

Blue Header Slide

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

$$h = \frac{15^2}{2 \times 9.8} = 11.5 \text{ m} \tag{2}$$

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

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

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.

Taylor Series Example

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 $x \in \mathbb{R}$.

Taylor Series Example

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.

Python code for calculating e^x using the Taylor series

```
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:

$$\int x e^x dx \quad (1)$$

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

Code

Using variables:

- `Mass = 10 kg`
- `Acceleration = 9.8 m/s2`
- `Force = 98 N`

Math functions:

■ $\sqrt{15} = 3.872983346207417$

■ $2^8 = 256$

■ $\sin\left(\frac{\pi}{2}\right) = 1$

```
 #(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))
```

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 $]
}
```

Output

Fibonacci sequence (first 12 terms):

**0, 1, 1, 2, 3, 5, 8, 13, 21,
34, 55, 89**

Code

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

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

```
// 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(", ")
}
```