1. *If f is convex then $f\big(\mathbb{E}[X]\big) \le \mathbb{E}\big[f(X)\big]$.*

Proof. Apply (1) inductively to finite sums, then pass to the limit. □

Theorem 1 is Jensen's inequality [1]. Aligned derivations work too:

$$\begin{aligned} \|x+y\|^2 &= \|x\|^2 + 2\langle x, y\rangle + \|y\|^2 && (2)\\ &\le \big(\|x\| + \|y\|\big)^2. && (3) \end{aligned}$$

2 Figures

TikZ and `pgfplots` are compiled by a real TeX engine to SVG, and follow the site's light or dark theme.[2]

3 Tables and code

[1] The same converter arXiv uses for its HTML papers. It actually runs your macros rather than guessing at them.

[2] Black in the source becomes the current text colour.

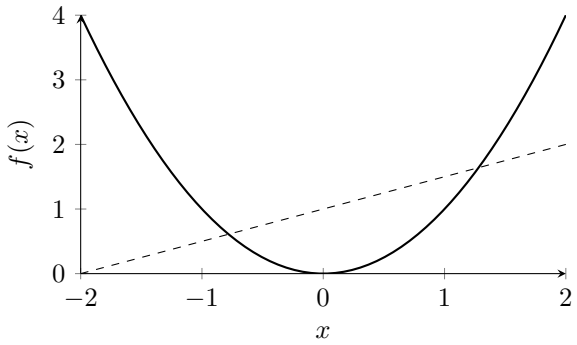

Figure 1: A convex function and a chord above it.

Method	Iterations	Error
Gradient descent	1 200	10^{-6}
Newton	8	10^{-12}

Table 1: Convergence on a toy problem.

```
def descend(f, grad, x, lr=0.1):
    for _ in range(1000):
        x = x - lr * grad(x)
    return x
```

References

[1] J. L. W. V. Jensen. Sur les fonctions convexes et les inégalités entre les valeurs moyennes. *Acta Mathematica*, 30:175–193, 1906.