MACROS FOR NUMBERING EQUATIONS AND FIGURES
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ABSTRACT

This document presents three macros for numbering and cross-referencing equations and figures in Word for Windows 6.0.

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1 INTRODUCTION

Although Microsoft Word for Windows contains all the basic tools needed to completely automate the numbering and cross-referencing of equations and figures, it lacks a decent set of macros to pull everything together and make it easy. I wrote three macros to do just that. The topic of numbering equations comes up about every two weeks on the Internet. Each time, I post my macros. So far, although others have discussed similar solutions, I have not seen one that is substantially better.

I'll assume you already know how to install and run a macro, and how to use fields and hidden text. If you don't, you won't find instructions here.

Before discussing the macros, let me make a comment. If you use equations frequently, consider purchasing a copy of MathType by Design Science, Inc. MathType is the commercial equation editor upon which Microsoft Equation Editor is based. Although my macros are original, MathType includes a very similar macro. MathType also includes other features that make it well worth the purchase price. (Note: I have no affiliation with or financial interest in MathType. Please do not ask me to review MathType. You can contact Design Science at mtsales@mathtype.com or http://www.mathtype.com/mathtype/)

Suggestions from lwebber@mr.net (Leigh Webber) helped me write the macros.

2 THE MACROS

2.1 WHAT DO THE MACROS DO?

I have written three macros to automate the numbering and cross-referencing of equations and figures in Winword 6. The first, InsertEqnNum, inserts an equation number at the cursor. The second, InsertEqnPara, inserts an equation paragraph with an equation number at the right margin. The third, InsertFigNum, inserts a figure number and caption at the cursor.

(Note: InsertEqnNum can also be used as a general item numbering tool. You can get a table of item numbers using the field {TOC /c equation}.)

The equation and figure numbers include optional section numbers (chapter numbers) and adjustable formatting. You can get section numbers either from automatic paragraph numbering (referenced to Heading 1) or from {Seq Chapter} fields. You can customize the text that preceeds the numbers, e.g., "[" for equation numbers or "Figure " for figures. You can customize the text that separates the section number from the equation number, e.g., a dot or hyphen. You can also customize the text that follows the numbers, e.g., "]" for equation numbers or ": " for figures. All such setup information is stored permanently with the document using SetDocumentVar.

For cross-referencing, you can either give the equation /figure number a name or you can use InsertCrossReference.

2.2 EQUATION NUMBERING

To use InsEqnNum, just put the cursor where you want the equation number to appear and run the macro. You will be presented with a self-explanatory dialog box.

InsertEqnNum takes advantage of the special way that InsertCrossReference treats the last character in the paragraph. If the last character is a field, and you use InsertCrossReference to refer to "Caption Text Only", the text in the field will appear in the cross-reference. The trick is to include the *entire* equation number in the field, complete with parentheses and everything, so that it all gets referenced. If you just put in a Seq field surrounded by parentheses, only the trailing parenthesis will be referenced by "Caption Text Only".

Two methods can be used to insert equation numbers. For either method, you can cross-reference the equation number in the text using InsertCrossReference. The regular method uses a Quote field. Another method can be used for an equation that you know you will be cross-referencing frequently in the text; you can give the equation a name and then cross- reference it using a Ref field.

Whenever you want to cross-reference an equation number in the text, do this:
1. pick the Insert menu
2. choose Cross-Reference to open the InsertCrossReference dialog box
3. under "Reference Type", choose "Equation"
4. under "Insert Reference To", choose "Only Caption Text"
5. pick the equation number out of the list of equation numbers
6. pick "Close" to close the dialog box

To cross-reference a **named** equation number, press Ctl-F9 to create a blank field and then type in the name of the equation and press F9 to update the field.

InsertEqnPara assumes that you have defined a paragraph style called "Equation" that has one tab stop where you want the equation to appear and a second tab stop where you want the equation number to appear. I use a

centered tab at the center of the page for the equation and a right-justified tab at the right margin for the equation number.

$$M\ddot{q} + Kq = 0 \tag{1}$$

Here I refer to Eq. (1), which is a **really** neat equation. Another option available is to give an equation number a name; an example is shown in Eq. (2) below.

$$M\ddot{q} + Kq = 0 \tag{2}$$

You can cross-reference a named equation using either InsertCrossReference, such as Eq. Error: Reference source not found, or a Ref field such as Eq. (2).

2.3 FIGURES AND FIGURE CAPTIONS

Winword 6 includes an "Insert Caption" command, but in some instances it isn't very useful. If you want to use a Table of Figures, each figure will probably need two different captions: the multi-sentence, descriptive caption that appears below the figure is usually too long for the Table of Figures. Of course, you'll need to cross-reference the figure in the text. Sometimes you'll want to name the figure for easier cross-referencing, and sometimes you won't. The macro InsertFigNum accomplishes all this rather neatly.

To use InsertFigNum, just put the cursor where you want the figure number and caption to appear and then run the macro. You will be presented with a self-explanatory dialog box. For an example, see Figure 3.1 below; be sure to view the caption with Field Codes and Hidden Text turned on.

Figure 3.1: AKC Rheba Mae Razzbutin, the author's dog. Rheba is a pure-bred Boxer; she weighs 60 pounds and has a vertical leap of over six feet. (Sorry, I couldn't resist!) To see the shortened caption that will appear in the Table of Figures, view this paragraph with Field Codes and Hidden Text turned off.

As with the equations, you can cross-reference figures using either InsertCrossReference (like Figure 3.1) or a Ref field (like Figure 3.1). To cross-reference a figure using InsertCrossReference, do this:
   1. pick the Insert menu

2. choose Cross-Reference to open the InsertCrossReference dialog box
3. under "Reference Type", choose "Figure"
4. under "Insert Reference To", choose "Only Label and Number"
5. pick the figure number out of the list of figure numbers
6. pick "Close" to close the dialog box

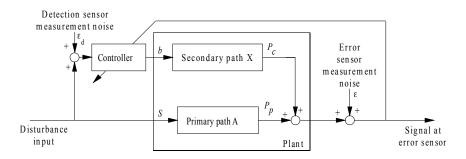Below is yet another fine figure, which I have called Figure 3.1.

Figure 3.11: This is another long caption. It is a really, REALLY long caption.

2.4 INSERTING A TABLE OF FIGURES

You can easily insert a Table of Figures. Insert a field containing the string "TOC /f f" and you will get a result something like this:

TABLE OF FIGURES

3 CONCLUSIONS

Unfortunately, I don't have an automatic way to reset the equation numbers at the beginning of each chapter. I puzzled and puzzled until my puzzler was sore, but no luck. I found some possible solutions, but they were far too complicated to be a stable long-term solution. I guess we'll have to keep manually inserting {seq Equation \ r} fields at the beginning of each chapter.

Please forward suggestions or improvements to the author (ruckman@oasys.dt.navy.mil).

Enjoy!

Revision history:

Version   Date
1.0   3/9/95   Added InsertFigNum
0.9   8/24/94 Initial release, reposted periodically thru 3/1/95.