

theofig

figure implementation of theorem environments

A [Typst](#) package for creation and customization
of theorem environments built on top of [std.figure](#).

github.com/Danila-Bain/typst-theorems

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Usage examples

Importing everything with `*` is recommended:

```
#import "@preview/theofig:0.0.1": *
```

Basic usage

```
#theorem[#lorem(5)] <theorem-1>
#theorem[Lorem][#lorem(10)]
#proof[It follows from @theorem-1.]
```

,

Default environments

theofig defines a number of default environments with sensible default style.

```
#theorem[#lorem(5)]
#lemma[#lorem(5)]
#statement[#lorem(5)]
#remark[#lorem(5)]
#corollary[#lorem(5)]
#example[#lorem(5)]
#definition[#lorem(5)]
#algorithm[#lorem(5)]
#proof[#lorem(5)]
#problem[#lorem(5)]
#solution[#lorem(5)]
```

Custom environments

All default environments of theofig are defined as with-specializations of a function theofig.theofig, which can be used to create custom environments.

Theorem 1. Lorem ipsum dolor sit amet.

Theorem 2 (Lorem). Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.

Proof. It follows from Theorem 1. ■

Theorem 1. Lorem ipsum dolor sit amet.

Lemma 1. Lorem ipsum dolor sit amet.

Statement 1. Lorem ipsum dolor sit amet.

Remark 1. Lorem ipsum dolor sit amet.

Corollary. Lorem ipsum dolor sit amet.

Example 1. Lorem ipsum dolor sit amet.

Definition 1. Lorem ipsum dolor sit amet.

Algorithm 1. Lorem ipsum dolor sit amet.

Proof. Lorem ipsum dolor sit amet. ■

Problem 1. Lorem ipsum dolor sit amet.

Solution. Lorem ipsum dolor sit amet.

```
#let joke = theofig.with(supplement: "Joke")

#{theofig-kinds += ("joke", )}

#show figure-where-kind-in(theofig-kinds): set
text(gradient.linear(red, green, blue))

#joke[Why was six afraid of seven? Because 7 8 9.]
#joke[
  Parallel lines have so much in common...
  It's a shame they'll never meet.
]
#statement[A topologist is someone who can't tell
the difference between a coffee mug and a
doughnut.]
```

If supplement is specified, the kind of figure is chosen automatically as `lower(supplement)`, so in this example adding "joke" to theofig-kinds lets us apply styling to a joke environment together with all standard environments.

Ways to specify numbering

Most default environments use figure's default numbering, which is "1" (see Definition 1). Hence, we can change default numbering for many environments simultaneously using a `show` rule with `set figure(numbering: ...)` (see Definition II). Then, if we specify an argument numbering in the environment, it takes priority over figure's numbering (see Definition C and Definition (iv)).

```
#definition[Default @def-a-1.]<def-a-1>

#show figure-where-kind-in(
  theofig-kinds
): set figure(numbering: "I")
#definition[Show rule @def-a-2.]<def-a-2>

#let definition = definition.with(numbering: "A")
#definition[Redefined @def-a-3.]<def-a-3>

#definition(numbering: numbering.with("(i)"))[
  Argument @def-a-4.
]<def-a-4>
```

Joke 1. Why was six afraid of seven? Because 7 8 9.

Joke 2. Parallel lines have so much in common... It's a shame they'll never meet.

Statement 1. A topologist is someone who can't tell the difference between a coffee mug and a doughnut.

Definition 1. Default Definition 1.

Definition II. Show rule Definition II.

Definition C. Redefined Definition C.

Definition (iv). Argument Definition (iv).

Numbers out of order

Using the theofig's argument number, we can specify a number regardless of automatic numeration. Passing a label to number copies the numbering of the same environment by that label, which is useful for alternative definitions or equivalent statements of theorems (see Definition 2 and Definition 2').

```

#definition[Default.]

#definition(numbering: none)[No numbering.]

#definition[Equivalent to @def-2.]<def-1>

#definition(number: <def-1>, numbering: "1")[
    Equivalent to @def-1.
]<def-2>

#definition(number: 100)[
    This is @def-100.
]<def-100>

#definition(number: 5, numbering: "A")[
    This is @def-3.
]<def-3>

#definition(number: $e^{\pi}$)[
    This is @def-exp
]<def-exp>

#definition[Back to default.]

```

Show rules to specify a style

All environments are figure's under the hood, and they can be styled using show rules. The title of environment, such as “**Theorem 4 (Cauchy).**” can be style using `show figure.caption: ... rules`.

```

// apply to one
#show figure.where(kind: "theorem"): smallcaps
// apply to some
#show figure-where-kind-in(
    ("solution", "problem")
): emph
// apply to all
#show figure-where-kind-in(theofig-kinds): set
figure(
    numbering: "I",
)
// apply to all except some
#show figure-where-kind-in(
    theofig-kinds, except: ("proof",),
): set text(blue)

#definition[#lorem(10)]
#theorem[#lorem(10)]
#proof[#lorem(10)]
#problem[#lorem(10)]
#solution[#lorem(10)]
,

```

Definition 1. Default.

Definition. No numbering.

Definition 2. Equivalent to Definition 2'.

Definition 2'. Equivalent to Definition 2.

Definition 100. This is Definition 100.

Definition E. This is Definition E.

Definition e^π . This is Definition e^π

Definition 3. Back to default.

Definition I. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.

THEOREM I. LOREM IPSUM DOLOR SIT AMET, CONSECTETUR ADIPISCING ELIT, SED DO.

Proof. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do. ■

Problem I. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.

Solution. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.

Style examples

```
#theorem[Default. #lorem(16)]

#show figure.where(kind: "definition"): it => {
  show figure.caption: emph
  show figure.caption: strong.with(delta: -300)
  it
}
#definition[Italic caption. #lorem(16)]

#show figure.where(kind: "lemma"): it => {
  show figure.caption: underline.with(offset:
1.5pt)
  show figure.caption: strong.with(delta: -300)
  it
}
#lemma[Underline caption. #lorem(16)]

#show figure.where(kind: "proposition"): it => {
  show: emph
  show figure.caption: emph
  show figure.caption: smallcaps
  show figure.caption: strong.with(delta: -300)
  it
}
#proposition[Italic body, smallcaps caption.
#lorem(12)]

#show figure.where(kind: "corollary"): it => {
  show figure.caption: strong.with(delta: -300)
  show figure.caption: set text(tracking: 3pt)
  it
}
#corollary[Sparse caption. #lorem(16)]

#show figure.where(kind: "statement"): block.with(
  stroke: 1pt, radius: 3pt, inset: 5pt,
)
#statement[Block. #lorem(16)]

#show figure.where(kind: "solution"): block.with(
  stroke: (left: 1pt), inset: (right: 0pt, rest:
5pt)
)
#solution[Line to the left. #lorem(16)]
```

Languages support

Enabled by default argument `translate-supplement: true`, the `fig` environments map supplement based on context-dependant `text.lang`. List of supported languages: `en`, `ru`, `de`, `fr`, `es`, `it`, `pt`, `pl`, `cs`, `zh`, `ja`, `ko`, `ar`. Note that unlike supplement of a figure, a supplement in reference changes if `text.lang` is not the same as it was at the location of the figure.

Theorem 1. Default. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et.

Definition 1. Italic caption. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et.

Lemma 1. Underline caption. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et.

PROPOSITION 1. *Italic body, smallcaps caption. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.*

C o r o l l a r y. Sparse caption. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et.

Statement 1. Block. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et.

Solution. Line to the left. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et.

```
#set text(lang: "ru")
#theorem[#lorem(5)]

#set text(lang: "es")
#theorem[#lorem(5)]

#set text(lang: "de")
#theorem[#lorem(5)]

#set text(lang: "ja")
#theorem[#lorem(5)]
```

Теорема 1. Lorem ipsum dolor sit amet.

Teorema 2. Lorem ipsum dolor sit amet.

Satz 3. Lorem ipsum dolor sit amet.

定理 4. Lorem ipsum dolor sit amet.

Limitations

Because environments in theofig are implemented as figures, show rules applied to them affect nested figures of any kind, including images and tables:

```
#show figure.where(kind: "example"): it => {
  set figure(numbering: "I")
  show figure.caption: smallcaps
  it
}
#example[
  Example with an image:
  #figure(caption: [Example Image])[
    #image(
      bytes(range(256).map(i => i.bit-and(i*i))),
      format:(encoding:"luma8",width:32,height:8),
      width: 100%,
    )
  ]
]
```

EXAMPLE I. Example with an image:

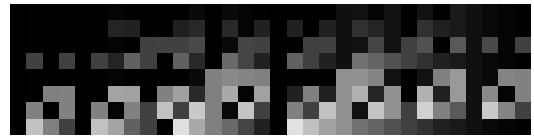


FIGURE I: EXAMPLE IMAGE

In this example, `smallcaps` is applied not only to the example title, but also to the actual figure's caption, the same is true for numbering. It is an undesirable limitation, which leads us to either moving our figures outside of theofig environments or styling each theofig environment individually like in the following example.

```
#let example = example.with(
  numbering: "I",
  format-caption: it => smallcaps(strong(it)),
)
#example[
  Example with an image:
  #figure(caption: [Example Image])[
    #image(
      bytes(range(256).map(i => i.bit-and(i*i))),
      format:(encoding:"luma8",width:32,height:8),
      width: 100%,
    )
  ]
]
```

EXAMPLE I. Example with an image:



Figure 2: Example Image

Main functions