

URSI Radio Science Letters Manuscript Template

First Author, Second Author, and Third Author

Abstract – This document provides a template for submitting manuscripts to the *URSI Radio Science Letters*. It also provides style guidelines for writing manuscripts, including information on handling equations, tables, and figures. All papers must have an Abstract.

1. Introduction

While the *Radio Science Letters (RSL)* uses a double-column format for the body text of papers, a single-column format is used for manuscript submission. Allen Press will take care of the final formatting after the paper has been reviewed and if it is accepted for publication. Note that the authors' affiliations and contact information should be appended to the end of the manuscript, after the references.

2. Formatting

It is preferred that a Microsoft *Word* document (.doc or .docx) be provided for final manuscript submission, although an equivalent \LaTeX document can also be provided using this template. For the initial submission (prior to the paper being reviewed), a PDF of the document should be created and submitted. In all cases, *all fonts must be embedded in the document*.

When typeset with the class option `manuscript`, the formatting of this \LaTeX template closely follows the *Word* template regarding page size (US letter), font sizes, and margins. This must be used for submitting the manuscript to RSL. For other purposes, a two-column format can be typeset using the class option `preprint`. In both cases the column width is 3.15 in.

Words other than articles (but including leading articles) are capitalized in the title and section headings.

Use the standard \LaTeX tools (`\label`, `\ref`, `\cite`, etc.) for cross references and citations in the text. Some examples can be found in this template. *Do not mess with the layout, load any additional packages, or define any custom macros.*

3. Equations

Please use standard \LaTeX for mathematics. The conversion tools used in the publication process should support $\mathcal{A}\mathcal{M}\mathcal{S}\text{\LaTeX}$ and so the packages `amsmath` and

`amssymb` are loaded by this template, but please keep the mathematics as simple as possible.

In constructing equations, please use “auto-scaling” brackets like $(x^2 + y^2)$. Please also observe the correct hierarchy of brackets: $\{[(\dots)]\}$. If you have two brackets of the same type next to each other, you have probably made a mistake. Please do not use the vector-dot-product `\cdot` or the vector-cross-product `\times` to indicate multiplication. The use of a bold font, obtained using `\mathbf{E}`, is preferred to other notations for indicating vectors and matrices.

Please be careful to typeset all mathematics (including single symbols like vector **E**) in math mode and all text in text mode. Also note that primes in formulas (math mode) are visually and semantically different from apostrophes.

As an example of equations and references to equations, Maxwell's equations can be written as

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}, \quad (1)$$

$$\nabla \times \mathbf{H} = \mathbf{J} + \frac{\partial \mathbf{D}}{\partial t}, \quad (2)$$

$$\nabla \cdot \mathbf{D} = \rho, \quad (3)$$

$$\nabla \cdot \mathbf{B} = 0, \quad (4)$$

where **E** is the electric field, etc. (Remember to define all symbols before or immediately after the first equation where they appear.) Faraday's law (1) and Ampère's law (2) can be converted to integral form using Stokes' theorem

$$\int_S \nabla \times \mathbf{F} = \oint_C \mathbf{F} \cdot d\mathbf{l}. \quad (5)$$

Note that equations are punctuated.

4. Figures

In composing figures, it is in general best to avoid figures that contain multiple parts with a single caption. This causes problems with layout, and it is often necessary to split the figures into separate parts with separate captions. It is certainly OK to have parts a, b, c, etc. with the same figure number. However, it is usually best to give each part a separate caption. The exception to this is when the parts will be looked at for comparison (e.g., patterns of the same antenna for two different parameters). Of course, in such cases it might be better to plot

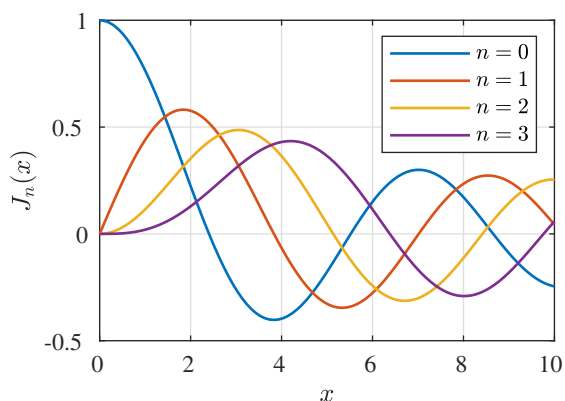


Figure 1: Graphs of the Bessel function of the first kind and order $n = 0, 1, 2, 3$.

two curves on the same graph, rather than using separate plots! If you do have a figure with multiple parts, it is usually best to stack the parts vertically, rather than to arrange them horizontally, if possible: the RSL is published in column format. Even when multiple parts of the same figure are to be stacked vertically, please provide each part of a figure as a separate file. If this is not done, it is often necessary to split figures apart for proper layout.

In the initial manuscript submission, figures with their captions should be inserted at the appropriate place in the PDF. For final manuscript submission, in addition to appearing at the appropriate place in the PDF, figures must also be submitted as individual files in .jpg, .tif, or .eps format. If .eps format is used, all fonts *must* be embedded. When the image is at the published size, it should have a minimum resolution of 300 dpi and a maximum resolution of 600 dpi if it is color or grayscale; and a minimum of 600 dpi and a maximum of 1200 dpi if it is line art, bitmap, or text.

All figures must be cited in the text, and must be numbered in the order first cited. In both the text and in figure captions, “Figure” is always spelled out.

For figures and tables, use the standard `figure` and `table` environments, put the code approximately where the figure or table is first referred to, and let \LaTeX place the floats. Figure 1 is an example using vector graphics and Figure 2 contains a bitmap image (photo) with suitable resolution. Table 1 is an example of a simple table for publishing numerical data. Since `latex + dvips + pd2pdf` only support .eps format while `pdflatex` supports .pdf, .jpg, and .png formats, two versions of each figure is included with this template.

5. Abbreviations

Try to avoid excessive abbreviations. If an abbreviation is in really common usage (e.g., RFID, UHF, dc)

Table 1: A few of the smallest non-negative zeros x_{ns} of the Bessel function J_n .

| n | $s = 1$ | $s = 2$ | $s = 3$ |
|-----|---------|---------|---------|
| 0 | 2.405 | 5.520 | 8.654 |
| 1 | 3.832 | 7.016 | 10.173 |
| 2 | 5.136 | 8.417 | 11.620 |
| 3 | 6.380 | 9.761 | 13.015 |



Figure 2: Coil for demonstrating Faraday’s law of induction.

then it can be left as an abbreviation (although unless it is so common that its usage is universal, it needs to be defined in parentheses when first used). However, all other instances, abbreviations should be replaced with the full, spelled-out meaning after first introduced. Examples include EFIE (electric-field integral equation), 3D (three-dimensional), BC (boundary condition), etc.

6. Commas and Dashes

The *RSL* uses the Oxford comma (a comma after each item in a list). There are no exceptions. The *RSL* also uses the American standard of punctuation going inside quotation marks.

The *RSL* follows the Associated Press style regarding dashes. Hyphens are used both as hyphens and to indicate ranges. Dashes in phrases are en dashes – with space before and after. No em dashes are used.

7. Citations and References

All references must be numbered in the order cited in the text, and must be cited by number in the text in square brackets: [1]. References in sequence are cited like this: [1,2] or like this: [1-3, 5, 6]. Page numbers ap-

pear after the citation number: [5, pp. 17-19]. References are never included “inline” in the text. They must always appear in the list of references. Furthermore, each reference must have a unique number: multiple references per number are not allowed. Even if a cited paper has multiple parts, each part must be given a separate number.

The list of references appears as the last section of the paper. 9 pt Times New Roman is used for the list of references.

In the list of references, the correct order of data for a journal is author(s) name(s), title of article (major words capitalized) in quotes, title of journal (not abbreviated) in italics, volume number (in bold), issue number, month (without abbreviation), year, and page-number range (preceded by “pp.”). The author’s initials always precede the surname (“last name first” is never used). There is a space between an author’s initials. “et al.” should be avoided unless absolutely necessary, and then only if there are more than five authors. Punctuation always goes inside quotation marks. As noted, titles of journal papers and books have major words capitalized. Journal titles are spelled out to the extent possible. Titles of books and journals are italicized. Titles of conferences are not italicized. Journal volume numbers are in bold. Hyphens (only) are used in ranges of numbers; em or en dashes are never used.

The city comes before the publisher’s name for books. Items within a reference (e.g., volume number, issue number, month, year, publisher’s city, publisher’s name) are separated by commas, and never by periods. Some examples are provided in the list of references at the end of this template.

Note that in the list of references, the reference number appears by itself rather than in square brackets.

8. Units

IEEE style is followed for units. Units are typed after the numerical value associated with them, separated by a non-breaking space (entered using CTRL-space in Word). For example, 260 MHz, 3.5 mm. When expressing ranges, the units are repeated: 260 MHz to 300 MHz instead of 260 – 300 MHz. Some scientists and engineers have a bad habit of trying to abbreviate the dimensions of two- or three-dimensional objects. They will write $2.5 \times 1.7 \text{ mm}^2$ when what they actually mean is $2.5 \text{ mm} \times 1.7 \text{ mm}$, or $2.5 \times 3.2 \times 1.7 \text{ mm}^3$ when what they mean is $2.5 \text{ mm} \times 3.2 \text{ mm} \times 1.7 \text{ mm}$. This should be corrected.

9. A Note on Style

Material that has already been published is referred to in the past tense: Smith [1] showed that this was a

poor antenna. Furthermore, when describing an experiment, a design, or a computation, the past tense is used: We computed the numerical results; the side of the patch was 2.3 mm; the antenna’s patterns agreed well with the computed results.

Scientists and engineers seem to be in love with “has been.” In describing work done, it has become fashionable to say that the measurement has been made, or the antenna has been built, or the algorithm has been tested: in other words, to use the present perfect (literally, the present past) tense to describe what was done. Oversimplifying a bit, this tense is appropriate when there is a connection to the present: for example, when something has just happened. If you had just made a measurement, you might say to a colleague, “The measurement has been made.” However, if the measurement was made a day, or a week, or a year ago, you would say, “The measurement was made” (using the simple past tense). Since papers almost always report what has happened some time ago, the simple past tense should be used: the measurement was made, the antenna was built, the algorithm was tested.

Compound adjectives should always be hyphenated.

10. Estimating the Length of an RSL Manuscript

Papers in the *Radio Science Letters* have a strict length limit of four published pages. The published length of your manuscript can be estimated as follows. Measure from the top to the bottom of paper title and list of author’s names portion of the paper: let this be A . Measure the number of column inches of text for the rest of the paper. This can be done by measuring the length of the single-column text on each page, starting from the top of the text (or heading) on a page to the bottom of the text on the page. Let the total length of the body text be B . Finally, measure and sum together the vertical heights of all figures with their captions (if a figure is two columns in width, double the value for its height and that of its caption). Let the total of the figure and caption heights be C . If $2A + B + C \leq 76.5$ in (194.3 cm), then the paper should fit within four published pages.

Typesetting your manuscript with the preprint option should also give a rough estimate if the manuscript fits on four pages in two-column format.

11. References

1. A. C. Smith, “An Example of a Poor Antenna,” *Journal of Questionable Science*, **2**, 3, March 2012, pp. 43-47.
2. R. J. Walker, “A Very Extraordinary Presentation,” International Conference on Radio Science, September 3, 2018, Naples, Italy.

3. A. J. Smith, "The Charge on the Electron," *Journal of Physics*, **18**, 2, February 1903, pp. 15-18.
4. A. J. Smith, L. Brown, and R. White, "An Interesting Variation in Current," IEEE International Symposium on Antennas and Propagation, Atlanta, GA, July 1998, pp. 3072-74.
5. J. Goodman, *Fourier Optics*, New York, Wiley, 1968.
6. H. Green, "Solving Integral Equations," in A. Baum and I. Turin (eds.), *Practical Equations*, Berlin, Springer, 2002, Chapter 13.

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