

# A Sample Article Using quarto-ieee for IEEE Journal and Transactions

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**Abstract**—This document describes the most common article elements and how to use the `quarto-ieee` class with Pandoc/Quarto-Markdown to produce files that are suitable for submission to IEEE journals. `quarto-ieee` can produce conference, journal, and technical note (correspondence) papers with a suitable choice of class options. It intends to generate PDF and HTML outputs that closely mimic what IEEE would generate.

**Index Terms**—IEEE, IEEEtran, journal, Quarto, Pandoc, template

## I. HOW TO USE CACHE IN QUARTO

### A. Global Cache

First, we need to activate the cache globally for the entire document. This means that all chunks that are executed will be cached and will not be executed again unless there is a change in the code or dependencies.

```
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = FALSE,
                      cache=TRUE)
```
```

### B. Simple Plot Example with Global Cache

This chunk uses the global cache. After the first execution, the cached result will be used, so the plot won't be regenerated unless the code or data changes.

```
set.seed(123)
data <- rnorm(1000)

plot(density(data), main = "plot")
```

### C. Cache in a Specific Chunk

This chunk caches the summary table calculation. The table will only be recalculated if the code or the data changes.

### D. Using `if (!file.exists(...))` to Save Data

This chunk uses the `if (!file.exists(...))` condition to avoid recalculating the data if the file already exists. If the file exists, it loads the saved data; otherwise, it runs the computation and saves the results to the file. This approach is useful

for collaboration, where you can share the file and avoid recomputation on other machines.

```
# This code will be displayed in the document

# Check if the data file exists and save the result

if (!file.exists("saved_data.Rdata")) {

  computed_data <- rnorm(1000)
  save(computed_data, file = "./Data/example_data.Rdata")
} else {

  # Load the saved data
  load("./Data/example_data.Rdata")
}

#
head(computed_data)
```

*E. eval: false*

```
# This chunk will display the code
# but will not execute it
set.seed(123)
data <- rnorm(1000)
plot(density(data), main = "plot")
```

## II. OTHER EXAMPLES: PLOT AND TABLE

In a famous paper, [1] introduced a family of transformations

...

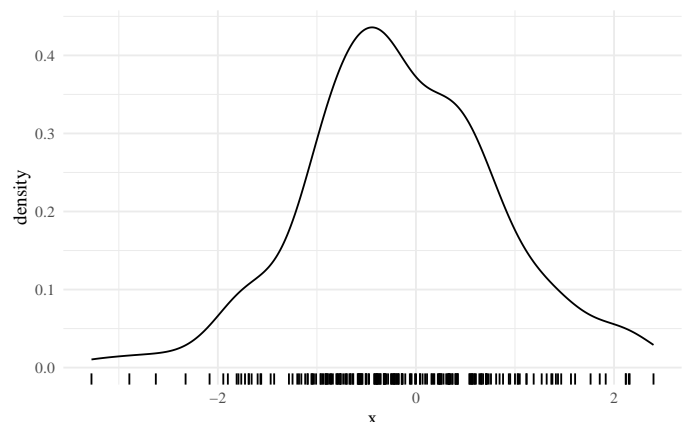


Fig. 1: Simulated data from a  $N(0,1)$  distribution.

The `quarto-ieee` template is freely available under the MIT license on github: <https://github.com/dfolio/quarto-ieee>.

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Fig. 1 shows a kernel density estimate of simulated data from a  $N(0,1)$  distribution. The sample variance is given by

$$s^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2 = 0.98. \quad (1)$$

Note that 1 is an unbiased estimate of the variance, but it is not the maximum likelihood estimate [2, p. 269].

In table ?? we have ...

### III. MARKDOWN BASICS

The reader can easily find many documentations on how to write using the (Pandoc/Quarto) Markdown syntax. The `quarto-ieee` template relies mainly on the Markdown markup supported by Quarto [3], which is build based on Pandoc [4], [5]. Below are some basic examples of usage of the Markdown markup (to save space, it is better to consult the original Quarto document `template.qmd`).

#### A. Figures

An image with nonempty alt text will be rendered as a figure with a caption with Pandoc and Quarto. Quarto includes a different features to simplify the use of figures and subfigures. Here, it is recommended to use `div` block with `#fig-` label to embed your Figures.



Fig. 2: An example of figure.

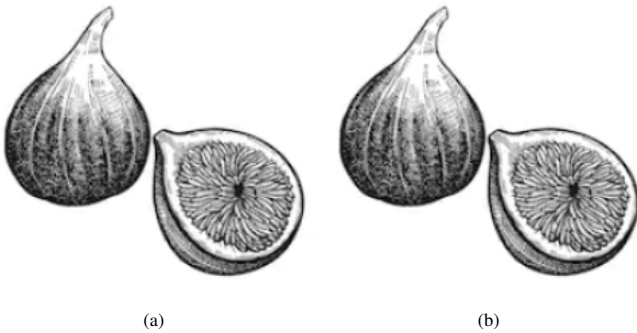


Fig. 3: An example with sub-figure.

The figures is cross-referenced as Fig. 3 and even the sub-figures as Fig. 3b.

1) *Tables*: Similarly, many kind of tables may be used with Pandoc and Quarto. The latter also includes different features to simplify the table output. To make tables cross-referenceable use a label with a `#tbl-` prefix.

However, it is recommended to avoid using the commonly used single Markdown table known as a ‘pipe table’. In fact, Pandoc Markdown uses the  $\LaTeX$  `longtable` package, which does not support the two-column mode, which is required for most IEEEtran journals. `quarto-ieee` uses a hack to temporarily switch to one-column mode. However, this hack may break the page layout. To overcome this issue, a basic way is to use code cells (as for Table ??). Quarto is a multi-language and it uses `Knitr` to execute R code and can execute Python code blocks within Markdown.

| Table I: Main Caption |      |      |                  |      |      |
|-----------------------|------|------|------------------|------|------|
| (a) First Table       |      |      | (b) Second Table |      |      |
| Col1                  | Col2 | Col3 | Col1             | Col2 | Col3 |
| A                     | B    | C    | A                | B    | C    |
| E                     | F    | G    | E                | F    | G    |
| A                     | G    | G    | A                | G    | G    |

The Tables are cross-referenced as Table I for details, especially Table Ib. There is also Table ??.

#### B. Bibliography

IEEE journal should normally use IEEEtran<sup>1</sup> Bib $\TeX$  style. Nevertheless, Pandoc and Quarto do support Bib $\TeX$  with `natbib` or `biblatex`. However, neither is officially recommended for normal IEEE use. For this reason, `quarto-ieee` uses `citeproc` with the `ieee` CSL style sheet.

### IV. CONCLUSIONS

The conclusion goes here.

### ACKNOWLEDGMENT

#### APPENDIX AN APPENDIX

Use `[]{\appendix options="An Appendix"}` markup if you have a single appendix. IEEEtran state that to do not use `\section{}` anymore after `\appendix`.

### REFERENCES

- [1] G. E. P. Box and D. R. Cox, “An analysis of transformations,” *Journal of the Royal Statistical Society, Series B*, vol. 26, no. 2, pp. 211–252, 1964.
- [2] J. A. Rice, *Mathematical statistics and data analysis*, 3rd edition. Duxbury, 2007.
- [3] “Quarto - Markdown Basics.” [Online]. Available: <https://quarto.org/docs/authoring/markdown-basics>. [Accessed: 25-Oct-2023]
- [4] J. MacFarlane, A. Krewinkel, and J. Rosenthal, “Pandoc.” [Online]. Available: <https://github.com/jgm/pandoc>
- [5] J. J. Allaire, C. Teague, C. Scheidegger, Y. Xie, and C. Dervieux, “Quarto.” Jan-2022 [Online]. Available: <https://github.com/quarto-dev/quarto-cli>

<sup>1</sup>IEEEtran Bib $\TeX$  style support page is: <http://www.michaelshell.org/tex/ieeetran/bibtex/>