

The cistercian package

A package to display Cistercian numerals

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<https://github.com/samcarter/cistercian>

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1 Introduction

The cistercian package is meant for displaying Cistercian numerals in L^AT_EX. It was inspired by the Numberphile video “The Forgotten Number System”¹. Many thanks to Paulo Cereda for bringing this video to my attention!

This package is work in progress, therefore I would be happy to hear your feedback and ideas how to improve the package. The development version of the source code can be found at <https://github.com/samcarter/cistercian>, including an issue tracker. If you seek any other assistance (not bug reports/feature requests), I suggest asking at <https://topanswers.xyz/tex>.

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2 Cistercian numerals

Cistercian numerals are a nearly forgotten number system which was invented in the late Middle Ages by Cistercian monks who were, at that time, one of the most influential congregations with monasteries spreading over most of Europe.

Cistercian numerals are a base-10 system for natural numbers up to 9999. They are formed by a vertical stem for zero I. Onto this stem, additional markings are added to denote individual digits, e.g. 1 is I, 2 is II, etc. The markings for ones are added at the top right, the ones for tens are mirrored to the top left (e.g. 10 is I), hundreds at the bottom right (e.g. 100 is II) and thousands at the bottom left (e.g. I). To form the complete number, the digits are superimposed on top of each other, e.g. 1111 is I.

While arithmetic calculations are hard with such a numeral system, it provides a compact and uniform way to denote natural numbers, making it well suited for year numbers or sequences like page numbers and footnotes.

Several variants were in use, in this package we are adopting the glyph shapes as shown in [https://commons.wikimedia.org/wiki/File:Cistercian_digits_\(vertical\).svg](https://commons.wikimedia.org/wiki/File:Cistercian_digits_(vertical).svg).

¹ <https://www.youtube.com/watch?v=9p55Qgt7Ciw>

3 Overview numerals

1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1000	2000	3000	4000	5000	6000	7000	8000	9000

4 Basic usage

The cistercian package provides the macro `\cistercian{<number>}` to show a given number as Cistercian numeral.

Basic macro	
<code>\cistercian{42}</code>	

To change the page numbering of a document to Cistercian numerals, the following macro can be used:

Page numbering
<code>\pagenumbering{cistercian}</code>

5 Options

By default, the Cistercian numerals will scale with the surrounding font:

Font scaling	
<code>\cistercian{2}</code> Text	Text
<code>\Huge \cistercian{5}</code> Text	Text

However the height, width and stroke can also be controlled individually (values in parenthesis denote the default value):

Height (height of “I”)

```
\cistercian{9}
\cistercian[height=2ex]{9}
```



Width (height/3)

```
\cistercian{5}
\cistercian[width=0.7ex]{5}
```



Stroke (height/10)

```
\cistercian{7}
\cistercian[stroke=0.5mm]{7}
```



Internally the package uses a `tikzpicture` to draw the numeral and also accepts all options, which can normally be passed to the `tikzpicture` environment, in its optional argument. This can for example be used to change the colour or scale the numeral:

TikZ options

```
\cistercian[scale=2,draw=red]{3141}
```



Another option TikZ option which might be useful for the Cistercian numerals is `line join`, which changes how the lines connect to each other. This alters the appearance of the numbers quite a bit and can help to blend them in with the surrounding font.

Line join (miter)

```
\cistercian[line join=round]{53}
\cistercian[line join=bevel]{53}
\cistercian[line join=miter]{53}
```



6 Alternatives

User, for whom compilation speed is important and who do not need the possibility to modify the appearance of the numerals via TikZ options, should have a look at the amazingly fast and very versatile `xistercian` package.