

# Testing LaTeX sty file

Lecturer(s): ChatGPT

Author: Saurav Banka

Semester: HS 2025

*Last edited:* September 14, 2025

# Contents

<b>1</b>	<b>Testing Colored Boxes</b>	<b>3</b>
1.1	What are those . . . . .	3
1.2	What are these . . . . .	3
<b>2</b>	<b>Math Shorthands</b>	<b>3</b>
2.1	Probability . . . . .	4
2.2	Optimization . . . . .	4
2.3	Linear Algebra . . . . .	4
<b>3</b>	<b>Warnings and Drafts</b>	<b>4</b>
<b>4</b>	<b>Algorithms</b>	<b>4</b>
<b>5</b>	<b>Cross References</b>	<b>4</b>
<b>6</b>	<b>Draft notes and side notes</b>	<b>5</b>
<b>A</b>	<b>Background on Measure Theory</b>	<b>6</b>
<b>B</b>	<b>Background on Information Theory</b>	<b>6</b>
<b>C</b>	<b>Bibliography Example</b>	<b>6</b>

# 1 Testing Colored Boxes

## 1.1 What are those

**Theorem 1.1.** Every odd number is the difference of two squares.

**Lemma 1.1.** If  $p$  divides  $ab$ , then  $p$  divides  $a$  or  $b$ .

**Definition 1.1.** A prime is a number with no nontrivial divisors.

**Example 1.1.** The number 7 is prime.

**Exercise 1.1.** Prove that there are infinitely many primes.

## 1.2 What are these

**Note 1.1.** This is equivalent to showing that primes cannot be bounded above.

**Theorem 1.2.** If something is suspicious...

*Proof.* Let  $n$  be odd. Then  $n = 2k + 1$ . Observe that

$$(k+1)^2 - (k)^2 = (k^2 + 2k + 1) - k^2 = 2k + 1 = n.$$

Thus every odd number is a difference of two squares. □

**Proposition 1.1** (Bayes Rule).  $\Pr(A | B) = \frac{\Pr(B | A) \Pr(A)}{\Pr(B)}.$

**Corollary 1.1.** Every prime  $p$  is either 2 or odd.....

# 2 Math Shorthands

Some math macros and operators:

## 2.1 Probability

$$\begin{aligned} X &\sim \text{Bin}(n, p), \quad Y \sim \text{Ber}(\theta), \quad Z \sim \mathcal{N}(0, 1). \\ \theta &\sim \text{Beta}(\alpha, \beta), \quad \lambda \sim \text{Gamma}(k, \theta), \quad N \sim \text{Delta}(\mu). \\ \mathbb{E}[X], \quad \text{Var}(X), \quad \text{Cov}(X, Y), \quad \Pr(A \cap B). \end{aligned}$$

## 2.2 Optimization

$$\begin{aligned} \arg \min_{x \in \mathbb{R}^n} f(x), \quad \arg \max_{\theta \in \Theta} \Pr(D \mid \theta). \\ \sup_{x \in \mathbb{R}} g(x), \quad \inf_{n \geq 1} a_n. \end{aligned}$$

## 2.3 Linear Algebra

$$Av = \lambda v, \quad \text{rank}(A), \quad \text{tr}(A), \quad \text{Null}(A).$$

## 3 Warnings and Drafts



This section might contain misleading or incomplete arguments.



Do not attempt this at home: Probability measure  $\mathbb{P}$  over an uncountable set can behave counterintuitively.

**DRAFT — September 14, 2025**

## 4 Algorithms

---

### Algorithm 1 Sample Pseudocode

---

```

1: Initialize  $x \leftarrow 0$ 
2: while  $x < 10$  do
3:    $x \leftarrow x + 1$ 
4: return  $x$ 

```

---

## 5 Cross References

We can reference earlier results:

- See Theorem 1.1.
- See Lemma 1.1.
- See Definition 1.1.
- See Example 1.1.
- See Exercise 1.1.

## 6 Draft notes and side notes

This is a sentence. Check this step later.

This needs a picture .

Draw diagram here

## **A Background on Measure Theory**

Appendix material here.

## **B Background on Information Theory**

No information....

## **C Bibliography Example**

We can cite classic references: see [2, 1].

## References

- [1] Thomas M. Cover and Joy A. Thomas. *Elements of Information Theory*. Wiley, 2006.
- [2] Walter Rudin. *Real and Complex Analysis*. McGraw-Hill, 1987.