Modification of the document "MathTrip.tex"

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October 1, 2022

This text will give some details how to modify the document "Math-Trip.tex" to compose it with a new math font without disturbing the tuning already done for some others math fonts.

Since this document is very dense and uses almost all the area of the page, this is not a trivial task.

Contents

1 Introduction

The main purpose of the document "MathTrip.tex" is to show the result of using a particular math font with a lot of different mathematical formulae spread over all the different mathematical fields.

"MathTrip.tex" uses almost all the area of an A4 page and contain a lot of text. These both aspects render the composition quite difficult since very few space remains to the TeX engine to setup the text on the page.

It is almost impossible to let TeX doing all the composition of the page and some visual formating is mandatory. To add a little more complexity it would be nice if the document "MathTrip.tex" could be composed easily with multiple different fonts.

This last point is solved quite easily by specifying few parameters to the document to specify the new font to use. But, unfortunately, this is only the beginning of the difficulties since the composition with a new math font destroy generally totally the layout of the document.

The good news, however, is that it is not too difficult to tune. Almost all the critical dimentions for the layout of the page are specified by parameters. By tuning very few of these parameters the layout can be restored quite easily even if this is a time consuming process.

It is too complicated to typeset all the versions of "MathTrip.tex" with all the possible fonts in one pass or with one file. The best solution to have a document with all the possible fonts is to generate (with an external script) all the different PDF files and merge them in one file afterwards. To facilitate this procedure, it is possible by specifying some parameters to have a title page of the document without all the elements used in the first page.

The last surprising difficulty encountered was the incompatibility between XeLaTeX and LuaLaTeX. The both engines produce different typesetting (specially in a narrow space) and at few places the parameters have had to be tuned specifically for LuaLaTeX (since the default TeX engine used was XeLaTeX).

The composition of the "MathTrip.tex" has been extensively tested with the TeXlive 2022 distribution but not yet with any other TeX distributions.

2 Structure of "MathTrip.tex"

The use of the LaTeX package "nicematrix" has greatly helped to better the structure of each page of the document. Each page is a "nicematrix" tabular of 1 to 5 columns (but generally 3).

The main document is MathTrip.tex. This is the start point to modify something since it contains the inclusion of all the pages. The best way to work on a page is to comment (in the file MathTrip.tex) all the pages which should not be modified and to work on one page after the other.

The second most important file is SpecificDimention.sty. This document contains all the parametrized values used somewhere in the document. Since the document was done initially for the font GFS NeoHellenicMath, all the dimentions are defined (in the macro \DefaultDimentions) for this font.

Some other macros are defined for the other fonts (which are usable to typeset the document) but they contain only the deviations from the values used for the GFS NeoHellenic font.

Currently these other macros exist but are unusable since they are defined for an old version of "MathTrip.tex" and some of the parametrized dimentions have changed or do not exist any more. In the next version of "MathTrip.tex" these macros will be adapted to the use of the other common math fonts available on CTAN.

Generally, there is only few different values (for the other fonts) since most of the values used for the GFS NeoHellenic font could be used with them.

The meaning of the different parameters and where they are used in the document is explained by some comments around their declaration in the file `SpecificDimen tion.sty`.

3 Structure of a page

Each page is contained in a file with a name starting with the letter **T** followed by the number of the page. Associated to each page there is an other file with the same name as the page but with the suffix `Def` added.

This latter file is important since it contains the list of each file used on the page to write the mathematical text. To find in what file some mathematical text is located one should look in the file of the definitions for the corresponding page.

For instance the page 10 (probably the most complicated one) is in the file `T10.tex` and the corresponding definitions are located in the file `T10Def.tex`.

4 Structure of a mathematical (or text) block

Most of the mathematical text is composed of a block of text of some dimention. This block is placed somewhere in a page. The most important dimention is the width of the line usable to write the mathematical text.

To be able to place correctly on the page the block of math text, a specific structure should be used by defining a macro with a parameter (which is the width usable for the text).

This macro should produce a `\parbox` top aligned with the required width. Inside this parbox the mathematical text should be typeset.

4.1 Example: block for a quote used in a page

%This command provides the text of the quote used on page 5
%

```
%The command has one parameter :
%   1)The width allowed for the text
\newcommand\TFiveQuote[1]{%
    \parbox[t]{#1}{%
        If I have seen farther than others,
        it is because I have stood on the shoulders of giants.

        \begin{flushright}—
         Issac Newton
        \end{flushright}
    }
}
```

4.2 Example: modification of a page

If one want to modify a page, it can follow what should be done for the page 10 (the most complicated one).

The file `T10.tex` contains the code of the page (mainly an environment `NiceTabular`). The file `T10Def.tex` contains some specific macro used only on page 10. The files:

- `series2.tex`
- `EscherPage10.tex`
- `series4.tex`
- `stieltjes.tex`
- `cramers.tex`
- `quote5.tex`
- `fib1.tex`
- `magic.tex`

contain the mathematic used in the page.

Each mathematical part is typeset in a parbox top aligned and with a width given in parameter. In fact, each of these files provides a macro to draw the parbox. This macro can be used in a `\Block` command of the package "nicematrix".

It is easier to test the command typesetting math outside the environment `NiceTabular`. To do that, the easiest solution is to comment out all the environment `NiceTabular` and to call the macro provided in one of the files by adjusting correctly the width of the text. An example of code to do that is:

```
\deflength{\MathContentSize}{\ColOne−2\tabcolsep}%
\TTwoTree{\MathContentSize}
```

The macro `\AddBlankLines` used in the environment `NiceTabular` is used to add some lines to the nice array (or tabular). The command `\Block` generally does not add space and the missing lines should be added manually (otherwise a block of more than one line cannot be drawn).

5 Using a new font

This section has to be written...