Converting *Mathematica* notebooks to Microsoft Word format.

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1. Introduction

So you've figured out how to prepare really nice documents using *Mathematica* but you find yourself collaborating with someone else who only ever uses Microsoft Word. Your collaborators want to be able to edit the document you have written so you need to provide them with something that they can both read and edit. Do you forget all about using *Mathematica* for document creation and wave the white flag or do you persevere and look for a method of converting your *Mathematica* notebook into the ubiquitous Word format? If you've faced this problem perhaps this notebook can be of some help.

This notebook is by no means a definitive example of how to convert a *Mathematica* notebook to Microsoft Word but rather contains a few things that I have found useful. Since the question of how best to convert notebooks to Word is occasionally asked in MathGroup I thought I would write this brief example.

The conversion approach I've taken is rather indirect but in my experience provides the best outcome. In brief it involves first converting the notebook to T*E*X using the File▶Save As Special... menu command. The resulting T*E*X document is then converted to rich text format (RTF) using the freeware application latex2rtf. The resulting RTF file can then be opened in Word and saved as a Word document.

Now the thing is that if you only have plain text in your notebook then you can simply cut and paste into word but the trouble and problems arise if you have inline equations and figures. Providing that you can save your notebook into a T*E*X file, latex2rtf will convert the entire T*E*X file with equations and figures into an RTF file. Better still the equations will be converted into "clickable" fields that can be edited using the inbuilt equation editor in Word.

To get started you'll need to download a copy of latex2rtf. It is available at http://latex2rtf.sourceforge.net/. Versions are available for UNIX and windows.

The examples contained in this folder were generated using version 1.9.16a for UNIX. I compiled it on an Apple G4 powermac running OS X 10.3.9. Mac users can also obtain latex2rtf via Fink. Thats it. The only other things you will need to test this is a notebook, such as this one, containing equations and figures, preferably also some means of editing and checking the T*E*X document that you save, this is not vital but can be useful, and a copy of MS Word.

2. Step One

In this section we'll generate some equation cells and figures and also some inline equations like this $x^2 + 2y = z$ and this $\int_0^b e^{-x} x^3 y dx$. I've deliberately made some numbered equation cells that contain multi-line equations. These require some small editing of the T*E*X file before they can be successfully converted by latex2rtf. I've found that for the T*E*X conversion to work best you need to name you numbered equation cells "NumberedEquation." If you were to open the style sheet and change the name, without changing the actual styling the T*E*X conversion looks a bit messy. You can try this out for yourself. This is presumably because the converter has been programmed to recognise only cells called "NumberedEquation" as numbered equations. If you know T*E*X fixing this in the output file would presumably be trivial. Unfortunately I do not know T*E*X. The remaining part of this section contains some equations, a plot and some filler text.

$$x^2 + 2y = z \tag{1}$$

$$\int_0^b e^{-x} x^3 y dx \tag{2}$$

$$\frac{d\Gamma_A}{dt} = -k_{\mathrm{f}1}\Gamma_A + k_{\mathrm{b}1}\Gamma_B + k_2\Gamma_{C.S} \tag{3}$$

(4)

$$\frac{d\Gamma_B}{dt} = -\left(k_{\mathrm{f}2} + k_{\mathrm{b}1}\right)\Gamma_B + k_{\mathrm{b}2}\Gamma_C + k_{\mathrm{f}1}\Gamma_A \tag{5}$$

(6)

$$\frac{d\Gamma_C}{dt} = k_{\mathrm{f}2}\Gamma_B - \left(k_{+1}c_S(0,t) + k_{\mathrm{b}2}\right)\Gamma_C + k_{-1}\Gamma_{C.S} \tag{7}$$

(8)

$$\frac{d\Gamma_{C.S}}{dt} = k_{+1}c_S(0,t)\Gamma_C - \left(k_{-1} + k_2\right)\Gamma_{C.S} \tag{9}$$

(10)

$$-D\left(\frac{\partial c_S(x,t)}{\partial x}\right)_{x=0} = -k_{+1}c_S(0,t)\Gamma_C + k_{-1}\Gamma_{C.S} \tag{11}$$

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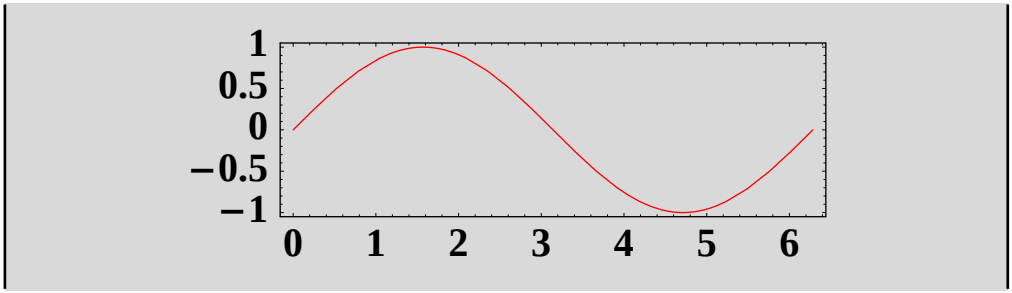
Plot[Sin[x], {x, 0, 2π}]



−Graphics−

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$$k_{\mathrm{b1}} = k_{\mathrm{s1}} \xi_1^{1-\alpha} \tag{12}$$

$$\tag{13}$$

$$k_{\mathrm{f1}} = k_{\mathrm{s1}} \xi_1^{-\alpha} \tag{14}$$

$$\tag{15}$$

$$k_{\mathrm{b2}} = k_{\mathrm{s2}} \xi_2^{1-\alpha} \tag{16}$$

$$\tag{17}$$

$$k_{\mathrm{f2}} = k_{\mathrm{s2}} \xi_2^{-\alpha} \tag{18}$$

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$$\Gamma_A + \Gamma_B + \Gamma_C = \Gamma_T \tag{19}$$

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$$x_A + x_B + x_C = 1 \tag{20}$$

3. Step two

Next step is to save this notebook as T*E*X. Go to the menu and select File▶Save As Special... I have saved this notebook as test.tex. The figures in your notebook will be saved as separate EPS files.

4. Step three

Next step you can either edit the T*E*X file. On the Mac I have used TeXShop to edit the T*E*X file but there are others around such as iTeXMac and texmaker. If you do not have any of these programs use a text editor.
On the Mac you need to change your typesetting method from "pdftex" to "T*E*X and Ghostscript." I've found this change necessary in order to get the EPS files included correctly ...however I might be showing my ignorance of L*A*T*E*X here. Perhaps someone can offer some better instructions here. Typeset the document and check that everything is okay.

You will notice that the linebreaks in eqns (3) and (4) have not been converted correctly. At the end of the day we are not seeking a perfect L*A*T*E*X document but some changes need to be made in order to get the conversion to RTF to work correctly. For example if we do nothing now we get the test.rtf file that can be found in this folder.

If you open the T*E*X file in either TeXShop or similar program or a text editor you will notice the equations are wrapped by begin{equation} and end{equation}. For example eqn (4) in full is:

```
 \begin{equation}k_{\text{b1}}=k_{\text{s1}}\xi _1^{1-\alpha }\\
\\
k_{\text{f1}}=k_{\text{s1}}\xi _1^{-\alpha }\\
\\
k_{\text{b2}}=k_{\text{s2}}\xi _2^{1-\alpha }\\
\\
k_{\text{f2}}=k_{\text{s2}}\xi _2^{-\alpha }\end{equation}
```

Our objective is not to make the perfect L*A*T*E*X document, though any input from readers would be welcome, it is to modify the T*E*X file so that all equations are converted to editable fields in the RTF file. As it stands an error

is produced when the conversion of eqns (3) and (4) is attempted; see the file test.rtf. To fix this you need to go to all the multi-line equations cells in your notebook and change {equation} to {eqnarray}. Save the file as test1.tex.

```
    \begin{eqnarray}k_{\text{b1}}=k_{\text{s1}}\xi _1^{1-\alpha }\\
\\
k_{\text{f1}}=k_{\text{s1}}\xi _1^{-\alpha }\\
\\
k_{\text{b2}}=k_{\text{s2}}\xi _2^{1-\alpha }\\
\\
k_{\text{f2}}=k_{\text{s2}}\xi _2^{-\alpha }\end{eqnarray}
```

5. Step four

In UNIX open a terminal and type:

latex2rtf test1.tex

There are various switches that are described in the latex2rtf documentation but I have found that the default settings work fine. Quite a few messages with be generated but an RTF file will be created. Open the RTF file, tests1.rtf, in Word. To ensure correct equation formatting double click on each the equations. This will open them in the equation editor window. Close the equation editor window without making and changes. Thats it. Everything should now look as nice as it possible can in Word.