

## TeX in church: A typographical adventure

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### Abstract

This article presents the author's typographical adventure when producing material for masses and church-related activities.

### 1 Introduction

As a result of the Second Vatican Council, the Constitution on the Sacred Liturgy, promulgated by Pope Paul VI, in articles 28 and 30, states that, to promote active participation, the people should be encouraged to take part by means of acclamations, responses, psalmody, antiphons, and songs.

The author chose two topics, which are related to each other, to cover in this article, namely songsheets and song booklets, describing how TeX and friends are used in producing them. It is worth mentioning that there is yet plenty of room to cover in other areas of the church as well. Keep in mind that there is more to the subject than meets the eye.

### 2 Songsheets

Sheet music is a handwritten or printed form of musical notation that uses musical symbols to indicate the pitches, rhythms or chords of a song or instrumental musical piece. The term *score* is a common alternative and more generic term for sheet music. The author uses the term *songsheet* which typically refers to a document containing the lyrics of a song alongside its musical representation.

So, a liturgical songsheet is a particular instance of the broad, general sheet music in a religious context, right? In a manner of speaking, yes, but there is something very important to be addressed. In this case, text and melody cannot be dissociated as in secular music. Some scholars consider the text to be food for the mind and melody to be food for the heart. Hence, both contribute to the complete fulfillment of a person's relationship with God. So a liturgical songsheet is not a mere score, it offers a special bond between human and divine and thus its typesetting deserves dedication to the best of its typographer's heart and soul.

Since the 1960s, permission has been granted to celebrate the Mass in vernacular languages, as seen in the Constitution on the Sacred Liturgy from the Second Vatican Council. It has been emphasized that the language used should be known to the gathered people. In the author's parish, only a very reduced number of hymns still remain their original Latin form, such as *Tantum ergo*, *Panis angelicus*, *Salve*

*Regina* and *Anima Christi*. Several other hymns were composed or translated using the vernacular language, which is, in the author's case, Brazilian Portuguese.

However, in small communities, the liturgical music tradition was devotedly kept through verbal heritage. There were no songsheets available or musically knowledgeable people to interpret them. The author's community had to ensure that newer generations learn songs by constant repetition and usage as a means to perpetuate them. This was basically the continuity of hermeneutics for future generations employed since the 1960s to the present day.

The community had nothing documented. The author being a music hobbyist, he decided to take a step further and transcribe as many liturgical songs as he possibly could. Transcription, for those unfamiliar with the term, is the practice of notating a piece which was previously unnotated (that is, not recorded in musical notation) as written music. The author takes some freedom regarding the pitch and, of course, due to the nature of verbal heritage, some melodic inaccuracies might arise. Such inaccuracies are mitigated with access to reliable audio sources, but that is not always the case.

A typical transcription session starts with picking up the song. The author hears it a couple of times and then proceeds to notate the song in his music notebook. Sometimes, he is in front of a digital piano or holding an acoustic guitar to help him locate the notes in the staff more easily (Fig. 1). After a few tweaks, he plays and sings the complete melody for proofreading. The first part of the transcription session is complete.

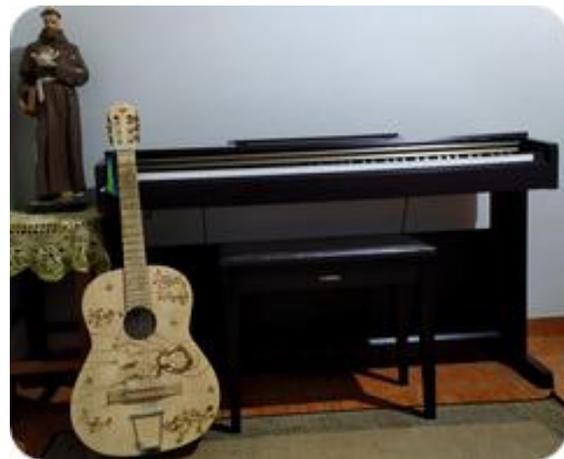


Figure 1: A typical transcription session environment.

Now the author needs to convert the songsheet sketched in his music notebook into a proper digital

version through computer music engraving, the art of drawing music notation at high quality for the purpose of mechanical reproduction. Although there are several  $\text{\TeX}$  packages for music engraving, his approach goes towards LilyPond.

LilyPond’s primary goal is to produce output comparable to professionally engraved scores instead of output that looks mechanical. Some of its features include:

- *Optical font scaling*: depending on the staff size, the design of the music font is slightly altered; this is a feature that the Computer Modern typeface is known for. As a result, note heads become more rounded, and staff lines become thicker.
- *Optical spacing*: stem directions are taken into account when spacing subsequent notes.
- *Special ledger line handling*: ledger lines are shortened when accidentals are nearby, thus enhancing readability.
- *Proportional spacing*: notes can be positioned in such a way that exactly reflects their duration. For example, with this setting, the space between consecutive quarter notes is four times greater than between consecutive sixteenth notes.

However, LilyPond solves only half of the task. The author also wants his liturgical songsheets to have text blocks with proper hyphenation, beautiful fonts, scripture verses and background images as well. This is a typical scenario where LilyPond’s syntax and commands become a nuisance.

Surely, the best solution to this task is neither LilyPond or  $\text{\TeX}$ , it is LilyPond *and*  $\text{\TeX}$ . One can benefit from the best of two worlds: LilyPond with professional music engraving and  $\text{\TeX}$  with its unparalleled text capabilities. So that is how the second part of the author’s transcription session goes: he converts the songsheet sketch from his notebook into the corresponding LilyPond format and sets up the score in a  $\text{\TeX}$  file.

When converting songsheets into the LilyPond format, the author typically uses a free software editor named Frescobaldi. This editor offers many templates to ease the writing of complex scores, as well as dictionary-based lyrics hyphenation and other engraving tweaks. The editor also features a score preview with point and click, which lets you find notes in the input by clicking on them. Observe that there is no need to handle paper size and margins in the LilyPond file, as such adjustments will be done later on, inside the  $\text{\TeX}$  file.

For the  $\text{\TeX}$  document, the author usually uses the standard `article` class with A4 paper and 12-

point size font options. For margins, the `geometry` package is used. If the text is too long, the author also includes the `multicol` package; otherwise, a simple `minipage` suffices. Finally, the author also loads the `background` and `graphicx` packages to provide watermark features and image support, respectively.

The LilyPond magic inside these  $\text{\TeX}$  documents happens thanks to a fantastic package named `lyluatex`, available out of the box from your typical  $\text{\TeX}$  Live and MiK $\text{\TeX}$  installations. As the name implies, this package can only be used with the Lua $\text{\LaTeX}$  engine. Some of its features include:

- LilyPond is used to compile music scores directly from within the Lua $\text{\LaTeX}$  engine run. Music scores are created in real time, so shell escape is required during the compilation.
- Intelligent caching of engraved scores, avoiding recompilation when possible.
- Matching of layout and appearance to perfectly fit the scores into the text document.
- Comprehensive configuration through global and per-score options.

Another important feature is the automatic font handling, which is disabled by default. As this approach uses Lua $\text{\TeX}$  engine, system fonts are available and `lyluatex` can handle them as well by passing such metrics to LilyPond.

It is worth mentioning that this workflow can be further automated by using a template tool like `\TeX`plate to generate the code boilerplate that handles both text and score, merging them into a coherent document structure.

So this is how a typical transcription session goes. There are always manual adjustments, usually minor, during proofreading, both in textual and music typography. It is an art, after all. The author will spare the reader details of such adjustments, but they do happen.

### 3 Booklets

A booklet is typically the name given to a very thin book with a small number of pages and sometimes a paper cover, giving information about something. In this case, a song booklet contains liturgical songs. Since almost no one in the author’s community can read sheet music, he decided to just put the song lyrics in the booklets. Granted, it is rather unusual to spot sheet music in today’s liturgical booklets, unless the reader is lucky enough to live near Rome and can attend the Holy Mass in Saint Peter’s Basilica. The Vatican website contains lots of mass booklets for download.

Finding a good layout for a song booklet is challenging. The author did several experiments

throughout the years with page size and margins, font shapes and colours, number of columns and other typographical aspects, in the hopes of finding the perfect balance between aesthetics and ergonomics. A good booklet project for a parish has to be useful without taking the person's focus from the liturgical celebrations.

The author found A5 to be the best paper size for his booklets, as it is easier for people to hold during masses and saves on printing resources. An A5 is equivalent to half of an A4 paper, so this approach gets the four pages instead of the usual two from a typical printing.

For these  $\text{\TeX}$  documents, the author again usually uses the standard `article` class with A5 paper and either an 11 or 12-point size font for options. He also enjoys fonts with round shapes, as a means to improve reading, so `bookman` is a good choice. For margins, the `geometry` package is used. The author found two columns to be a good balance between aesthetics and ergonomics, so the `multicol` package is also used. Since titles are added to songs, the fantastic `tcollection` package is loaded as well. And at last, but not least, the `graphicx` package is used to provide image support. A sample booklet is presented in Fig. 2.



Figure 2: A sample booklet.

The author rarely applies a cover, so all pages are available for content. The number of pages can be one, two or any multiple of four. For the final document, he uses the `pdfpages` package to help him distribute the A5 pages into a set of A4 pages. A simple Python script is used to organize the page order.

There is a reason for this specific page order: the author can produce song booklets without page cutting. He just needs to print the A4 papers, fold and group them. A very special stapler is used to prepare these booklets in a couple of minutes (Fig. 3). This workflow is surprisingly efficient.



Figure 3: A very special stapler.

These song booklets do require work and final adjustments, but the layout and content disposition are usually straightforward. However, there are songbooks that require a significant amount of rearrangement of elements as a means to achieve better aesthetics and ergonomics.

#### 4 Final remarks

This article presented the author's typographical adventures on producing songsheets and song booklets with  $\text{\TeX}$  and friends. It is worth mentioning that Gregorian chants can be typeset as well, using the `gregoriotex` package and a file containing the corresponding chant in the GABC format.

The author is interested in solutions for automating either all or part of the layout process, determining sizes and positions of visual elements. This field of research seems to lie at the crossroads between artificial intelligence and human-computer interaction. So far, the author is trying constraint-based methods. Preliminary results are promising, but there is still a long road to walk.

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