

# A Sample Article for IEEE Transactions

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**Abstract**—This document is a sample illustrating the Quarto `ieeetran` template. It includes the key elements of a scientific articles (references, equations, figures, tables, code, cross references). The template enables the generation of IEEE-formatted article from a Jupyter notebook.

**Note**

This is a template

## I. INTRODUCTION

Quarto is recent tool enabling the generation of polished HTML page or PDF article from Jupyter notebook [1]. It can generate, with one command and minimal configuration, PDF formatted according to journal template via extensions—see the [list of journals supported](#). This sample article illustrates the formatting achieved with the `ieeetran` extension. This extension invokes the [official release of LaTeX IEEEtran style](#). Before submitting to a IEEE journal, consult [2] for editorial guidelines and the journal or conference instructions.

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## II. EXECUTABLE CODE

Quarto can not only format, but also execute on the fly Python code. It enables “*executable articles*” [3]. Figure 1 illustrates this feature. The code, included in the article, generates the figure on the fly when rendering the article. Note that the code can be easily hidden, or folded (this only works in the HTML output though, the PDF being static).

```
import numpy as np
import matplotlib.pyplot as plt

r = np.arange(0, 2, 0.01)
theta = 2 * np.pi * r
fig, ax = plt.subplots(
    subplot_kw = {'projection': 'polar'}
)
ax.plot(theta, r)
ax.set_rticks([0.5, 1, 1.5, 2])
ax.grid(True)
plt.show()
```

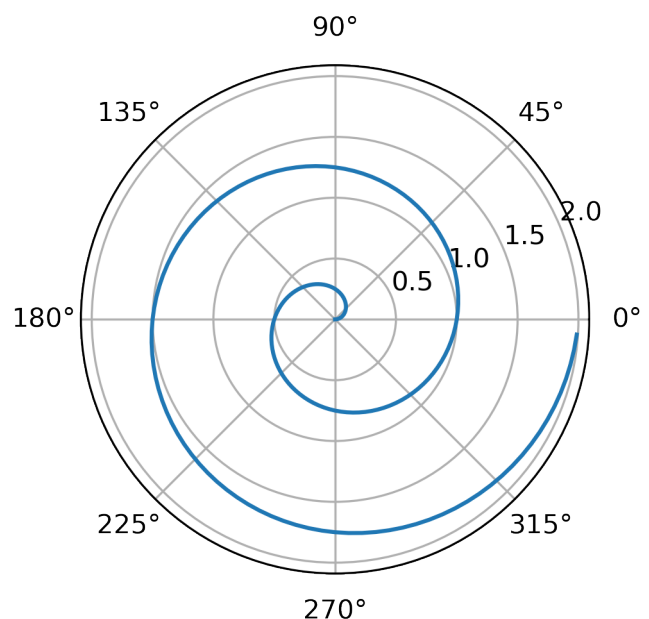


Figure 1: A line plot on a polar axis.

## III. OTHER FEATURES

Wide figure are supported, as demonstrated by Figure 2, by appending `fig-env="figure"` to the figure statement.

<sup>1</sup>Stanford University. <sup>2</sup>Some corporation.  
Released on: 1/1/22  
Extra footnote..

1500 x 300

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Figure 2: A wide figure spanning the two columns

Table I: Table of sensor parameters

Parameter	Symbol	Min	Typ	Max	Unit
Supply current	$i_{\text{off}}$	-	-	10	mA
Hall sensitivity	$S_H$	0.2	-	-	V/T
Effective nr. of bits	ENOB	12	-	-	-

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#### A. Equation

Equation 1 shows a block of equations.

$$\begin{aligned}\nabla \times \vec{B} - \frac{1}{c} \frac{\partial \vec{E}}{\partial t} &= \frac{4\pi}{c} \vec{j} \\ \nabla \cdot \vec{E} &= 4\pi\rho\end{aligned}\quad (1)$$

#### B. Tables

Tables are problematic due to 2-column nature of the IEEE class, but an easy workaround exist. Table I illustrates a simple table. Such table should be wrapped with a custom environment `mytable` (or `mywidecolumn` for wide table spanning the 2 columns) via the [extension latex-environment](#).

Data-rich tables can also be generated **programmatically** from Python code, and rendered on the fly. As an example, we execute here the example code from [the Pandas documentation](#) for a complicated styled table. The result is rendered in Table II. Clearly, generating such table in plain Latex would be **painful**. And the Latex code would have to be tweaked with each data update.

#### C. Conclusion

We have showed how the extension handles all key elements of scholarly writing. With one line of code, a Jupyter notebook (or its text equivalent) can be formatted into a IEEE article, almost ready for submission. During the drafting, the HTML output should be preferred (use option `--to ieetran-html` to render to HTML). It is quicker, and figure/table placement is trivial. In addition, the HTML format, with its dynamic features, opens up advanced features, like interactive plots to engage with the readers [1].

#### REFERENCES

- [1] G. Close, “Technical writing and publishing Data-Rich articles with quarto.” Towards Data Science, Sep. 2022 [Online]. Available: <https://towardsdatascience.com/technical-writing-and-publishing-data-rich-articles-with-quarto-d61a56bcaa64>
- [2] IEEE, “IEEE editorial style manual for authors.” Apr. 2020 [Online]. Available: <https://journals.ieeeauthorcenter.ieee.org/your-role-in-article-production/ieee-editorial-style-manual/>
- [3] J. Lasser, “Creating an executable paper is a journey through open science,” *Communications Physics*, vol. 3, no. 1, pp. 1–5, Aug. 2020 [Online]. Available: <https://www.nature.com/articles/s42005-020-00403-4>

Table II: Selected stock correlation and simple statistics

		Equity				Stats				Rating
		Energy		Consumer		Std Dev	Variance	52w High	52w Low	
		BP	Shell	H&M	Unilever					
Energy	BP	1.00	0.80	0.66	0.72	32.2	1,034.8	335.1	240.9	BUY
	Shell	0.80	1.00	0.69	0.79	1.9	3.5	14.1	19.8	HOLD
Consumer	H&M	0.66	0.69	1.00	0.86	7.0	49.0	210.9	140.6	BUY
	Unilever	0.72	0.79	0.86	1.00	213.8	45,693.3	2,807.0	3,678.0	SELL