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 Jupypter notebook.**

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 formating 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] which are reproducible. Figure 1 illustrates this feature. The code 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, 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()
```

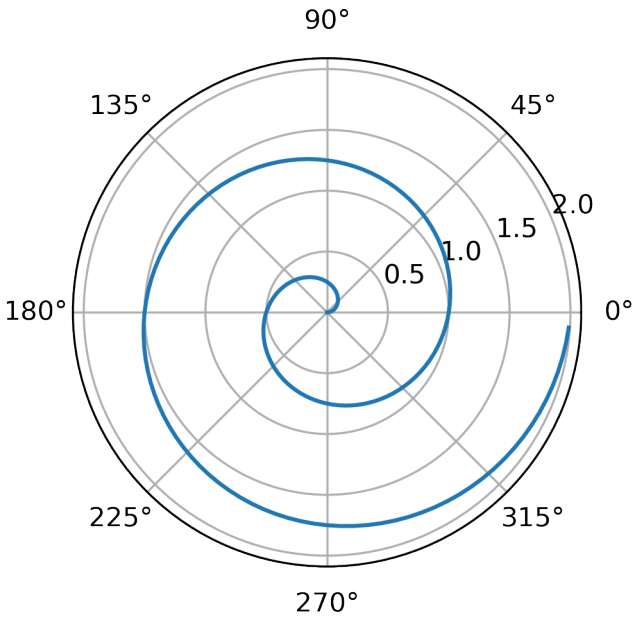

Figure 1: A line plot on a polar axis.

III. Other features

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

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[1]Stanford University. [2]Some corporation.
Released on: 01-Jan-2022.
Extra footnote..

Figure 2: A wide figure spanning the two columns

Table I: Table of sensor parameters

Parameter	Symbol	Min	Typ	Max	Unit
Supply current	i_{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.

$$\begin{aligned} \nabla \times \vec{\mathbf{B}} - \frac{1}{c}\frac{\partial \vec{\mathbf{E}}}{\partial t} &= \frac{4\pi}{c}\vec{\mathbf{j}} \\ \nabla \cdot \vec{\mathbf{E}} &= 4\pi\rho \\ \nabla \times \vec{\mathbf{E}} + \frac{1}{c}\frac{\partial \vec{\mathbf{B}}}{\partial t} &= \vec{\mathbf{0}} \\ \nabla \cdot \vec{\mathbf{B}} &= 0 \end{aligned} \tag{1}$$

B. Tables

Table I illustrates a simple table. Data-rich tables, with live-data, could also be manipulated in Python and rendered on the fly. Wide tables, spanning two columns, are supported via a workaround. Wrap the wide table with `\def\wide{1}` and `\def\wide{0}`.

C. Conclusion

We have showed how the extension handles all key elements of scholarly writing. With one line of code, a Jupyter notebook (or it text equivalent) can be formatted into a IEEE article, almost ready for submission. During the drafting, the HTML output should be preferred (render with option `--to ieeetran-html`). It is quicker, and float 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