ASSORTED LaTeX RECIPES

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Over the past three decades, mathematical typesetting software based upon TeX has had an enormous impact and become an indispensable tool for document preparation in mathematics and many related fields. With the passage of time it has become extremely versatile, particularly in further developments like LaTeX. However, like every widely used system of software, some users will want to do things that are not covered by the information and rules in standard references. Here are a few custom commands that I have found useful in writing my own papers. Admittedly each has some disadvantages, and some TeX users surely will prefer other solutions, but I am posting these constructions just in case someone else might also find them to be useful.

COMPOSITION CIRCLE. Mathematicians frequently use a raised circle "$^\circ$" to denote composition of functions.

$$g^{\circ} f(x) \;=\; g\big(\,f(x)\,\big)$$

The `\circle` commands in TeX give circles that are a bit too large for my taste, so I use the following `\tinycirc` command to print the circle displayed above:

```
\newcommand{\tinycirc}{{^{{_{\text{\rm o}}}}}}
```

One problem with this command is that it does not work well in subscripts or superscripts because it involes a subscript of a superscript. It is probably better to find an alternative for writing composition circles in subscripts of superscripts. The simple `\circle` command is one possibility; in subscript and superscript modes, it does not look quite as massive relative to other characters as it does in the normal mode.

DITTO SIGN. Sometimes it is also useful to include this, either in text tables or in mathematical formulas. One can obtain the text output —"— by means of the following text command:

```
\newcommand{\ditto}{---{\tt "}---}
```

A similar construction can be made in `mathmode`:

```
\newcommand{\mditto}{--\mathtt{"}--}
```

PALMER METHOD CAPITAL **A**. The standard cursive fonts have almost everything one would want, but there are situations where one wants the cursive capital A (a) that was part of the traditional Palmer method of cursive handwriting. When I have needed this, I have introduced the following commands. The first defines an oversized font for creating the character, and the second defines the shortcut command to use when inserting the character in mathematical expressions.

```
\font\palmer=cmti10 at 17.28 pt
\newcommand{\ah}{{\text{\palmer a}}}
```

MATRIX TRANSPOSITION OPERATOR. There are many different ways of writing the transposition operation on matrices, and each has disadvantages and/or ambiguities in some situations. One useful and unambiguous notation is the pre-superscript form, in which ${}^{\mathbf{T}}\!A$ denotes the transpose of A. This can be realized by a command of the form `{\tp A}`, where `\tp` is defined as follows:

```
\newcommand{\tp}{{} ∧ {mathbf{T}\!\!}
```

In some cases this symbol will be printed uncomfortably extremely close to the next character; if so, then one way of modifying things is to add a standard `thinspace` command of the form `\,` immediately following `\tp`. This is somewhat inefficient because one actually has one command which undoes the immediately preceding one, but it is simple and works in practice.

EXPONENTIATION ARROW. Sometimes it is useful to write exponentiated expressions like B^A so that A is not a superscript; this is particularly useful if A is a fairly complicated expression with subscripts and superscripts of its own. The obvious solution is to try something resembling the standard programming input `B**A`, but for purposes of clarity it seems desirable to replace the double asterisk by something which is still standard but more suggestive. An upward pointing arrow is an option that I particularly like, but the standard TEX arrow $\uparrow$ seemed a little distracting. My alternative has often been the symbol $\boldsymbol{\uparrow}$ defined by the following command:

```
\newcommand{\tothe}{\,\pmb{| ∧ {\!\!\!\wedge}}}
```

With this command, one can use $B\boldsymbol{\uparrow}A$ to write exponential expressions of the form B^A; this is particularly useful if A is complicated and contains subscripts or superscripts.