



Template for “jas.cls” (how to get Erdős number 1)

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Abstract

A simple \LaTeX template for `jas.cls`, documentclass for the *Journal of Approximation Software*, that shows the layout of the class and presents some guidelines for authors interested in publishing on the *Journal of Approximation Software*. Also a cheating way to improve one’s Erdős number.

Keywords: template, Erdős number (MSC2020: 05C99, 00A08)

1 Preamble and packages

- The following files are needed in order to compile with `\documentclass{jas}`: `jas.cls`, `jas.bst` and `JAS_logo_black.pdf`.
- Apart from packages needed for layout purposes, the `jas` class already loads packages for mathematical symbols and environment (see, e.g., Section 3), figures and code. It is possible to include other packages and custom commands, but it is recommended to keep the \LaTeX code as simple as possible, i.e., avoid inclusion of packages/commands that are not necessary. The main philosophy is: *if it works on Overleaf, it works for jas.cls*.
- Provide in the preamble both the full title of the paper, with the command `\title`, and the short version, with the command `\Shorttitle{}`, that will be use as a running title for all pages but the first one.

- Each author must be inserted in a single call of `\author[tag1,tag2]{N. Surname}`, with only the family name non-abbreviated. The “tag” arguments are used to identify the corresponding affiliations via the command `\affil[tag1]{name of affiliation1}`. The special tag `\star` is used to identify the corresponding author, which should provide a valid email address via the command `\Email{}`. It is encouraged to provide the Orcid of the authors via the command `\orcidlink{}` inside each `\author[[]]{}` call. If the `orcidlink` package is not already part of your distribution, it is possible to install it or get the standalone `.sty` file freely from <https://github.com/duetosymmetry/orcidlink-LaTeX-command> (note that the `hyperref` and `tikz` packages are required by `orcidlink`). A compact version of authors’ names must be included via `\Shortauthors{}` to be used as a footer for all pages but the first one.
- Use the command `\keywords{}` to add at least two keywords and at least one subject from the [MSC2020](#) classification system. Both keywords and subjects must be put in order, from the most applicable to the least applicable.

2 Body of the paper

- For pictures and figures, it is recommended to use `.eps` or `.pdf` formats within the command `\includegraphics{}` when possible.
- For the insertion of code, see Subsection [2.1](#).
- For info about the “declaration of interests” and bibliography management, see Appendix [A](#) and [B](#), respectively.

2.1 Code and pseudo-code

- To print code the package `listings` is loaded (see [listings documentation](#)) with custom layout preferences, which is able to identify keywords in various languages. It is possible to import directly a code file, see Code [1](#), or to write it as `TeX`text as in Code [2](#). In the latter case, beware of indentation, line and spaces in the `TeX`file.
- The code of the software must be available at an open access repository (such as [GitHub](#)). Hypertext links to the code must be provided using the `hyperref` package (see [hyperref documentation](#)), which is already loaded.

Code 1: imported MATLAB example

```

1 function y = jas_template_power(x,n)
2
3     % This function takes x real and n positive integer as input and returns y = x^n
4
5     y = 1;
6     X = x;
7     N = n;
8
9     while N ~= 0
10
11         if mod(N,2) == 0
12
13             X = X * X;
14             N = N / 2;
15

```

```

16     else
17
18         y = y * X;
19         N = N - 1;
20
21     end
22
23 end
24
25 end

```

Code 2: non-imported MATLAB example

```

1 function y = jas_template_power(x,n)
2
3     % This function takes x real and n positive integer as input and returns y = x^n
4
5     y = 1;
6     X = x;
7     N = n;
8
9     while N ~= 0
10
11         if mod(N,2) == 0
12
13             X = X * X;
14             N = N / 2;
15
16         else
17
18             y = y * X;
19             N = N - 1;
20
21         end
22
23     end
24
25 end

```

3 Mathematical environments

Definition 3.1 (Prime number). A positive integer $p \in \mathbb{N}$ is a *prime number* if and only if it has only two distinct divisors.

Remark 3.1. Note that, by Definition 3.1, 1 is not a prime number because it only has one divisor.

Lemma 3.1. Let $p, q \in \mathbb{N}$. If $p \geq 2$ divides q , then, for every $n \in \{1, \dots, p-1\}$, p does not divide $q+n$.

Theorem 3.2 (Euclid, ~300 b.C.). *There are infinitely many primes.*

Proof. Seeking a contradiction, suppose there are only N primes, for some $N \in \mathbb{N}$, denoted by $\{p_k\}_{k=0}^N$, such that

$$p_0 = 2 \quad \text{and} \quad p_{k-1} \leq p_k, \quad \forall k \in \mathbb{N}.$$

Define

$$q := \prod_{k=0}^{N-1} p_k.$$

By construction, p_k divides q , for every $k \in \{0, \dots, N-1\}$. Thus, due to Lemma 3.1, $q+1$ is not divisible by any p_k . Therefore, there must be a divisor of $q+1$ which is prime and it is not one of the given p_k , which is a contradiction. □

Definition 3.2 (Euclid number). Let $\{p_k\}_{k \in \mathbb{N}_0}$ the ascending sequence of prime numbers. For every $N \in \mathbb{N}$,

$$E_N := 1 + \prod_{k=0}^{N-1} p_k,$$

is called the N^{th} Euclid number.

Euclid numbers are always odd but they can be either prime or not.

Example 3.1.

1. For $N = 1$,

$$E_1 = 1 + \prod_{k=0}^{1-1} p_k = 1 + 2 = 3,$$

which is prime;

2. For $N = 6$,

$$E_6 = 1 + \prod_{k=0}^{6-1} p_k = 1 + 2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13 = 30031,$$

which is divisible by 59 (prime) and so it is not prime.

Acknowledgments

Many thanks to Prof. Erdős for being part of this template.

Declaration of interests

The authors declare the following which may be considered as potential competing interests: the corresponding author's Erdős number is 3 at the moment and, while getting 2 is still feasible, he can only cheat like this to get 1.

References

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A Declaration of interests

For the Declaration of interests, the authors must choose one of the following formulas, providing further details if necessary:

- The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.
- The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: ...

B Bibliography with BibTeX

- References need to be provided in a .bib BibTeX database (best if exported from a big bibliographic database, such as [MathSciNet](#)).
- The style of JAS bibliography is defined in the file `jas.bst`.
- All references should be made with the command `\cite`, e.g, `[2, 3, 1, 4]`.
- DOI and URL of the references should be included where available.