

- Simple, clean and consistent design
- If headercolor is not set, it defaults to blue. (Colors can be tweaked in slides\_utils.typ)
- Font family can be changed globally (not per slide) in the slides configuration

```
// Configure the presentation
#show: slides.with(
    ratio: "16-9", // Default is "16-9" if not set
    main-font: "Calibri", // Default value is "Calibri" if not set
    code-font: "Consolas", // Default value is "Consolas" if not set
    font-size-headers: 20pt, // 22pt is the default value if not set
    font-size-content: 19pt, // 20pt is the default value if not set
    footer_text: "", // Text to show in the footer. Empty by default if not set.
    equation_numbering_globally: true, // Default set to "false" if not set.
)
```

**Note:** Example of a gray focusbox with smaller font size to show the global slides configuration. The lightening of the focusbox background color is controlled in slides\_utils.typ with the variable 'percent\_lighter'

# Including Images

You can include images using the #figure command:

```
#figure(  
  image("Leonhard_Euler.jpg", width: 15%),  
  caption: [Leonhard Euler],  
) <img:LeonhardEuler>
```



Figure 1: Leonhard Euler

Arguably the GOAT of mathematics: Figure 1 (referenced with Typst's @ syntax).

**Problem:** A ball is thrown upward with initial velocity  $v_0 = 15$  m/s. Find the maximum height.

Start with the kinematic equation:

$$v^2 = v_0^2 - 2gh \quad (1)$$

At maximum height, the velocity is zero, so we set  $v = 0$ :

$$0 = v_0^2 - 2gh$$

$$h = \frac{v_0^2}{2g}$$

Substitute  $v_0 = 15$  m/s and  $g = 9.8\text{m/s}^2$ :

$$h = \frac{15^2}{2 \times 9.8} = 11.5 \text{ m} \quad (2)$$

Only Equation 1 and Equation 2 are numbered.

Here's Taylor's theorem using Typst math syntax (not LaTeX):

**Taylor's theorem:** Let  $k \geq 1$  be an integer and let the function  $f : \mathbb{R} \rightarrow \mathbb{R}$  be  $k$  times differentiable at the point  $a \in \mathbb{R}$ .

Then there exists a function  $h_k : \mathbb{R} \rightarrow \mathbb{R}$  such that

$$f(x) = \sum_{i=0}^k \frac{f^i(a)}{i!} (x - a)^i + h_k(x)(x - a)^k, \quad (1)$$

and  $\lim_{x \rightarrow a} h_k(x) = 0$ .

Equation numbering is default set to false, but can be turned on by setting `equation_numbering_globally: true` in the slides configuration.

Green header slides are recommended for examples and practical applications.

**Example:** Taylor series for  $e^x$  around  $a = 0$ :

Since  $f(x) = e^x$ , all derivatives are  $f^n(x) = e^x$ , and  $f^n(0) = 1$  for all  $n$ .

Therefore, the Taylor series is:

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots$$

This series converges for all  $x \in \mathbb{R}$ .

**Note:** This is a green x-centered focusbox with 90% width, slightly bigger font size and equation numbering is turned off for only this slide using slide-equation-numbering: false.

# Python code for calculating $e^x$ using the Taylor series

Here's a Python example that approximates  $e^x$  using its Taylor series. **Note:** The code is shown in a white focusbox for readability and easy font-size control.

```
import math
def exp_taylor(x, N=10):
    """Approximate e^x using the Taylor series sum_{n=0}^N x^n/n!"""
    total = 1.0 # n = 0 term
    term = 1.0
    for n in range(1, N + 1):
        term = term * x / n
        total = term + total
    return total
x, N = 1.0, 10
approx = exp_taylor(x, N)
print(f"N={N}: {approx}")
print("math.exp(1) =", math.exp(1.0))
```

Cyan header slides are recommended for explicit student tasks and exercises.

## Task

Compute the integral:

$$\int xe^x \, dx \quad (1)$$

## Hint

Use integration by parts:

$$\int u \, dv = uv - \int v \, du \quad (2)$$

choose  $u = x$  and  $v' = e^x$ , then  $u' = 1$  and  $v = e^x$ .

# Centering Slide Content

By default, slides are:

- Left-aligned horizontally
- Centered vertically

This slide overrides both to center content horizontally and vertically.

```
#slide(headercolor: purple, title: "Centering Slide Content", center_x: true, center_y: false)[  
]
```

# Live Calculations

Typst can perform calculations directly in the document:

## Output

### Basic arithmetic:

- Addition: 5
- Multiplication: 56
- Division: 25

### Using variables:

- Mass = 10 kg
- Acceleration = 9.8 m/s<sup>2</sup>
- Force = 98 N

### Math functions:

- $\sqrt{15} = 3.872983346207417$
- $2^8 = 256$
- $\sin\left(\frac{\pi}{2}\right) = 1$

## Code

```
#(2 + 3)
#(7 * 8)
#(100 / 4)

#let mass = 10
#let acceleration = 9.8
#let force = mass * acceleration
#mass
#acceleration
#force

#(calc.sqrt(15))
#(calc.pow(2, 8))
#(calc.sin(calc.pi / 2))
```

# Generating Series using code directly in the document (Part 1)

## Output

Squares of first 10 numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Sum of first 100 natural numbers:

$$\sum_{i=1}^{100} i = 5050 \quad (1)$$

## Code

```
// Squares
#{
    let squares = []
    for i in range(1, 11) {
        squares.push(i * i)
    }
    squares.map(str).join(", ")
}

// Sum
#{
    let _sum = 0
    for i in range(1, 101) {
        _sum += i
    }
    [$ sum_(i=1)^100 i = #_sum $]
}
```

# Generating Series using code directly in the document (Part 2)

## Output

**Fibonacci sequence (first 12 terms):** 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89

**Powers of 2:** 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024

## Code

```
// Fibonacci
#{
    let fib = (0, 1)
    for i in range(2, 12) {
        fib.push(fib.at(-1) + fib.at(-2))
    }
    fib.map(str).join(",")
}

// Powers of 2
#{
    let powers = ()
    for i in range(0, 11) {
        powers.push(calc.pow(2, i))
    }
    powers.map(str).join(",")
}
```