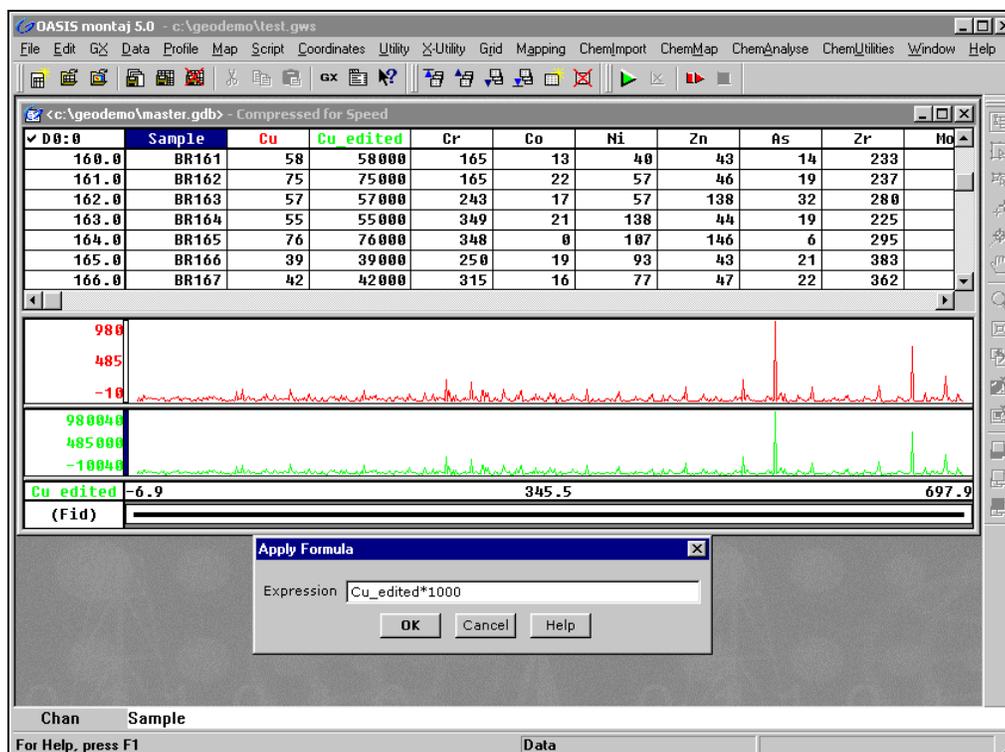


Mathematical Expressions

How to Apply Geochemistry Mathematical Expressions in Oasis montaj

TECHNICAL NOTE



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How to Apply Mathematical Expressions in Oasis montaj

One of the most frequently asked questions we receive is, "How do I apply a mathematical expression in **Oasis montaj**?" This technical note will provide you with an overview on constructing, applying, and saving math expressions in **Oasis montaj**.

Before you begin...

You can create new channels in your database to store the results of math expressions, or any other processing operations. We recommend that you create a new channel for storing any changes you make to the original imported data.

Create a New Channel:

1. Move to the top of the next empty column and highlight the channel header cell using a single click of your left mouse button.
2. Right click, and select *New* from the popup menu. The system displays the *Create Channel* dialog box.
3. Type in the *Name* of the new channel (**Cu_edited**), and specify the *Class* as (**ASSAY**).
4. Click the **[OK]** button to accept the rest of the default values. The system creates a new channel in the database named **Cu_edited** and fills this channel with dummy values.

Copy Data from an Existing Channel:

1. On the *ChemUtility* menu (or *Utility* menu), click *Copy channel*. The system displays the *Copy a channel* dialog box.
2. Select **Cu** from the dropdown list for the *Copy FROM* box and **Cu_edited** from the dropdown list for the *TO* box. Click the **[OK]** button.
3. The system copies values from the **Cu** channel into the newly created **Cu_edited** channel.

Defining and Applying Mathematical Expressions

The **Oasis montaj** system enables you to define and apply mathematical expressions in three ways:

- Interactively in the Spreadsheet window
- Using the *Apply Formula* dialog (MATH GX)
- From a file (MATHFILE GX)

Apply a Mathematical Expression Interactively in the Spreadsheet Window:

1. Select the channel you want to change by left clicking three times on the **Cu_edited** channel so that the channel and header are highlighted.
2. Physically press the [=] sign on the keyboard. This changes the edit line of the screen to "**Formula=**" (bottom left hand corner of the screen).
3. In the *Formula=* entry field, type an expression where the variables are existing channel names (for example, **Cu_edited*1000**).
4. Press the **[Enter]** key. The result of the expression is placed in the currently selected cells.

Apply a Mathematical Expression using the Apply Formula dialog (MATH GX):

1. On the *ChemUtility* menu, click *Expression* (or on the *X-Utility* menu click, *Expressions|Expression*). The *Apply Formula* dialog is displayed.
2. In the *Expression* box, type an expression where the variables are existing channel names (for example, **Cu_edited/1000**).
3. Press the **[OK]** button. The result of the expression is placed in the currently specified cells.

Create and Save a Mathematical Expression file:

A math expression file can be created in your default text editor program (eg. Notepad). A math expression file may contain many lines of expressions and blank or comment lines. Comment lines are indicated by a '/' character as the first character of the line. For example, following is an expression file for squaring the sum of two channels:

```
/Channel C will be the square of the sum of channel A and channel B:  
@sum = A + B; C = @sum * @sum;
```

Note: Each expression must end with a semi-colon (;) character. You can place more than one expression on a line as long as each expression ends with a semi-colon.

Save your math expression file with an **(.EXP)** extension. **Oasis montaj** will display files with the **(.EXP)** extension in the *Apply Formula from a file* dialog.

Apply a Mathematical Expression from a file (MATHFILE GX):

1. On the *ChemUtility* menu, click *Expression file* (or on the *X-Utility* menu, click *Expressions|Expression file*). The *Apply Formula from a file* dialog is displayed.
2. Using the **[Browse]** button for the *Math expression file (.EXP)* box, locate the file containing the math expression you want to apply.
3. Select the file, and then click the **[OK]** button to apply the math expression the to specified cells.

Note: For more information on Math Expression files, click the **[Help]** button on the *Apply Formula from a file* dialog.

Composing math expressions

The following list provides examples of simple math expressions. For details on more complex math functions please see **Math Expressions** in the **Oasis montaj Online Help System**.

Multiplying or dividing values (changing ppm to ppb or ppb to ppm)

Cu_edited*1000

Cu_edited/1000

Determining Ratio values

Cu_edited/Pb

Replacing outliers with dummy

Cu_edited>200?dummy:Cu_edited

i.e if Cu_edited is greater than 200, then put dummy, else put Cu_edited

$(Cu_edited > 100 \&\& Cu_edited < 200) ? (new = 1) : (new = DUMMY)$

i.e. if Cu_edited greater than 100 and less than 200, then put new = 1, else put new = dummy

Window data channel

Window(Cu_edited,0,100)

i.e. all values < 0 and >100 will = dummy

Log transformations

log(Cu_edited)

i.e. Natural log

Log10(Cu_edited)

i.e. Log base10

Calculating Distance between each point and the origin of the local coordinate system

$\sqrt{X^2 + Y^2}$

i.e. expression assumes that "X" and "Y" are coordinate channel names.

Summary of Operators and Precedence

By definition, operators are symbols used to compare left hand and right hand variables or operands in expressions. In **Oasis montaj**, there is a hierarchy or precedence in which operators are used in expressions.

In the following table, each operator is shown in decreasing order of precedence. For some operators, there is also a left-to-right order for evaluating them.

Precedence	Operator	Definition
1	()	Parentheses
2	F()	Function
3	!	Logical NOT operator
4	**	Exponent
5	/,*,% evaluated left to right	Division, multiplication, modular division
6	+,- evaluated left to right	Plus, minus
7	<,<=,>,>= evaluated left to right	Greater than, greater than or equal to, less than, less than or equal to
8	==,!= evaluated left to right	Equal to, not equal to
9	&&	Logical AND operator
10		Logical OR operator
11	?:	True/ false operator used with the statement preceding it. ? represents the value if true, : represent the value if false.