A Demo of Elegantbook Bookdown

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Introduction

ElegantLaTeX Program developers are intended to provide you beautiful, elegant, user-friendly templates. Currently, the ElegantLaTeX is composed of ElegantNote, ElegantBook, ElegantPaper, designed for typesetting notes, books, and working papers respectively. Latest releases are strongly recommended! This guide is aimed at briefly introducing the 101 of this template. For any other question, suggestion or comment, feel free to contact us on GitHub issue or email us.

Chapter 1 Some Explanations

The way to make the Bookdown generated TeX files works of the elegantbook class is to use `bookdown.post.latex` option to modify the generated tex file. Due the natural of the fancy definition of theorem environments in elegantbook, the current hack of theorem environments is to add `{}{}` to the end to `\BeginKnitrBlock{}`. Note that the name and label options for bookdown theorem environments still cann't be handled at this moment. An alternative option is to define theorem environments using pandoc fence blocks and lua to translate them into tex environments. This is the way, how Think, Note, and Tip environments work in this demo.

In the following Chapter, you will see a demo of how theorem environments work with elegantbook class. If you have any suggestions/comments, please submit them to this repo. Thank you!

Chapter 2 Examples

2.1 Don't Be Tricked

Think

1. A pizza shop sales 12-inches pizza and 8-inches pizza at the price \$12/each and \$6/each respectively. With \$12, would you like to order one 12-inches and two 8-inches. Why?
2. A sheet of everyday copy paper is about 0.01 millimeter thick. Repeat folding along a different side 20 times. Now, how thick do you think the folded paper is?

2.2 Properties of Exponents

For an integer n, and an expression x, the mathematical operation of the n-times repeated multiplication of x is call exponentiation, written as x^n, that is,

$$x^n = \underbrace{x \cdot x \cdots x}_{n \text{ factors of } x}.$$

In the notation x^n, n is called the exponent, x is called the base, and x^n is called the power, read as "x raised to the n-th power", "x to the n-th power", "x to the n-th", "x to the power of n" or "x to the n".

Property	Example
The product rule $x^m \cdot x^n = x^{m+n}.$	$2x^2 \cdot (-3x^3) = -6x^5.$
The quotient rule (for $x \neq 0$.) $\frac{x^m}{x^n} = \begin{cases} x^{m-n} & \text{if} m \geq n. \\ \frac{1}{x^{n-m}} & \text{if} m \leq n. \end{cases}$	$\frac{15x^5}{5x^2} = 3x^3;$ $\frac{-3x^2}{6x^3} = -\frac{1}{2x}.$
The zero exponent rule (for $x \neq 0$.) $x^0 = 1.$	$(-2)^0 = 1;$ $-x^0 = -1.$
The negative exponent rule (for $x \neq 0$.) $x^{-n} = \frac{1}{x^n}$ and $\frac{1}{x^{-n}} = x^n.$	$(-2)^{-3} = \frac{1}{(-2)^3} = -\frac{1}{8};$ $\frac{x^{-2}}{x^{-3}} = \frac{x^3}{x^2} = x.$

Property	Example
The power to a power rule $(x^a)^b = x^{ab}.$	$(2^2)^3 = 2^6 = 64;$ $(x^2)^3 = x^6.$
The product raised to a power rule $(xy)^n = x^n y^n.$	$(-2x)^2 = (-2)^2 x^2 = 4x^2.$
The quotient raised to a power rule (for $y \neq 0$.) $\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}.$	$\left(\frac{x}{-2}\right)^3 = \frac{x^3}{(-2)^3} = -\frac{x^3}{8}.$

Note

Order of Basic Mathematical Operations

In mathematics, the order of operations reflects conventions about which procedure should be performed first. There are four levels (from the highest to the lowest):

Parenthesis; Exponentiation; Multiplication and Division; Addition and Subtraction.

Within the same level, the convention is to perform from the left to the right.

Example 2.1 Simplify. Write with positive exponents.

$$\left(\frac{2y^{-2}z^{-5}}{4x^{-3}y^6}\right)^{-4}.$$

Solution The idea is to simplify the base first and rewrite using positive exponents only.

$$\begin{aligned}\left(\frac{2y^{-2}z^{-5}}{4x^{-3}y^6}\right)^{-4} &= \left(\frac{x^3}{2z^5y^8}\right)^{-4} \\ &= \left(\frac{2z^5y^8}{x^3}\right)^4 \\ &= \frac{2^4(z^5)^4(y^8)^4}{(x^3)^4} \\ &= \frac{16y^{32}z^{20}}{x^{12}}.\end{aligned}$$

Tips

Simplify (at least partially) the problem first

To avoid mistakes when working with negative exponents, it's better to apply the negative exponent rule to change negative exponents to positive exponents and simplify the base first.

Theorem 2.1

If c denotes the length of the hypotenuse and a and b denote the lengths of the other two sides, the Pythagorean theorem can be expressed as the Pythagorean equation:

$$a^2 + b^2 = c^2.$$

♡

Corollary 2.1

For any angle θ, we have

$$\sin^2 \theta + \cos^2 \theta = 1$$

♡

2.3 Practice

✍ Exercise 2.1 Simplify. Write with positive exponents.

1. $(3a^2b^3c^2)(4abc^2)(2b^2c^3)$
2. $\dfrac{4y^3z^0}{x^2y^2}$
3. $(-2)^{-3}$

✍ Exercise 2.2 Simplify. Write with positive exponents.

1. $\dfrac{-u^0v^{15}}{v^{16}}$
2. $(-2a^3b^2c^0)^3$
3. $\dfrac{m^5n^2}{(mn)^3}$

✍ Exercise 2.3 Simplify. Write with positive exponents.

1. $(-3a^2x^3)^{-2}$
2. $\left(\dfrac{-x^0y^3}{2wz^2}\right)^3$
3. $\dfrac{3^{-2}a^{-3}b^5}{x^{-3}y^{-4}}$

✍ Exercise 2.4 Simplify. Write with positive exponents.

1. $\left(-x^{-1}(-y)^2\right)^3$
2. $\left(\dfrac{6x^{-2}y^5}{2y^{-3}z^{-11}}\right)^{-3}$
3. $\dfrac{(3x^2y^{-1})^{-3}(2x^{-3}y^2)^{-1}}{(x^6y^{-5})^{-2}}$

✍ Exercise 2.5 A store has large size and small size watermelons. A large one cost \$4 and a small one \$1. Putting on the same table, a smaller watermelons has only half the height of the larger one. Given \$4, will you buy a large watermelon or 4 smaller ones? Why?