

Meta: Wiki Capabilities, TeX Math & Typography Reference

1. Mathematical Typography: KaTeX TeX Math Engine

The wiki is equipped with a high-performance **KaTeX** client-side rendering engine. Mathematical formulas and scientific equations are written using standard LaTeX math syntax.

Delimiters

- **Display Equations (Block Math):** Enclose in double dollar signs `$$ ... $$` on their own lines. Centered and formatted with full display geometry.
- **Inline Equations:** Enclose in single dollar signs `$ ... $` directly within sentences.

Core TeX Math Examples & Cheat Sheet

1. Fractions, Exponents & Powers

```
$$\text{FREQ} = \frac{433,920,000}{24,000,000} \times 2^{16} = 1,184,883 = \mathbf{0x121473}$$
```

```
$$\text{FREQ} = \frac{433,920,000}{24,000,000} \times 2^{16} = 1,184,883 = \mathbf{0x121473}$$
```

2. Symbol Timing & Multi-Term Equations

```
$$\text{Data Rate} = \frac{(256 + \text{DRATE-M})}{f_{\text{XOSC}}} \times 2^{\text{DRATE-E}} \times 2^{28} \times \mathbf{3433.22 \text{ baud}}$$
```

$$\text{Data Rate} = \frac{(256 + \text{DRATE-M}) \times 2^{\{\text{DRATE-E}\}}}{2^{28}} \times f_{\{\text{XOSC}\}} = \mathbf{3433.22 \text{ baud}}$$

3. Signal Flow & Daisy-Chains

$$\text{Red (Source: fc79)} \rightarrow \text{Blue (1st Sink)} \rightarrow \text{Green (2nd Sink)} \rightarrow \text{Yellow (75)\Omega\text{ Terminated}} \}$$

$$\text{Red (Source: fc79)} \rightarrow \text{Blue (1st Sink)} \rightarrow \text{Green (2nd Sink)} \rightarrow \text{Yellow (75)\Omega\text{ Terminated}} \}$$

4. Radicals, Integrals & Summations

$$f(x) = \int_{-\infty}^{\infty} \hat{f}(\xi) e^{2\pi i \xi x} d\xi \quad \sum_{k=0}^n \binom{n}{k} x^k y^{n-k} = (x + y)^n$$

$$f(x) = \int_{-\infty}^{\infty} \hat{f}(\xi) e^{2\pi i \xi x} d\xi \quad \sum_{k=0}^n \binom{n}{k} x^k y^{n-k} = (x + y)^n$$

5. Matrices & Linear Systems

$$\begin{pmatrix} y_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$\begin{pmatrix} y_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

6. Piecewise Functions & Cases

$$f(n) = \begin{cases} \frac{n}{2} & \text{if } n \equiv 0 \pmod{2} \\ 3n + 1 & \text{if } n \equiv 1 \pmod{2} \end{cases}$$

$$f(n) = \begin{cases} \frac{n}{2} & \text{if } n \equiv 0 \pmod{2} \\ 3n + 1 & \text{if } n \equiv 1 \pmod{2} \end{cases}$$

KaTeX vs. XeLaTeX: What Is and Is Not Supported

Feature	KaTeX (Browser Math Engine)	Full XeLaTeX / pdfLaTeX
---------	-----------------------------	-------------------------

Execution Environment	Client-side JavaScript DOM rendering	Server-side CLI TeX compiler (<code>xelatex</code>)
Mathematical Formulas (<code>\frac</code> , <code>\int</code> , <code>\sum</code>)	YES (Full TeX math subset)	YES
Inline Math (<code>\$x\$</code>) & Block Math (<code>\$\$x\$\$</code>)	YES	YES
Greek, Hebrew & Math Symbols	YES (<code>\alpha</code> , <code>\beta</code> , <code>\Omega</code> , <code>\aleph</code>)	YES
Unicode in Math (<code>\text{□□□}</code>)	YES (Direct UTF-8 support)	YES
Document Preambles (<code>\documentclass</code>)	NO (Not a document compiler)	YES
Arbitrary LaTeX Packages (<code>\usepackage</code>)	NO	YES
XeTeX FontSpec & System TTF Embedding	NO	YES

2. Comprehensive Symbol & Character Reference Tables

Below is the complete reference of scientific, mathematical, typographic, and special symbols available in BookStack using **TeX Math (KaTeX)** and **Standard HTML/Unicode**.

2.1 Units, Angles, Temperature & Physics Symbols

Symbol Name	TeX Math Code	TeX Rendered	HTML Entity / Code	HTML Rendered	Example Usage
Degree (Angle / Temp)	<code>^\circ</code> or <code>^\circ\text{C}</code>	$^\circ$, 25°C	<code>°</code> or <code>&#176;</code>	°	<code> \$\theta = 90^\circ\$, <code>72\deg;F</code></code>
Degree Fahrenheit	<code>^\circ\text{F}</code>	$^\circ\text{F}$	<code>°F</code>	°F	<code> \$T = 68^\circ\text{F}\$</code>
Ohm (Resistance)	<code>\Omega</code> or <code>\text{k}\Omega</code>	Ω , $\text{k}\Omega$	<code>Ω</code>	Ω	<code> \$R_1 = 4.7\text{k}\Omega\$</code>
Micro (Prefix)	<code>\mu</code> or <code>\mu\text{F}</code>	μ , μF	<code>µ</code>	μ	<code> \$C = 100\mu\text{F}\$, <code>µs</code></code>

Symbol Name	TeX Math Code	TeX Rendered	HTML Entity / Code	HTML Rendered	Example Usage
Delta (Change / Diff)	<code>\Delta</code> or <code>\delta</code>	Δ , δ	<code>&Delta;</code> , <code>&delta;</code>	Δ , δ	<code>\Delta V = 1.2\text{ V}</code>
H-bar (Planck Constant)	<code>\hbar</code>	$\hbar$	<code>&#8463;</code>	$\hbar$	<code>\hbar = \frac{h}{2\pi}</code>
Angstrom (Wavelength)	<code>\text{\AA}</code> or <code>\mathring{\text{A}}</code>	$\text{\AA}$	<code>&Aring;</code>	$\text{\AA}$	<code>\lambda = 5500\text{\AA}</code>
Angle	<code>\angle</code> , <code>\measuredangle</code>	$\angle$, $\measuredangle$	<code>&ang;</code> or <code>&#8736;</code>	$\angle$	<code>\angle ABC = 45^\circ</code>
Perpendicular / Orthogonal	<code>\perp</code>	$\perp$	<code>&perp;</code>	$\perp$	<code>\vec{A} \perp \vec{B}</code>
Parallel	<code>\parallel</code>	$\parallel$	<code>&#8741;</code>	$\parallel$	<code>L_1 \parallel L_2</code>
Infinity	<code>\infty</code>	∞	<code>&infin;</code>	∞	<code>\lim_{x \to \infty} f(x)</code>
Proportional To	<code>\propto</code>	$\propto$	<code>&prop;</code>	$\propto$	<code>F \propto \frac{1}{r^2}</code>
Approximately Equal	<code>\approx</code> , <code>\sim</code>	$\approx$, $\sim$	<code>&asymp;</code>	$\approx$	<code>x \approx 3.14</code>
Plus-Minus / Minus-Plus	<code>\pm</code> , <code>\mp</code>	$\pm$, $\mp$	<code>&plusmn;</code>	$\pm$	<code>V_{\text{out}} = 5\text{ V} \pm 5\%</code>
Multiplication / Dot	<code>\times</code> , <code>\cdot</code>	$\times$, $\cdot$	<code>&times;</code> , <code>&middot;</code>	$\times$, $\cdot$	<code>A \times B</code> , <code>A \cdot B</code>
Division	<code>\div</code>	$\div$	<code>&divide;</code>	$\div$	<code>a \div b</code>

2.2 Complete Greek Alphabet Reference

Letter Name	Lowercase TeX	Rendered	Uppercase TeX	Rendered	HTML Lower / Upper
Alpha	<code>\alpha</code>	α	<code>A</code>	A	<code>&alpha;</code> (α) / <code>&Alpha;</code> (A)
Beta	<code>\beta</code>	β	<code>B</code>	B	<code>&beta;</code> (β) / <code>&Beta;</code> (B)
Gamma	<code>\gamma</code>	γ	<code>\Gamma</code>	Γ	<code>&gamma;</code> (γ) / <code>&Gamma;</code> (Γ)
Delta	<code>\delta</code>	δ	<code>\Delta</code>	Δ	<code>&delta;</code> (δ) / <code>&Delta;</code> (Δ)
Epsilon	<code>\epsilon</code> , <code>\varepsilon</code>	ϵ , ε	<code>E</code>	E	<code>&epsilon;</code> (ϵ) / <code>&Epsilon;</code> (E)
Zeta	<code>\zeta</code>	ζ	<code>Z</code>	Z	<code>&zeta;</code> (ζ) / <code>&Zeta;</code> (Z)

Letter Name	Lowercase TeX	Rendered	Uppercase TeX	Rendered	HTML Lower / Upper
Eta	<code>\eta</code>	η	<code>H</code>	H	<code>&eta;</code> (η) / <code>&Eta;</code> (H)
Theta	<code>\theta</code> , <code>\vartheta</code>	θ , ϑ	<code>\Theta</code>	Θ	<code>&theta;</code> (θ) / <code>&Theta;</code> (Θ)
Iota	<code>\iota</code>	ι	<code>I</code>	I	<code>&iota;</code> (ι) / <code>&Iota;</code> (Ι)
Kappa	<code>\kappa</code>	κ	<code>K</code>	K	<code>&kappa;</code> (κ) / <code>&Kappa;</code> (Κ)
Lambda	<code>\lambda</code>	λ	<code>\Lambda</code>	Λ	<code>&lambda;</code> (λ) / <code>&Lambda;</code> (Λ)
Mu	<code>\mu</code>	μ	<code>M</code>	M	<code>&mu;</code> (μ) / <code>&Mu;</code> (Μ)
Nu	<code>\nu</code>	ν	<code>N</code>	N	<code>&nu;</code> (ν) / <code>&Nu;</code> (Ν)
Xi	<code>\xi</code>	ξ	<code>\Xi</code>	Ξ	<code>&xi;</code> (ξ) / <code>&Xi;</code> (Ξ)
Pi	<code>\pi</code> , <code>\varpi</code>	π , ϖ	<code>\Pi</code>	Π	<code>&pi;</code> (π) / <code>&Pi;</code> (Π)
Rho	<code>\rho</code> , <code>\varrho</code>	ρ , ϱ	<code>P</code>	P	<code>&rho;</code> (ρ) / <code>&Rho;</code> (Ρ)
Sigma	<code>\sigma</code> , <code>\varsigma</code>	σ , ς	<code>\Sigma</code>	Σ	<code>&sigma;</code> (σ) / <code>&Sigma;</code> (Σ)
Tau	<code>\tau</code>	τ	<code>T</code>	T	<code>&tau;</code> (τ) / <code>&Tau;</code> (Τ)
Upsilon	<code>\upsilon</code>	υ	<code>\Upsilon</code>	Υ	<code>&upsilon;</code> (υ) / <code>&Upsilon;</code> (Υ)
Phi	<code>\phi</code> , <code>\varphi</code>	ϕ , φ	<code>\Phi</code>	Φ	<code>&phi;</code> (φ) / <code>&Phi;</code> (Φ)
Chi	<code>\chi</code>	χ	<code>X</code>	X	<code>&chi;</code> (χ) / <code>&Chi;</code> (Χ)
Psi	<code>\psi</code>	ψ	<code>\Psi</code>	Ψ	<code>&psi;</code> (ψ) / <code>&Psi;</code> (Ψ)
Omega	<code>\omega</code>	ω	<code>\Omega</code>	Ω	<code>&omega;</code> (ω) / <code>&Omega;</code> (Ω)

2.3 Calculus, Operators & Matrix Formats

Operation / Concept	TeX Math Code	Rendered Output
Definite / Indefinite Integral	<code>\int_{a}^{b} f(x) \text{ } dx</code>	$\int_{a}^{b} f(x) \text{ } dx$
Contour / Surface Integral	<code>\oint_C \vec{B} \cdot d\vec{\ell}</code> , <code>\iint_S \vec{E} \cdot d\vec{A}</code>	$\oint_C \vec{B} \cdot d\vec{\ell}$, $\iint_S \vec{E} \cdot d\vec{A}$
Summation & Product	<code>\sum_{k=1}^n k^2</code> , <code>\prod_{i=1}^n x_i</code>	$\sum_{k=1}^n k^2$, $\prod_{i=1}^n x_i$
Partial Derivatives & Nabla	<code>\frac{\partial^2 \psi}{\partial x^2}</code> , <code>\nabla \times \vec{B}</code>	$\frac{\partial^2 \psi}{\partial x^2}$, $\nabla \times \vec{B}$

Operation / Concept	TeX Math Code	Rendered Output
Limits	<code>\lim_{x \to 0} \frac{\sin x}{x} = 1</code>	$\lim_{x \to 0} \frac{\sin x}{x} = 1$
Square & Nth Roots	<code>\sqrt{x^2 + y^2}</code> , <code>\sqrt[3]{V}</code>	$\sqrt{x^2 + y^2}$, $\sqrt[3]{V}$
Vectors & Hats	<code>\vec{v}</code> , <code>\mathbf{E}</code> , <code>\hat{n}</code> , <code>\dot{x}</code> , <code>\ddot{\theta}</code>	$\vec{v}$, $\mathbf{E}$, $\hat{n}$, $\dot{x}$, $\ddot{\theta}$
Matrix (Parentheses)	<code>\begin{pmatrix} a & b \\ c & d \end{pmatrix}</code>	$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$
Matrix (Brackets)	<code>\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}</code>	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
Determinant / Magnitude	<code>\begin{vmatrix} x & y \\ z & w \end{vmatrix}</code>	$\begin{vmatrix} x & y \\ z & w \end{vmatrix}$

2.4 Logic, Set Theory & Relational Symbols

Category	TeX Math Code	Rendered	HTML Entity / Code
Quantifiers	<code>\forall x</code> , <code>\exists y</code> , <code>\nexists z</code>	$\forall x$, $\exists y$, $\nexists z$	<code>&forall;</code> (∀), <code>&exist;</code> (∃)
Set Membership	<code>x \in A</code> , <code>y \notin B</code> , <code>\emptyset</code>	$x \in A$, $y \notin B$, $\emptyset$	<code>&isin;</code> (∈), <code>&notin;</code> (∉), <code>&empty;</code> (∅)
Subsets & Supersets	<code>A \subset B</code> , <code>A \subseteq B</code> , <code>A \cup B</code> , <code>A \cap B</code>	$A \subset B$, $A \subseteq B$, $A \cup B$, $A \cap B$	<code>&sub;</code> (⊂), <code>&sube;</code> (⊆), <code>&cup;</code> (∪), <code>&cap;</code> (∩)
Logic Relations	<code>P \land Q</code> , <code>P \lor Q</code> , <code>\neg P</code>	$P \land Q$, $P \lor Q$, $\neg P$	<code>&and;</code> (∧), <code>&or;</code> (∨), <code>&not;</code> (¬)
Implication & Equivalence	<code>P \implies Q</code> , <code>P \iff Q</code> , <code>A \equiv B</code>	$P \implies Q$, $P \iff Q$, $A \equiv B$	<code>&rArr;</code> (⇒), <code>&hArr;</code> (⇔), <code>&equiv;</code> (≡)
Conclusions	<code>\therefore</code> , <code>\because</code> , <code>\blacksquare</code> , <code>\Box</code>	$\therefore$, $\because$, $\blacksquare$, $\Box$	<code>&there4;</code> (∴), <code>&#8757;</code> (∵)

2.5 Arrows & Signal Flow Symbols

Arrow Direction / Type	TeX Math Code	Rendered	HTML Entity
Right / Left Arrow	<code>\rightarrow</code> , <code>\leftarrow</code> , <code>\leftrightharrow</code>	$\rightarrow$, $\leftarrow$, $\leftrightharrow$	<code>&rarr;</code> (→), <code>&larr;</code> (←), <code>&harr;</code> (↔)

Arrow Direction / Type	TeX Math Code	Rendered	HTML Entity
Long Right / Left	<code>\longrightarrow</code> , <code>\longleftarrow</code> , <code>\longlefttrightarrow</code>	$\longrightarrow$, $\longleftarrow$, $\longlefttrightarrow$	<code>&#10230;</code> ($\rightarrow$), <code>&#10229;</code> ($\leftarrow$)
Up / Down Arrow	<code>\uparrow</code> , <code>\downarrow</code> , <code>\updownarrow</code>	$\uparrow$, $\downarrow$, $\updownarrow$	<code>&uarr;</code> ($\uparrow$), <code>&darr;</code> ($\downarrow$)
Double Implies Arrows	<code>\Rightarrow</code> , <code>\Leftarrow</code> , <code>\Leftrightarrow</code>	$\Rightarrow$, $\Leftarrow$, $\Leftrightarrow$	<code>&rArr;</code> ($\Rightarrow$), <code>&lArr;</code> ($\Leftarrow$), <code>&hArr;</code> ($\Leftrightarrow$)
Mapping / Yields	<code>\mapsto</code> , <code>\longmapsto</code> , <code>\rightharpoonup</code>	$\mapsto$, $\longmapsto$, $\rightharpoonup$	<code>&#8614;</code> ($\mapsto$)

2.6 Typographic & Standard Wiki HTML Entities

Character / Symbol	HTML Entity	Decimal Code	Rendered	Common Use Case
Degree Symbol	<code>&deg;</code>	<code>&#176;</code>	°	Angles (<code>45&deg;</code>), Temperatures (<code>72&deg;F</code> , <code>22&deg;C</code>)
Em Dash	<code>&mdash;</code>	<code>&#8212;</code>	—	Long punctuation breaks — like this
En Dash	<code>&ndash;</code>	<code>&#8211;</code>	-	Number ranges (e.g. pp. 10–15, 2020–2026)
Non-Breaking Space	<code>&nbsp;</code>	<code>&#160;</code>	 	Prevents unwanted line-breaks between values and units
Left / Right Smart Double Quotes	<code>&ldquo;</code> , <code>&rdquo;</code>	<code>&#8220;</code> , <code>&#8221;</code>	“ ”	Publication-quality quotation marks
Left / Right Smart Single Quotes	<code>&lsquo;</code> , <code>&rsquo;</code>	<code>&#8216;</code> , <code>&#8217;</code>	‘ ’	Apostrophes and single quotations
Fractions (Vulgar)	<code>&frac12;</code> , <code>&frac14;</code> , <code>&frac34;</code>	<code>&#189;</code> , <code>&#188;</code> , <code>&#190;</code>	½, ¼, ¾	Inline fractions without invoking full TeX
Copyright / Registered / Trademark	<code>&copy;</code> , <code>&reg;</code> , <code>&trade;</code>	<code>&#169;</code> , <code>&#174;</code> , <code>&#8482;</code>	©, ®, ™	Legal and branding designations
Checkmark / Crossmark	<code>&#10003;</code> , <code>&#10007;</code>	<code>&#10003;</code> , <code>&#10007;</code>	✓, ✕	Verification and status indicators
Bullet / Middle Dot	<code>&bull;</code> , <code>&middot;</code>	<code>&#8226;</code> , <code>&#183;</code>	•, ·	Lists and inline separators

3. Japanese Typography & Furigana (Ruby Text)

BookStack fully supports **HTML5 Ruby Annotations** (`<ruby>` and `<rt>`) for rendering Japanese Furigana (reading glosses placed above Kanji characters).

Furigana Syntax & Examples

Whole-Word Furigana

```
<ruby>青<rt>アヲ</rt></ruby>
<ruby>青<rt>アヲソラ</rt></ruby>
```

- **Rendered Output:** 青 アヲ , 青 アヲソラ

Per-Character Furigana (Fine-Grained Alignment)

```
<ruby>青<rt>ア</rt>ソ<rt></rt>ラ<rt>ア</rt>ヲ<rt>ソ</rt></ruby>
<ruby>青<rt>アソ</rt>ラ<rt>アヲ</rt></ruby>
```

- **Rendered Output:** 青 ア ソ ラ ア ヲ , 青 アソ ラ アヲ

Japanese Text Inside TeX Math Blocks

Japanese characters can be rendered directly inside math equations using `\text{...}`:

```
$$\text{青 } f = 433.92\text{ MHz} \quad \text{青 } T_e = 291.27\text{ }\mu\text{s}$$
```

```
$$\text{青 } f = 433.92\text{ MHz} \quad \text{青 } T_e = 291.27\text{ }\mu\text{s}$$
```

4. General Markdown & HTML Features Supported

3.1 Native BookStack Callout Alert Boxes

BookStack provides colored callout boxes for contextual notes:

```
<p class="callout info"><strong>Info Note:</strong> Background context and informational details.</p>
<p class="callout success"><strong>Success:</strong> Empirical zero-drift test passed with 0 samples drift.</p>
<p class="callout warning"><strong>Warning:</strong> Ensure Word Clock is 75Ω terminated on the final device.</p>
<p class="callout danger"><strong>Danger / Critical:</strong> Never run recursive find commands on host ul.</p>
```

Rendered Output:

Info Note: Background context and informational details.

Success: Empirical zero-drift test passed with 0 samples drift.

Warning: Ensure Word Clock is 75Ω terminated on the final device.

Danger / Critical: Never run recursive find commands on host ul.

3.2 Collapsible Details & Accordions

```
<details>
  <summary><strong>Click to expand technical registers</strong></summary>
  <p>Detailed hardware memory offsets and bitfields go here.</p>
</details>
```

Rendered Output:

Click to expand technical registers

Detailed hardware memory offsets and bitfields go here.

3.3 Scaled Lightbox Images with Captions

```
<p align="center">
  <a href="https://wiki.drheck.dev/uploads/images/gallery/2026-08/20260808-19h19m36s-grim.png"
  target="_blank">
    
  </a>
  <em style="display: block; text-align: center; margin-top: 6px; font-size: 0.9em; color:
  #666;">Figure 1: Example styled gallery image with lightbox link</em>
</p>
```

Rendered Output:

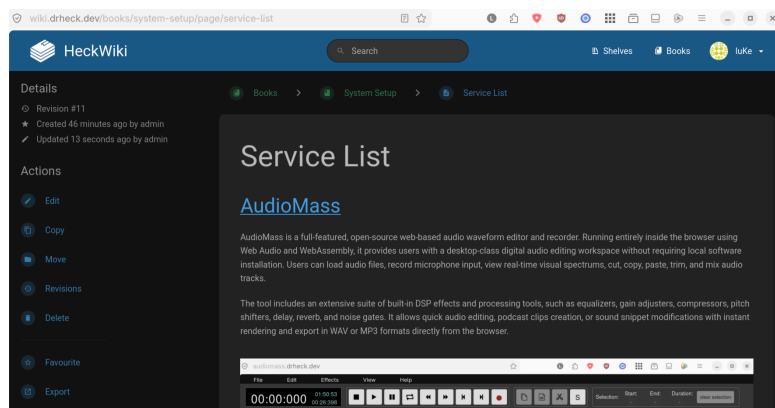


Figure 1: Example styled gallery image with lightbox link

3.4 YouTube Video Embedding

BookStack supports direct HTML5 `<iframe>` embedding from YouTube. For optimal viewing across mobile phones, tablets, and desktop displays, responsive aspect-ratio wrappers, standard fixed dimensions, or thumbnail fallbacks can be used.

Note on Ad-Blockers: Standard `youtube.com/embed/VIDEO_ID` URLs are recommended. If using browser privacy extensions or adblockers (e.g. uBlock Origin), ensure third-party iframe embeds are permitted.

Method A: Styled & Mobile-Responsive Embed (Recommended)

Embed the player using explicit 16:9 pixel dimensions (`640` × `360` or `560` × `315`) combined with `max-width: 100%`, rounded borders, and drop shadows. The `max-width: 100%` inline rule ensures the player automatically scales down on smaller screens (such as mobile phones) without overflowing the page boundary horizontally:

```
<iframe width="640" height="360" src="https://www.youtube.com/embed/M7lc1UVf-VE"
title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write;
encrypted-media; gyroscope; picture-in-picture; web-share" allowfullscreen style="border: 0;
border-radius: 8px; box-shadow: 0 4px 12px rgba(0,0,0,0.2); max-width: 100%;"></iframe>
```

Rendered Output:

<https://www.youtube.com/embed/M7lc1UVf-VE>

Method B: Raw YouTube Share Embed Snippet (Default Copy-Paste)

This is the default, unstyled iframe code copied directly from YouTube's **Share** **Embed** modal (`560` × `315`). It uses fixed pixel dimensions without `max-width: 100%`, which maintains a strict fixed size on desktop, but may require horizontal scrolling on narrow mobile viewports:

```
<iframe width="560" height="315"
src="https://www.youtube.com/embed/Ap04demUaLs?si=FT0sjdM6_M5ybmZp" title="YouTube video
player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media;
gyroscope; picture-in-picture; web-share" referrerpolicy="strict-origin-when-cross-origin"
allowfullscreen></iframe>
```

Rendered Output:

https://www.youtube.com/embed/Ap04demUaLs?si=FT0sjdM6_M5ybmZp

Method C: Lightweight Thumbnail Link (Markdown Fallback)

When an active video iframe is not required or when optimizing for strict privacy environments, use a high-resolution YouTube video thumbnail with an external link:

```
[[Watch
Video](https://img.youtube.com/vi/dQw4w9WgXcQ/hqdefault.jpg)](https://www.youtube.com/watch?v=
dQw4w9WgXcQ)
```

5. Summary Guide for Authors & AI Agents

1. **Math Formulas:** Use standard `$$ ... $$` for display equations and `$ ... $` for inline math.
2. **Avoiding Underscore Collisions:** Multiple unescaped underscores in a formula (e.g. `VAR_1 ... VAR_2`) can trigger Markdown italics (`<em>`). Use hyphens (e.g. `\text{DRATE-M}`) or single subscripts (`x_1`) to prevent Markdown parser mangling.
3. **Japanese / Furigana:** Use `<ruby>...<rt>...</rt></ruby>` in Markdown, or `\text{...}` in KaTeX equations.
4. **Callout Boxes:** Use `<p class="callout info|success|warning|danger">` for styled alert banners.
5. **Code Safety:** Shell commands (`$ sudo ...`) inside `<pre>` or `<code>` code blocks are automatically preserved and never evaluated as math.
6. **YouTube Embeds:** Use `<iframe src="https://www.youtube-nocookie.com/embed/VIDEO_ID" ...>` inside a responsive 16:9 `<div style="position: relative; padding-bottom: 56.25%;">` wrapper.

6. Addendum: System Configuration Changes Made to BookStack

To enable native, global TeX mathematical rendering across the wiki, the following configuration changes were applied to the BookStack service running on host `ul`:

1. Global KaTeX Injection (`app-custom-head`)

BookStack's global HTML head template was updated via the `app-custom-head` setting in the `settings` database table to inject KaTeX `0.16.11`:

- **Stylesheet:** `<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/katex@0.16.11/dist/katex.min.css">`
- **Content Security Policy ('strict-dynamic') Loader:** Because BookStack enforces a strict Content Security Policy (`script-src http: https: 'nonce-...' 'strict-dynamic'`), standard static `<script>` tags with `onload` attributes are blocked by the browser. A nonced inline JavaScript loader was installed to dynamically append the external scripts sequentially:

```
(function() {
    function loadScript(url, callback) {
        var el = document.createElement('script');
        el.src = url;
        el.async = false;
        el.onload = callback;
        document.head.appendChild(el);
    }
    function init() {
        loadScript('https://cdn.jsdelivr.net/npm/katex@0.16.11/dist/katex.min.js',
function() {
        loadScript('https://cdn.jsdelivr.net/npm/katex@0.16.11/dist/contrib/auto-
render.min.js', function() {
            var doRender = function() {
                if (window.renderMathInElement) {
                    window.renderMathInElement(document.body, {
                        delimiters: [
                            {left: '$$', right: '$$', display: true},
                            {left: '$', right: '$', display: false}
                        ],
                        ignoredTags: ['script', 'noscript', 'style', 'textarea',
'pre', 'code', 'option'],
                        throwOnError: false
                    });
                }
            };
            if (document.readyState === 'loading') {
                document.addEventListener('DOMContentLoaded', doRender);
            } else {
                doRender();
            }
        });
    });
});
```

```
}  
    init();  
})();
```

2. Cache Invalidation

Whenever `app-custom-head` is modified in the database, BookStack's application view cache and compiled templates must be cleared inside the container:

```
sudo docker exec -w /app/www bookstack php artisan cache:clear  
sudo docker exec -w /app/www bookstack php artisan view:clear
```

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