

Review of MathType v5

Jeff Waldock
Sheffield Hallam
University

j.waldock@shu.ac.uk

MathType is a powerful interactive tool for Windows and Macintosh that lets you create mathematical notation for word processing, Web pages, desktop publishing, presentations, and for TeX, LaTeX, and MathML documents. It is the full version of the Equation Editor bundled with MS Word that many readers will be familiar with. Users unfamiliar with the product might want to read Douglas Quinney's 1999 review of Mathtype 4, at <http://www.bham.ac.uk/ctimath/reviews/aug99/mathtype4.pdf> - this review will emphasise the new features of version 5. Users of the Equation Editor in Microsoft Word may be quite happy with the features it provides, and not aware of the additional benefits of Mathtype. The following table, adapted from that provided on the MathType website, summarises these:

Feature	Mathtype	Equation Editor
Number of math symbols and templates	500+	275
Creates good-looking math Web pages	Yes	No
Customisable equation toolbars	Yes	No
Colour with CMYK, RGB and spot colour support	Yes	No
Automatically change spacing, font size and style of equations in MS Word docs	Yes	No
Equation numbering and referencing in MS Word	Automatic	Manual
Customisable keyboard shortcuts	Yes	No
TeX, LaTeX, AMS-TeX, AMS-LaTeX output	Yes	No
MathML 1.0 & 2.0* output	Yes	No
Euclid math font set	Yes	No
Batch export of equations in MS Word doc to GIF, EPS & WMF files	Yes	No
Save equations as GIF files with or without anti-aliasing	Yes	No
Save equations as EPS files	Yes	No
Save font, style, and size settings in preference files	Yes	No
Add/delete rows & columns to a matrix*	Yes	No
Unlimited undo and redo*	Yes	No
Unicode-based character descriptions	Yes	No
Formatting ruler with tab stops	Yes	No
Fence alignment controls	Yes	No
Customisable function recognition (sin, cos, etc.)	Yes	No
Toolbar size and workspace controls	Yes	No
DLL interface for special tasks	Yes	No
Hierarchical view of equation structure	Yes	No
User manual (printed and PDF)	Yes	No
MathPage technology*	Yes	No
Mouse wheel support*	Yes	No

Supplier's contact details

Chartwell-Yorke
 (Mathematics Software
 and Books)
 114 High Street
 Belmont
 Bolton
 Lancashire, BL7 8AL

T: 01204 811001
 F: 01204 811008
info@chartwellyorke.com
www.chartwellyorke.com

Table 1: Mathtype 5 for Windows vs Equation Editor (* - new in version 5.0)

Although, as shown by this table, there are a number of new features introduced with version 5, the biggest change is in the way Mathtype saves equations for use on the web. MathType 5 includes the new MathPage

technology for converting Microsoft Word documents to Web pages, properly handling mathematical symbols as well as MathType and Equation Editor equations, viewable in any modern Windows, Macintosh, Unix and Linux browser. MathType installs the toolbar illustrated in Figure 1 into Microsoft Word 97 and later, giving you the ability to insert mathematical notation inline or centred, with chapter, section and equation numbers, to renumber equations on the fly, to insert equation references and to convert a Word document to a Web page, all while working in Word.



Figure 1

MathType also installs these commands into Word (see Figure 2):

- **Format Equations** — automatically change spacing, font sizes and styles of all equations in a document, without having to open equations individually.
- **Convert Equations** — convert all equations in a document to TeX, LaTeX and MathML. This command can also convert Equation Editor equations to MathType equations, so you never have to go back to using Equation Editor again.

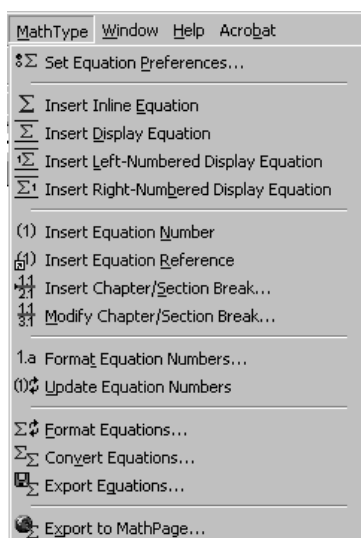


Figure 2

- **Export Equations** — automatically export all equations into a folder as EPS, GIF or WMF. If you are working with page layout or HTML-authoring software, this command will save you time by not having to open and save individual files.
- **Insert Numbers** — Insert chapter, section and equation numbers on either the right or left-hand side of your equations. If you later insert new equations into the middle of your document, the entire document is automatically renumbered.
- **Format Equation Numbers** — Customize equation numbering formats by choosing Roman or Arabic numerals, upper and lower case letters, and any type of enclosure and separator for styles applied

to chapter, section and equation numbers.

- **Insert Equation References** — Double-clicking on an equation reference moves the insertion point to the referenced equation. If you use MathType to convert the document to a Web page, the references automatically become hyperlinks.
- **Preference Files** — You can save MathType settings (spacing, font styles and sizes) in Preference files and use those Preference files any time you open MathType or a Word document.

Saving a Word Document with MathPage

“MathPage” is the name given by Design Science to the tool, introduced with version 5 of Mathtype, for exporting a Word document containing equations to an HTML web page. You can configure Mathtype to export equations and symbols either by means of MathML ‘islands’ or as EPS, GIF or WMF image files (MathML is an XML-based language adopted as a Recommendation by the World Wide Web Consortium, the main standards body governing the Web). Here are some of the advantages of MathPage technology:

- Pages are standard HTML with JavaScript and work in all modern browsers (Internet Explorer, Netscape, Mozilla), on all platforms (Windows, Mac, Linux, Unix).
- Unlike PDF, which requires a browser plug-in and takes over the browser, MathPage’s generated HTML can be combined with other Web technologies, such as movies, sound, graphics, database access, etc.
- No software to install on your Web server. Everything is done in the browser.
- Equations are properly aligned in text and do not interfere with line spacing.
- No plug-ins or maths fonts need to be installed on browsing user’s computer to display maths (unless you choose to generate MathML).
- Equation display is automatically optimised for the resolution of the user’s screen.
- Using the new MathZoom technology, clicking on the equation enlarges it, making it much easier to see small accents, superscripts, and subscripts. Click again and the equation goes back to its original size.
- MathPage generates high-resolution GIFs for each equation, so that all equations print with laser-printer quality instead of blocky, pixellated images.
- Other people browsing your Web pages can re-use your equations by dragging & dropping, or copy/

pasting them into their copy of MathType.

- Equation references are converted into hyperlinks that jump to the referenced equation when clicked.

Having used Mathtype (version 3, 4 and 5) over a number of years, I can testify that it does provide significant advantages over Equation Editor. One of the most striking of these is the actual editing environment. Whereas Equation Editor, in its Word incarnation, defaults to a tiny window, in which the content is hard to read, Mathtype displays in a large window, with clearly readable content (see Figure 3). I have also found the customisable toolbars useful for storing commonly used equation objects.

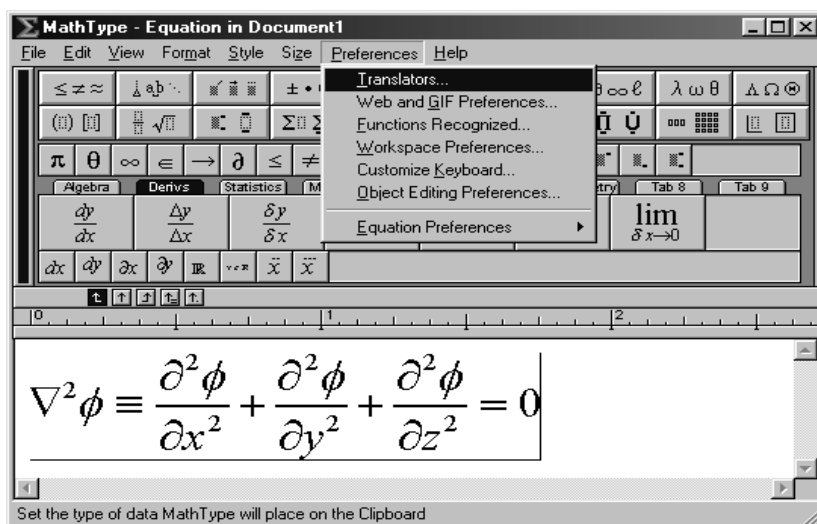


Figure 3

The other primary advantage, as the publicity material emphasises, is the new MathPage technology, which attempts to move the publishing of Mathematics on the web forward a step or two. So far, the basic strategy has been to save each equation as a gif image (with either a transparent or opaque background) and convert the text to HTML. A typical document, when saved as a web page, then has a main HTML file and a number of separate image files. Each equation is inserted at the appropriate place in the web page by means of an anchor tag, referring to the external gif file. The current release of Mathtype represents a step forward in this technique by utilising DHTML (Dynamic HTML – i.e. javascript) to optionally store an equation as two gif images, each a different size. When documents have been saved with this option enabled, users can click on an equation to see it in enlarged form. Clicking on it again reduces it back to its original size. For an example of this, look at <http://www.mathtype.com/features/samples/compare/mathpage.htm>.

The future, however, has to be MathML (Math Markup Language). As stated earlier, this differs from the previous approach in that it represents equations using textual ‘markup’ tags, rather like HTML (and rather like Tex and Postscript – perhaps the old ideas really are the best!). It is, therefore, XML based, and will eventually be supported directly by future versions of the main web browsers. A further advantage is that the documents will be smaller and will hence load faster (representing equations by bitmaps is NOT efficient!), the equations will be rendered using the full resolution of the screen or printer available and the whole document will be stored on disk as a single file. For now, however, unless using one of the only two browsers to natively support MathML (Mozilla and Amaya) users require one of a

variety of add-ins to view MathML. Design Science state on their website that they will soon be releasing MathPlayer, a MathML viewer for Internet Explorer (keep an eye on <http://www.dessci.com/webmath/mathplayer/> for more details). For more information about MathML, look at Design Science’s page at <http://www.mathtype.com/webmath/tech/mathml.stm>.

For exporting to a web page, Mathtype in Word provides a toolbar button for this purpose. This brings up a dialog box, allowing you to choose whether to use images or MathML (see the screenshot in Figure 4).

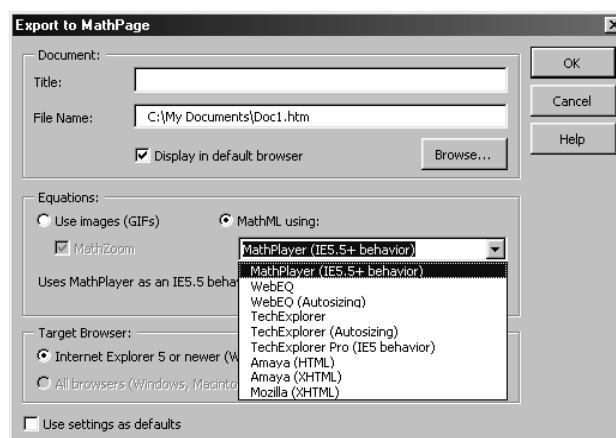


Figure 4

As you can see, the list of target systems supporting MathML is not great, so although the MathML generated by Mathtype is perfectly sound, the rest of the world has not yet reached the point where it can enjoy widespread

use. For the time being, it is probable that most people will remain with the 'images' option.

If you send documents containing MathType equations to your friends and associates, they will need to have MathType's fonts installed on their computers in order to properly view or print them. In order to make this as easy as possible, Design Science make font installers freely available on their website that take care of installing the entire MathType font set. Users who wish to share their documents, containing MathType Equations, around their institution, will therefore need to arrange for their computer services department to do this across their network. If the recipients of your document wish to amend your MathType expressions, but don't have the MathType program, they can download a free 30-day trial which thereafter becomes MathType Lite, which it is claimed allows both read and write access to existing MathType equations.

It is up to individuals to decide whether the benefits outweigh the disadvantages!

One other disadvantage I have encountered is when adding and viewing equation objects in Powerpoint it is necessary to enlarge the text and symbols 9-12 times. Unfortunately, not all parts of the equation scale at the same rate – subscripts and superscripts look unfeasibly large after this process and need individual editing. This becomes excessively laborious. Although you can

specify the default size of, say, superscripts, you then have to reset this when going back to 'normal' sized equations. Why can't elements scale proportionately?

Conclusion

For an individual, the upgrade from Equation Editor to MathType is significant. The usability is considerably enhanced, thanks to the layout of the editor window and the customisable toolbars. Unless you plan to export large numbers of equations and documents to the web, however, it is unlikely that this advantage will justify the cost of purchasing the upgrade from equation editor (academic prices currently £59 + vat from Chartwell-Yorke, or £35 +vat for upgrades), particularly given the difficulties in sharing documents containing MathType equations with other users who do not have the software. If however you do intend to use the export to HTML capability of MathType, then the situation is altogether different! The quality, usability and ease-of-use of the new features offered by version 5 of MathType make the upgrade good value, both for users moving from Equation Editor and from version 4 of MathType. If you intend to use MathML rather than images for your equations, however, it might be prudent to wait a bit longer, until it is natively supported by web browsers.

Nevertheless, since the download is free, and can still be used after the 30-day trial period, why not get a copy and see for yourself?

Supplier comments from Philip Yorke, Chartwell-Yorke

We'd like to thank Jeff warmly for writing the review.... Most *MSOR Connections* readers will appreciate that the many features and qualitative improvements offered by MathType 5 will save time and communicate more professionally in print or on the web. Documents including MathType can be read by anyone with or without the full program. The fonts are available for free, as is a 30-day trial and MathType Lite thereafter. Every reader should have it. The productivity benefits far outweigh the low (or non-existent) cost. A single user academic licence is £59 + vat, whilst upgrades from version 4 are just £35 + vat. Low cost departmental licences including home use for all staff and students are also available - see <http://www.chartwellyorke.com/mathtype.html>