
Algorithmic Implementation of Grand Normalization for Adaptive Loss Balancing in Deep Multitasking Networks

Anonymous Author(s)

Affiliation

Address

email

Abstract

1 The abstract paragraph should be indented 1/2 inch (3 picas) on both the left- and
2 right-hand margins. Use 10 point type, with a vertical spacing (leading) of 11 points.
3 The word **Abstract** must be centered, bold, and in point size 12. Two line spaces
4 precede the abstract. The abstract must be limited to one paragraph.

5 1 Submission of papers to NeurIPS 2022

6 Please read the instructions below carefully and follow them faithfully.

7 1.1 Style

8 Papers to be submitted to NeurIPS 2022 must be prepared according to the instructions presented
9 here. Papers may only be up to **nine** pages long, including figures. Additional pages *containing only*
10 *acknowledgments and references* are allowed. Papers that exceed the page limit will not be reviewed,
11 or in any other way considered for presentation at the conference.

12 The margins in 2022 are the same as those in 2007, which allow for ~15% more words in the paper
13 compared to earlier years.

14 Authors are required to use the NeurIPS L^AT_EX style files obtainable at the NeurIPS website as
15 indicated below. Please make sure you use the current files and not previous versions. Tweaking the
16 style files may be grounds for rejection.

17 1.2 Retrieval of style files

18 The style files for NeurIPS and other conference information are available on the World Wide Web at

19 <http://www.neurips.cc/>

20 The file `neurips_2022.pdf` contains these instructions and illustrates the various formatting re-
21 quirements your NeurIPS paper must satisfy.

22 The only supported style file for NeurIPS 2022 is `neurips_2022.sty`, rewritten for L^AT_EX 2_ε.
23 **Previous style files for L^AT_EX 2.09, Microsoft Word, and RTF are no longer supported!**

24 The L^AT_EX style file contains three optional arguments: `final`, which creates a camera-ready copy,
25 `preprint`, which creates a preprint for submission to, e.g., arXiv, and `nonatbib`, which will not
26 load the `natbib` package for you in case of package clash.

27 **Preprint option** If you wish to post a preprint of your work online, e.g., on arXiv, using the
28 NeurIPS style, please use the preprint option. This will create a nonanonymized version of your
29 work with the text “Preprint. Work in progress.” in the footer. This version may be distributed as
30 you see fit. Please **do not** use the final option, which should **only** be used for papers accepted to
31 NeurIPS.

32 At submission time, please omit the final and preprint options. This will anonymize your
33 submission and add line numbers to aid review. Please do *not* refer to these line numbers in your
34 paper as they will be removed during generation of camera-ready copies.

35 The file neurips_2022.tex may be used as a “shell” for writing your paper. All you have to do is
36 replace the author, title, abstract, and text of the paper with your own.

37 The formatting instructions contained in these style files are summarized in Sections 2, 3, and 4
38 below.

39 **2 General formatting instructions**

40 The text must be confined within a rectangle 5.5 inches (33 picas) wide and 9 inches (54 picas) long.
41 The left margin is 1.5 inch (9 picas). Use 10 point type with a vertical spacing (leading) of 11 points.
42 Times New Roman is the preferred typeface throughout, and will be selected for you by default.
43 Paragraphs are separated by 1/2 line space (5.5 points), with no indentation.

44 The paper title should be 17 point, initial caps/lower case, bold, centered between two horizontal
45 rules. The top rule should be 4 points thick and the bottom rule should be 1 point thick. Allow 1/4 inch
46 space above and below the title to rules. All pages should start at 1 inch (6 picas) from the top of the
47 page.

48 For the final version, authors’ names are set in boldface, and each name is centered above the
49 corresponding address. The lead author’s name is to be listed first (left-most), and the co-authors’
50 names (if different address) are set to follow. If there is only one co-author, list both author and
51 co-author side by side.

52 Please pay special attention to the instructions in Section 4 regarding figures, tables, acknowledgments,
53 and references.

54 **3 Headings: first level**

55 All headings should be lower case (except for first word and proper nouns), flush left, and bold.

56 First-level headings should be in 12-point type.

57 **3.1 Headings: second level**

58 Second-level headings should be in 10-point type.

59 **3.1.1 Headings: third level**

60 Third-level headings should be in 10-point type.

61 **Paragraphs** There is also a \paragraph command available, which sets the heading in bold, flush
62 left, and inline with the text, with the heading followed by 1 em of space.

63 **4 Citations, figures, tables, references**

64 These instructions apply to everyone.



Figure 1: Sample figure caption.

65 4.1 Citations within the text

66 The `natbib` package will be loaded for you by default. Citations may be author/year or numeric, as
 67 long as you maintain internal consistency. As to the format of the references themselves, any style is
 68 acceptable as long as it is used consistently.

69 The documentation for `natbib` may be found at

70 `http://mirrors.ctan.org/macros/latex/contrib/natbib/natnotes.pdf`

71 Of note is the command `\citet`, which produces citations appropriate for use in inline text. For
 72 example,

73 `\citet{hasselmo}` investigated\dots

74 produces

75 Hasselmo, et al. (1995) investigated...

76 If you wish to load the `natbib` package with options, you may add the following before loading the
 77 `neurips_2022` package:

78 `\PassOptionsToPackage{options}{natbib}`

79 If `natbib` clashes with another package you load, you can add the optional argument `nonatbib`
 80 when loading the style file:

81 `\usepackage[nonatbib]{neurips_2022}`

82 As submission is double blind, refer to your own published work in the third person. That is, use “In
 83 the previous work of Jones et al. [4],” not “In our previous work [4].” If you cite your other papers
 84 that are not widely available (e.g., a journal paper under review), use anonymous author names in the
 85 citation, e.g., an author of the form “A. Anonymous.”

86 4.2 Footnotes

87 Footnotes should be used sparingly. If you do require a footnote, indicate footnotes with a number¹
 88 in the text. Place the footnotes at the bottom of the page on which they appear. Precede the footnote
 89 with a horizontal rule of 2 inches (12 picas).

90 Note that footnotes are properly typeset *after* punctuation marks.²

91 4.3 Figures

92 All artwork must be neat, clean, and legible. Lines should be dark enough for purposes of reproduction.
 93 The figure number and caption always appear after the figure. Place one line space before the figure

¹Sample of the first footnote.

²As in this example.

Table 1: Sample table title

Part		
Name	Description	Size (μm)
Dendrite	Input terminal	~ 100
Axon	Output terminal	~ 10
Soma	Cell body	up to 10^6

caption and one line space after the figure. The figure caption should be lower case (except for first word and proper nouns); figures are numbered consecutively.

You may use color figures. However, it is best for the figure captions and the paper body to be legible if the paper is printed in either black/white or in color.

4.4 Tables

All tables must be centered, neat, clean and legible. The table number and title always appear before the table. See Table 1.

Place one line space before the table title, one line space after the table title, and one line space after the table. The table title must be lower case (except for first word and proper nouns); tables are numbered consecutively.

Note that publication-quality tables *do not contain vertical rules*. We strongly suggest the use of the booktabs package, which allows for typesetting high-quality, professional tables:

`https://www.ctan.org/pkg/booktabs`

This package was used to typeset Table 1.

5 Final instructions

Do not change any aspects of the formatting parameters in the style files. In particular, do not modify the width or length of the rectangle the text should fit into, and do not change font sizes (except perhaps in the **References** section; see below). Please note that pages should be numbered.

6 Preparing PDF files

Please prepare submission files with paper size “US Letter,” and not, for example, “A4.”

Fonts were the main cause of problems in the past years. Your PDF file must only contain Type 1 or Embedded TrueType fonts. Here are a few instructions to achieve this.

- You should directly generate PDF files using `pdflatex`.
- You can check which fonts a PDF files uses. In Acrobat Reader, select the menu Files>Document Properties>Fonts and select Show All Fonts. You can also use the program `pdf fonts` which comes with `xpdf` and is available out-of-the-box on most Linux machines.
- The IEEE has recommendations for generating PDF files whose fonts are also acceptable for NeurIPS. Please see <http://www.emfield.org/icuwb2010/downloads/IEEE-PDF-SpecV32.pdf>
- `xfig` “patterned” shapes are implemented with bitmap fonts. Use “solid” shapes instead.
- The `\bbold` package almost always uses bitmap fonts. You should use the equivalent AMS Fonts:

`\usepackage{amsfonts}`

followed by, e.g., `\mathbb{R}`, `\mathbb{N}`, or `\mathbb{C}` for \mathbb{R} , \mathbb{N} or \mathbb{C} . You can also use the following workaround for reals, natural and complex:

```

129      \newcommand{\RR}{\mathbb{R}} %real numbers
130      \newcommand{\Nat}{\mathbb{N}} %natural numbers
131      \newcommand{\CC}{\mathbb{C}} %complex numbers

```

132 Note that `amsfonts` is automatically loaded by the `amssymb` package.

133 If your file contains type 3 fonts or non embedded TrueType fonts, we will ask you to fix it.

134 6.1 Margins in L^AT_EX

135 Most of the margin problems come from figures positioned by hand using `\special` or other
 136 commands. We suggest using the command `\includegraphics` from the `graphicx` package.
 137 Always specify the figure width as a multiple of the line width as in the example below:

```

138      \usepackage[pdftex]{graphicx} ...
139      \includegraphics[width=0.8\linewidth]{myfile.pdf}

```

140 See Section 4.4 in the graphics bundle documentation ([http://mirrors.ctan.org/macros/](http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf)
 141 [latex/required/graphics/grfguide.pdf](http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf))

142 A number of width problems arise when L^AT_EX cannot properly hyphenate a line. Please give L^AT_EX
 143 hyphenation hints using the `\-` command when necessary.

144 References

145 References follow the acknowledgments. Use unnumbered first-level heading for the references. Any
 146 choice of citation style is acceptable as long as you are consistent. It is permissible to reduce the font
 147 size to `small` (9 point) when listing the references. Note that the Reference section does not count
 148 towards the page limit.

149 [1] Alexander, J.A. & Mozer, M.C. (1995) Template-based algorithms for connectionist rule extraction. In
 150 G. Tesauro, D.S. Touretzky and T.K. Leen (eds.), *Advances in Neural Information Processing Systems 7*, pp.
 151 609–616. Cambridge, MA: MIT Press.

152 [2] Bower, J.M. & Beeman, D. (1995) *The Book of GENESIS: Exploring Realistic Neural Models with the*
 153 *GENeral NEural Simulation System*. New York: TELOS/Springer–Verlag.

154 [3] Hasselmo, M.E., Schnell, E. & Barkai, E. (1995) Dynamics of learning and recall at excitatory recurrent
 155 synapses and cholinergic modulation in rat hippocampal region CA3. *Journal of Neuroscience* **15**(7):5249-5262.

156 Checklist

157 The checklist follows the references. Please read the checklist guidelines carefully for information on
 158 how to answer these questions. For each question, change the default **[TODO]** to **[Yes]**, **[No]**, or
 159 **[N/A]**. You are strongly encouraged to include a **justification to your answer**, either by referencing
 160 the appropriate section of your paper or providing a brief inline description. For example:

- 161 • Did you include the license to the code and datasets? **[Yes]** See Section 2.
- 162 • Did you include the license to the code and datasets? **[No]** The code and the data are
 163 proprietary.
- 164 • Did you include the license to the code and datasets? **[N/A]**

165 Please do not modify the questions and only use the provided macros for your answers. Note that the
 166 Checklist section does not count towards the page limit. In your paper, please delete this instructions
 167 block and only keep the Checklist section heading above along with the questions/answers below.

168 1. For all authors...

- 169 (a) Do the main claims made in the abstract and introduction accurately reflect the paper’s
 170 contributions and scope? **[TODO]**
- 171 (b) Did you describe the limitations of your work? **[TODO]**

- 172 (c) Did you discuss any potential negative societal impacts of your work? **[TODO]**
173 (d) Have you read the ethics review guidelines and ensured that your paper conforms to
174 them? **[TODO]**
- 175 2. If you are including theoretical results...
- 176 (a) Did you state the full set of assumptions of all theoretical results? **[TODO]**
177 (b) Did you include complete proofs of all theoretical results? **[TODO]**
- 178 3. If you ran experiments...
- 179 (a) Did you include the code, data, and instructions needed to reproduce the main experi-
180 mental results (either in the supplemental material or as a URL)? **[TODO]**
181 (b) Did you specify all the training details (e.g., data splits, hyperparameters, how they
182 were chosen)? **[TODO]**
183 (c) Did you report error bars (e.g., with respect to the random seed after running experi-
184 ments multiple times)? **[TODO]**
185 (d) Did you include the total amount of compute and the type of resources used (e.g., type
186 of GPUs, internal cluster, or cloud provider)? **[TODO]**
- 187 4. If you are using existing assets (e.g., code, data, models) or curating/releasing new assets...
- 188 (a) If your work uses existing assets, did you cite the creators? **[TODO]**
189 (b) Did you mention the license of the assets? **[TODO]**
190 (c) Did you include any new assets either in the supplemental material or as a URL?
191 **[TODO]**
192 (d) Did you discuss whether and how consent was obtained from people whose data you're
193 using/curating? **[TODO]**
194 (e) Did you discuss whether the data you are using/curating contains personally identifiable
195 information or offensive content? **[TODO]**
- 196 5. If you used crowdsourcing or conducted research with human subjects...
- 197 (a) Did you include the full text of instructions given to participants and screenshots, if
198 applicable? **[TODO]**
199 (b) Did you describe any potential participant risks, with links to Institutional Review
200 Board (IRB) approvals, if applicable? **[TODO]**
201 (c) Did you include the estimated hourly wage paid to participants and the total amount
202 spent on participant compensation? **[TODO]**

203 A Appendix

204 Optionally include extra information (complete proofs, additional experiments and plots) in the
205 appendix. This section will often be part of the supplemental material.