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What's ExCalc?

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ExCalc is a handy, highly configurable math expression evaluator. It handles math expressions like $2.35 * 3.78 / \{5.883 * \text{TAN}(36.2) - 1\}$ or $\text{LOG}_{10}(3.312\text{E}+03 / 5) + \text{SQR}\{(1.3 - 5.5)^2 + (8.1 - 2.7)^2\}$ including lots of derived math functions for engineering. Any complicated math expressions can be instantaneously evaluated.

ExCalc also enables you to limitlessly add custom functions which contains up to three variables like $\{X + \text{sqr}(X^2 - 4 * Y * Z)\} / (2 * Y)$. You just enter values for X, Y and Z, and you will immediately get the answer. For example $\{X + \text{sqr}(X^2 - 4 * Y * Z)\} / (2 * Y) : 8.753 : 1.85 : 1.577$ gives 4.543745686, which means $\{X + \text{sqr}(X^2 - 4 * Y * Z)\} / (2 * Y) = 4.543745686$ for $X = 8.753$, $Y = 1.85$ and $Z = 1.577$.

Further, you can use the abbreviations for some special values such as the ratio of the circumference of a circle to its diameter (pi) and the conversion factors to the metric units (pound, pound-force, gallon [U.S.], gallon [U.K.], Btu[IT], Btu[th], calorie [IT], calorie [th], mile, yard, foot, inch, knot, horsepower, etc.): For example the expression $\text{\$lb/\$in}^3$ gives 27679.9047102031, which means 1 lb/in³ is 27679.9047102031 kg/m³ in metric system with an error less than 1.0E-12 %.

For various purposes of usage, ExCalc allows you to easily change the configuration settings such as number of digits, number format, trigonometric unit, font properties and colors.

Trademark acknowledgments: Microsoft, Windows and Visual Basic are registered trademarks of Microsoft Corporation.

Requirements

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Operating System

For Windows 98/95 only.

Fonts

MS Sans Serif and Arial must be at lease installed.

Executing Calculations

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Ordinary Math Expressions

Enter a math expression in the Expression Input box on the left, and click the Execute button (=) or press the **Enter** key. A calculation result is given in the Calculation Result box on the right.

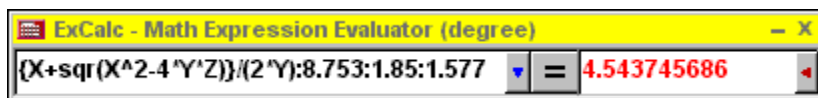
Note that the maximum absolute value which ExCalc supports is **within the range from 4.94E-324 to 1.79E+308**. Calculation results must be also within this scope.

Click the Show History button (▼) to show the evaluation history and to recall one of up to twelve (12) expressions previously evaluated.

Click the Replace button (◀) on the right to send the calculation result to the Expression Input box, removing meaningless zeros after decimal separator. The calculation result is replaced with a part of the characters you select in the Expression Input box, or it is inserted at the cursor position if you select no part of the input characters.

Custom Functions

Enter an equation expression like $\{X+\text{sqr}(X^2-4*Y*Z)\}/(2*Y):8.753:1.85:1.577$, where X, Y and Z represent variables (case-insensitive), with a colon (:) followed by each variable value from X to Z in order (X = 8.753, Y = 1.85 and Z = 1.577 for instance) at the right end of the expression. Click the Execute button (=) or press the **Enter** key. You will immediately get the answer 4.543745686 in the Calculation Result box as shown below:



Of course you may use just X and Y, or just X as variables such as $\{X+\text{sqr}(X^2-4*Y*1.577)\}/(2*Y):8.753:1.85$, where X = 8.753 and Y = 1.85 (X must always come first and Y follows), or $\{X+(X^2-4*1.85*15.7)\}/(2*1.85):8.753$, where X = 8.753. The number of colons must be same as the number of variables.

You can paste your custom function by choosing Function Paster|Custom from the right-click menu to open the Custom Functions dialog box. You select one of the functions shown in the list box, and click the OK button. The selected function expression will be called up to the Expression Input box with a colon (:) at its right end. Of course you have to add your custom functions beforehand. See Adding/Editing Custom Functions for details.

Exiting ExCalc

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Click "X" (the Close button) at the far right of the title bar or choose Exit from the right-click menu.

Changing the Configuration Settings

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Right-click the title bar to show the menu items to change the configuration settings of ExCalc such as significant figures, number format, trigonometric unit, fonts and colors.

Rules for Math Expressions

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Rules

The rules of math expressions are almost the same as ordinary math equations. However, you should obey the following rules:

- You can use either a dot (".") or a comma (",") as decimal separator regardless of the number locale of your operating system. However, you must in no case use them as thousands separator.
- Only alphanumeric characters, operands and function names are permitted.
- You can use "(", ")", "{", "}", "[", and "]" as brackets.

Operands

Addition: $1.23+3.57$ $-1.23+3.57$
Subtraction: $1.23-3.57$ $-1.23-3.57$
Multiplication: $1.23*3.57$ $-1.23*(-3.57)$ $-1.23*-3.57$
Division: $1.23/3.57$ $-1.23/(-3.57)$ $-1.23/-3.57$
Power: $1.23^3.57$ $-1.23^{(-1/3)}$ -1.23^{-2}

Note that -3^2 gives -9 while $(-3)^2$ gives 9, but $(-3)^2.1$ is an erroneous expression.

Functions

The function names are case-insensitive. The function lists are shown in the Function Paster menu except **rnd** (random number), **sgn** (sign), **int** (integer) and **abs** (absolute).

Scientific (Exponential) Expressions

Enter exponent numbers as follows:

12.3E5, 12.3e5, 12.3E+5, 12.3E-5, -12.3e-5, 12.3e+05, -12.3e-05

Using Abbreviations for Special Values

You can use the abbreviations for some special values such as the ratio of the circumference of a circle to its diameter (pi) and the conversion factors to the metric units. The following abbreviations in the expression are replaced with their value with the error less than 1.0E-12 %. The abbreviations are case-insensitive:

Abbreviation	Name	Value
PI	The ratio of the circumference of a circle to its diameter	ATAN(1)*4
PA	The ancient pi value	3.141986363
\$G	The acceleration of gravity	9.80665
\$IN	The C.F. from inch to meter	0.0245
\$FT	The C.F. from foot to meter	0.3048
\$YD	The C.F. from yard to meter	0.9144
\$MI	The C.F. from mile to meter	1609.344
\$LB	The C.F. from pound to kilogram	0.45359237
\$LBF	The C.F. from pound-force to newton	\$LB*\$G
\$GAL	The C.F. from gallon (U.S.) to cubic meter	128*\$FT^3

\$GALUK	The C.F. from gallon (U.K.) to cubic meter	0.00454609
\$BTUIT	The C.F. from Btu(IT) to newton meter	1055.05585262
\$BTUTH	The C.F. from Btu(th) to newton meter	$\$BTUIT * 4.184 / 4.1868$
\$CALIT	The C.F. from calorie (IT) to newton meter	4.1868
\$CALTH	The C.F. from calorie (th) to newton meter	4.184
\$HP	The C.F. from horsepower (metric) to watt	75\$G
\$KT	The C.F. from knot to meter per second	1852/3600
\$DEG	The C.F. from degree to radian (angle)	PI/180
\$FAHR	The C.F. from Fahrenheit to Celsius (temp. interval)	5/9
\$KB	The C.F. from kilobyte to byte	1024

C.F.: conversion factor, Btu: British thermal unit, IT: International Table, th: thermochemical

Right-click Menu

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Right-click the title bar to show the following menu items to configure ExCalc.

- **Minimize:** Minimizes ExCalc in the task bar.
- **Always on Top:** Shows ExCalc window always on the top.
- **Clear History:** Clears evaluation history.
- **Function Paster:** Pastes the function name with a left bracket like "SIN(" or "LOG10(" to the Expression Input box as you choose one of the submenu items. You can also call your custom function up to the Expression Input box by choosing Custom.
- **Significant Figures:** Allows you to choose a significant figure from 6 to 15.
- **Number Format:** Allows you to choose a number format (regular, scientific or integer).
- **Trigonometric Unit:** Allows you to choose a trigonometric unit (degree or radian).
- **Fonts and Colors:** Allows you to set font properties and colors for each display area.
- **Hide Tool Tip/Show Tool Tip:** Hide or show tool tip.
- **Exit:** Exits ExCalc.

Technical Support

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E-mails for technical support on this software are accepted at support@hitekdesign.com or tekdesign@nifty.com.

This software is continuously maintained and updated from time to time. You can download the latest version from our web site <http://www.hitekdesign.com> or <http://village.infoweb.ne.jp/~tek/index.htm>. You may at times visit there to check the version number and/or the time stamp of the released file.

Installing/Un-installing ExCalc

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Installing ExCalc

You must have successfully installed ExCalc when you read this help document. The following information is provided for those who read this document without running ExCalc.

This program additionally requires the Visual Basic 5.0 runtime drivers (Service Pack 2 or higher). If you have already installed them to your Windows system, skip step 1).

1) Install Visual Basic 5.0 runtime drivers (Service Pack 2 or higher) if not installed yet. The setup module to install the required drivers can be downloaded from some software archive sites as freeware. For more information visit our web site <http://www.hitekdesign.com> or <http://village.infoweb.ne.jp/~tek/index.htm> and go to "Visual Basic Runtime Drivers".

2) Unzip the distributed file EXCAL???.ZIP into an arbitrary folder, where ??? is a version number of ExCalc.

3) Run SETUP.EXE and follow its instructions.

4) The files extracted into the temporary folder can be removed after the installation has been successfully finished.

It is our stance that each distributed file should *not always* include runtime drivers because they are shared by programs and, by including them, each distributed (compressed) file would become considerably large.

Un-installing ExCalc

Launch Add/Remove Programs in the Control Panel and choose ExCalc.

License Agreement

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Fonts and Colors Dialog Box

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This dialog box opens when you choose one of the items from the Fonts and Colors menu item. In this dialog box you can set the text font properties and the background color for each display area.

B Click this button to make the text bold.

I Click this button to make the text italic.

U Click this button to make the text underlined.

 Click this button to show the Color dialog box, where you change the text color.

 Click this button to show the Color dialog box, where you change the background color.

Design Note

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I have longed to get a free math expression evaluator for my engineering purposes: I used to do calculations like $a * x^3 + b * x^2 + c * x + d$ or $\text{ATN}\{(a - b) / (c - d)\}$ and change one of variables. It was something like $\text{ATN}\{(5.783\text{E}+05 - 1.345\text{E}+05) / (3.255\text{E}-03 - 2.288\text{E}-03)\}$ and $3.255\text{E}-03$ to be replaced with other values for instance. I have intensively searched the web in vain, so I wrote this program. It is small enough in size not to hinder other windows and always visible while doing other tasks.

Keyboard Shortcuts

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The right-click menu can be accessed by pressing the **Alt** and **M** keys. Each menu item can be chosen by pressing one of the following keys:

Menu Item	Key
Minimize	N
Always on Top	T
Clear History	C
Function Paster	P
Significant Figures	S
Number Format	U
Trigonometric Unit	R
Fonts and Colors	F
Help Topics	H
Hide/Show Tool Tip	O
About	A
Exit	X

The evaluation history list can be shown by pressing the **Alt** and **L** keys.

Custom Functions Dialog Box

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This dialog box opens when you choose Function Paster|Custom Functions from the [right-click menu](#). In this dialog box you can add, remove and edit custom functions.

Adding Custom Functions

Enter an equation expression like $\{X+\text{sqr}(X^2-4*Y*Z)\}/(2*Y)$ in the text box at the top, where X, Y and Z represents variables (case-insensitive), and click the Add button. It will be added in the list box below the text box. You can also add a comment for the equation such as **Quadratic formula:** $\{X+\text{sqr}(X^2-4*Y*Z)\}/(2*Y)$ placing a colon between the comment and the equation.

Removing the Custom Functions

Choose one of the custom functions in the list box and click the Remove button to removed it from the list.

Changing the Expressions of the Existing Custom Functions

Click one of the custom functions in the list box. It will be shown in the text box at the top. Change it and click the Add button. You may remove the old expression if you do not use it any more.

Adding/Editing Custom Functions

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Choose Function Paster|Custom Functions from the right-click menu to open the Custom Functions dialog box, where you can limitlessly add, remove and edit custom functions. See [Custom Function Dialog Box](#) for details.

