could be something you realize about your research project only months or years later, where two distant concepts are connected by an idea, or a method can be used in different settings uncovering something new.

Spend some time identifying the story of your talk: the main problem, its genesis, the relevant attempts, its resolution, and what is missing from its current status. Make the narrative clear during your talk: when giving a definition or presenting a lemma, frame it as part of the story by alluding to its role in it. Presenting something you tried but did not work is also a good example of constructing a narrative, and it is very instructive for your audience who may be wondering about similar directions.

A narrative helps the audience follow your talk and pay attention. Humor is also a great way to keep people engaged. Always remember: to deliver a great talk, you are as important as the words you will be saying. Use your body and tone of voice to be emphatic and passionate; be a pleasure to listen to.

...overlooks the motivations and the conclusions of your work

Why are you doing what you are doing? It may seem obvious to you, so obvious that you forget to mention it, but it is one of the most important parts of your talk. Start your talk with a presentation of the motivation for your work, not only your personal motivations but also those that could be inspiring for other people, both internal and external to your field of research.

Give some history of your problem by positioning it in the larger context of your field. Include a long introduction where you can touch on the take-away message of your talk. End your talk with clear conclusions: a brief summary of your talk is particularly helpful for those who may have gotten lost at a certain point.

...does not respect the audience

Nobody wants to feel stupid, so don't make them. Saying things like "it is trivial" or "it is obvious" is disrespectful towards your audience, who may not consider as trivial or obvious any of the things you mentioned, as they have not been thinking about them as much as you have.

It is important to show real openness to questions: ask often if anybody has any questions, and ask it repeatedly, with particular attention to the younger audience who may be frightened to ask. Another way to respect the audience (in the room or outside) is to always refer to the relevant work of other people.

...goes over time

If you don't want to give a terrible talk, don't go over time. There are various reasons why your talk can end up running over time, but it is important to find a way to avoid it, no matter the reason.

The most common reason is that the talk was not adequately prepared: you thought you were able to say more

than actually possible in the given amount of time. There is an easy fix to this: plan in advance with realistic expectations, and if uncertain, it is better to make it shorter to avoid looking stressed and anxious when trying to finish on time.

It is also possible that you are not able to finish the talk on time due to no fault of your own, for example because you received lots of questions from the audience. It is normally a good sign if the audience is engaged with your talk and asks many questions. If this happens, when the time is almost up and you realize you didn't have time to get to the points you wanted, summarize the most important take-home message and try to connect them to some of the previous questions. Be at peace with yourself: answering the questions of your audience is far more effective at explaining your work than finishing at all costs your pre-planned talk.

Elena Giorgi

Credits

Photo of Elena Giorgi is courtesy of Columbia University: April Renae.

Making Accessible Documents Using LaTeX

Eric Larson and Isabel Vogt

In order to disseminate mathematics as widely as possible, it is desirable to produce documents which are accessible to people with visual impairments. Indeed, there is a long history of successful blind mathematicians (including Euler late in life [J]), yet visual impairments can pose an obstacle to the written communication of mathematics. In the modern era, screen readers are a major way that blind individuals interact with written (electronic) documents. Unfortunately, without special effort, screens readers will typically garble equations, often beyond comprehensibility.

Eric Larson is an assistant professor at Brown University. His email address is elarson3@gmail.com.

Isabel Vogt is an assistant professor at Brown University. Her email address is ivogt.math@gmail.com.

Many guides exist for producing accessible documents in software such as Word—this is, in fact, a standard topic at many university-wide teacher-training workshops—but similar guides for mathematical content and LaTeX are difficult to find.

Since mathematics is often distributed as PDFs, we intended to write an article about producing accessible PDF documents in LaTeX. But this turns out to be incredibly difficult! The basic issue is that PDF documents produced in LaTeX do not, by default, contain extra information that *could* be used by a screen reader to make equations accessible (i.e., the LaTeX code, the pronunciation, or anything else besides the visual appearance). And since very few PDF documents *not* produced by LaTeX contain any equations, very little work on the screen reader side has been done for equations in PDF documents. Thus, even if you produce a PDF with this extra information, it is unlikely to be properly read by a screen reader. (And even if you manage to make it work in one situation, it might fail with a different operating system, different PDF viewer, or a different screen reader).

By contrast, it is relatively straightforward to make accessible HTML pages using LaTeX! The reason for this is two-fold:

1. A standard method for including equations on websites is mathjax, which works by embedding LaTeX code in the HTML file, so screen readers have been developed that take advantage of this.
2. There are web browsers that can be installed on any operating system and have their own functional screen readers specifically for HTML documents, for example the ChromeVox extension for Chrome. This eliminates the uncertainty of how an unknown general-purpose screen reader will react to your document.

We therefore begin, in Section 1, by giving a brief guide to producing accessible HTML pages from LaTeX source. We then discuss, in Section 2, some incremental steps you can take to make your PDFs more accessible for visually impaired students, like setting PDF metadata and choosing colorblind friendly color palettes. Finally, in Section 3, we discuss some of the more serious obstacles to creating truly accessible PDFs.

Note to the reader: We are not experts on this topic—just sympathetic users who are beginning to grapple with these issues ourselves. In addition, this article describes some steps that can be taken as of 2022... we hope that development on accessibility software continues at a rapid pace, making this article out of date in the near future!

1. Accessible HTML Documents

Currently, the most functional tool for creating HTML documents from LaTeX source is `tex4ht`, which can be easily used via the `make4ht` build system. On a UNIX-based system, to compile the document `mydocument.tex`, using

a configuration file `myconfigfile.cfg`, and using mathjax to display equations, one simply executes the command:

```
--$ make4ht -c myconfigfile.cfg mydocument.
tex mathjax
```

1.1. Communication inside and outside of math mode. The major issue with this approach—which also affects the visual appearance of the document—is that the processing of math mode is done by `mathjax`, while `tex4ht` itself processes the remainder of the document. Therefore communication failures between `tex4ht` and `mathjax` can arise. For most documents, this manifests in two ways:

- A macro defined in your preamble will be processed by `tex4ht`, and not be available inside of math mode, so the corresponding symbols will be replaced by error messages. (There are no issues with user-defined macros outside of math mode.)
- A `\label` on an equation in math mode will be processed by `mathjax`, and not be available for use by a corresponding `\eqref` outside of math mode, so the reference will render as (??).

A simple way to fix these issues is to first place your macros that will be used in math mode in a separate document `mymacros.tex`. So that your document will compile normally with TeX or pdfTeX, create a file called `mymacros.sty` containing the following code:

```
\ProvidesPackage{mymacros}
\input{mymacros.tex}
\endinput
```

and add the following line to your preamble:

```
\usepackage{mymacros}
```

Then, to make `mathjax` aware of your macros, place the following code in your configuration file (`myconfigfile.cfg` referenced above):

```
\Preamble{xhtml,mathjax}
\Configure{@BODY}{\IgnorePar
\HCode{\detokenize{\(}}
\special{t4ht*<mymacros.tex}
\HCode{\detokenize{\)}}
\par}
\begin{document}
\renewcommand\eqref[1]{\NoFonts\HChar{92}
eqref\{\detokenize{#1}\}\EndNoFonts}
\EndPreamble
```

This code (on the second-to-last line) also redefines the `\eqref` command so that it will properly link up with a `\label` defined inside of math mode.

1.2. Alternative text for figures in HTML. When using a figure to illustrate a mathematical argument, it is essential that a complete proof is written in words. This is not just

for visually impaired mathematicians—in private communication with the second author about a previous *Notices* article on the topic of mathematical writing, Jean-Pierre Serre jokingly said that he is sometimes frustrated that "a picture needs a thousand words" to be understood!

If you have any figures, you can also easily provide alternative text for screen readers to read in place of the image. In the most recent version of TeXLive, this can be done as follows:

```
\includegraphics[alt={my alternative text}]
{myimage}
```

2. Incremental Steps to Make PDF Documents More Accessible

2.1. Specifying document language and title in metadata. One simple step you can take is to specify the language of the document in the metadata (so a screen reader will be able to infer the pronounciation of words). It is also helpful to specify the title of the document, so that the screen reader can communicate easily to the user which document is being read. These two, as well as other metadata, can easily be set with the `hyperref` package as follows:

```
\usepackage{hyperref}
\hypersetup{
pdflang={en-US},
pdftitle={Making Accessible Documents Using
LaTeX},
pdfauthor={Eric Larson and Isabel Vogt},
pdfsubject={Mathematics},
pdfkeywords={Accessibility, LaTeX}
}
```

2.2. Colorblind friendly color palettes. If you choose to include color in your figure, you should try to make sure that color is not the *only* distinguishing attribute and be sure to select a palette that will appear distinct to colorblind mathematicians.

There are several excellent online guides aimed at scientists and mathematicians that contain sample palettes and tools to simulate what your own choice of palette would look like to a colorblind person [OI, N]. These guides are written in terms of RGB values of colors. To define a color `mycolor` in LaTeX from its RGB value, include the following in your preamble:

```
\usepackage{xcolor}
\definecolor{mycolor}{RGB}{myrvalue,
mygvalue,mybvalue}
```

For the reader who is already familiar with modern RGB color theory (red–green–blue primaries), we remark that a simple rule of thumb is that complementary colors in RGB color theory are usually easy to distinguish; the same is not true for complementary colors in traditional color theory (red–yellow–blue primaries). Moreover, different levels of

the blue component are most important (since the peak spectral sensitivities of the red and green cones are much closer). For example, the complementary color to green in modern color theory is *magenta*, which appears contrasting to nearly everyone; by contrast, green and *red* can be difficult for many colorblind individuals to distiguish.

2.3. Alternative text for figures in PDFs. You can specify alternative text to be read in place of a figure in a PDF using the `pdfcomment` package. In the preamble, you add:

```
\usepackage{pdfcomment}
```

You can then add alternative text to a figure using the `pdftooltip` command. For example, to draw this figure:

You would use the LaTeX code:

```
\pdftooltip{
\begin{tikzpicture}
\draw (0,0) -- (1,0) -- (1,1) -- (0, 1) --
(0, 0);
\end{tikzpicture}
}{Here is a square!}
```

3. Hard Obstacles to Accessible PDF Documents

3.1. Navigational data in PDFs. PDF documents can contain *tags*, a type of metadata that screen readers can use to infer the structure of the document. Several packages are under development to generate tagged PDFs using LaTeX; the most mature such package is `tagpdf` [F], but even that package is still experimental.

3.2. Where does what data about equations go in the PDF file? In order for a screen reader to verbalize equations, the PDF must contain some sort of structured data describing the equations or their verbalizations, perhaps via the `/Alt` or `/ActualText` fields. Unfortunately, there is no standard method of doing this; as a consequence, even if this data *is* embedded in a PDF, a screen reader is unlikely to read it properly.

So far, the only package under development to do this is `axessibility` [CCABKMAB], which embeds the LaTeX code for the equations in the `/ActualText` field. For two different setups (operating system + PDF viewer + screen reader), the authors were able to get the screen reader to read the equations... but only after hand-coding two different math dictionaries. In fact, the screen readers in question already had such dictionaries, but didn't recognize that the embedded LaTeX code was LaTeX code, because it is not (yet) standard to do this.

This illustrates the benefit of including such data, in a way as standardized as possible, *even if* screen readers will

not be able to use it: Until including this data becomes standard, nobody will write screen readers that take full advantage of it.

At the moment, of course, it is not clear what the best way of including such data is. We urge continued experimentation from TeX developers on this important project.

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Eric Larson

Isabel Vogt

Credits

Photos of Eric Larson and Isabel Vogt are courtesy of Lori Nascimento, Brown University.

How to Referee a (Math) Paper

Álvaro Lozano-Robledo

You can run but you can't hide. Eventually, an editor will find you and send you a referee request.

Now what?

If you do not have any previous experience on what to do next, this article is for you. I would also recommend Arend Bayer's "Writing, and reading, referee reports," and Brian Katz's "What makes a good PRIMUS review."

Why do we referee papers? Refereeing papers is a service that mathematicians provide to the community. Math papers can be long and complicated, and the refereeing process gives you the opportunity to have other research mathematicians proofread your paper carefully for correctness and for suggestions, before it is published. It is a hard job, it can take many, many hours, and it is unpaid. But we publish papers, and others referee our papers so we return the favor by refereeing other mathematicians' papers.

This article is not about the academic publication system, which deserves an entire different piece. Here I will limit myself to the task of refereeing a paper, and we will leave the editorial commentary on journals, predatory journals, "publish or perish," the tenure system and the need to publish, etc., for another piece.

When do mathematicians start refereeing? When you receive a request to referee a paper, there are several important factors to consider. But before we go into such factors, let us first address the question "when should you start taking on referee jobs?" Or, more generally, "who should be a referee?"

The most important qualification in order to be a referee is that you need to be an "expert" in the topic of the paper, which usually means that (i) you have enough background to follow and digest the arguments and techniques used in the paper under review, and (ii) you are familiar with the literature on the subject, enough to know how this result fits into the published record. If you are invited to referee, then the editor believes you are suffciently qualified to write a review of the paper, so now it is up to you to decide if you are a good fit for the job.

In light of all this, typically, mathematicians start refereeing after (a) they graduate with a PhD, and (b) they have published at least one paper. And the first paper you are asked to referee is probably related to your thesis, or to the topics of your first papers.

Álvaro Lozano-Robledo is a professor of mathematics at the University of Connecticut. His email address is `alvaro.lozano-robledo@uconn.edu`.