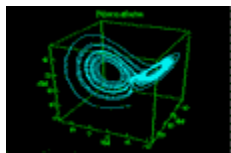


Mathbrain Ver 1.51E for Windows



Overview

Introduction:

Mathbrain is an authentic MDI software application which is to make graphics solving ordinary differential equations and functions by the analysis of their numerical values. This application can solve differential equations in 10 elements simultaneously and of 100 order as maximum. You can use parameters in functional equations, and mapping and integral calculations are also possible. Graphics this application can make are ordinary graphics, real-time animations, cycloprot graphics and 3-D ones.

The application has been developed with the concept of preventing failures in the use of software application as much as possible which may happen before referring to mathematical matters. There have been applications on the market which make graphics solving differential equations. Unfortunately, however, these applications are all very expensive, and as the applications require writing scripts and programming languages, they cannot be handled easily by ordinary customers who are not familiar with computers and don't have experience in writing programs. Such a situation made us to start study if we can develop the application which can be used much easily and with reasonable price for the public as well. Our software application is also expected to be used for educational purpose thanks to its easy operation without matured skills.

Application features:

This application, making the best use of Windows control functions, features easy calculations and creating graphics by simple controls without being troubled by difficult writing scripts and programming which are common to other mathematical analysis type applications on the market. (Most of the writing for our application are the same as those of mathematics, and for others you can use mouse). Furthermore, input writing secures so flexible functions as programming does, like optional naming for variables and constants. Another main feature is that all of the solving methods are numerical. Hence, non-solving objects (manually) like non-linear objects, polymorphs and chaos and objects which have no solution can also be controlled easily. (It is not possible to find solutions of differential equations).

Our application has rich graphical functions like real-time animations, and it is well constructed for visual support. Its most current version is capable of 3-D graphics. Functions of rotation around any axes and viewpoint shifting provide more powerful graphical tools. Graphics are saved in the enhanced metafile format, and they can be saved on file, copied, pasted on a word processor document and printed with a high grade meeting printer's original resolution.

Shareware Information

This application is shareware with 30 days trial. It is toll-free to use this application for the period of 30 days for the purpose of your evaluation and to know if it is useful or not. However, when you use this after the 30 days period or for your practical purposes like making reports and theses, you are required, without any failure, to remit registration fee and register it without any failure.

Limited functions for its trial use:

Following functions cannot be workable without registration.

1. To save Mathbrain files.
2. To cut, copy and save on file numerical value solutions.

System Requirements

System Requirements:

Windows95 or WindowsNT

System Recommended:

CPU:

Pentium or higher.

VGA :

1024*768 16bit color or higher.

Conditions for use

You can use our this application after you agree upon the following conditions which are applicable both to your trial use and use after shareware registration.

1. The author of this application will not take responsibility for any damages or losses which may occur by your own use of the application.
2. The author is free from duty to restore the application from defects like bugs and inconveniences in use.
3. The author has no duty to provide cares like supporting activities(to answer questions, information of upgraded versions).
4. You are not allowed to change or amend the application inclusive of the attached files to it without acceptance by the author.

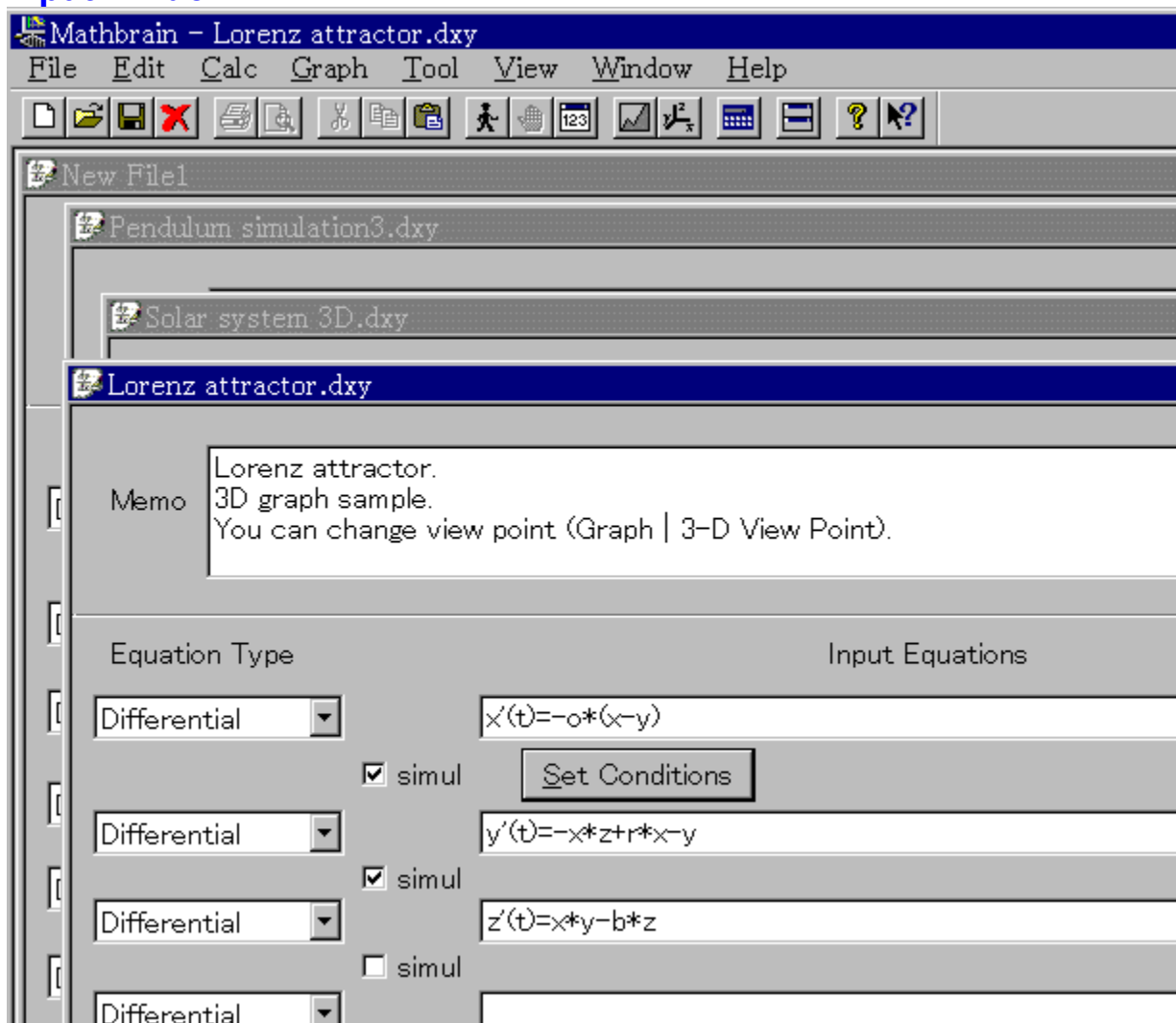
Your use of this application will automatically mean that you have agreed upon the above conditions.

Sample files

Mathbrain has many sample files. Please open these files and select Start Calc command (Calc menu).

It might be the fastest way to know what Mathbrain can do.

Input window



Memo:

You can write memo about equations.

Equation Type:

Select equation type. (Differential, Function, Integral)

Input Equations:

Input equations here.

Set Conditions:

This button expresses [Calc Condition dialog box](#) to set calc range, step, initial conditions.

How to input equations:

[Differential equation](#), [Function equation](#)

Input differential equation

Functional equation

Supported operators, Functions, Constants

**Please see sample files!*

1) Select "Differential" from "Equation Type".

2) How to input differential equation of first order:

Form:

Dependent variable name "... (Independent variable name) = f(Dependent variable name, Independent variable name, Dependent variable name, ...)

Left side must be term of highest order. Left side cannot be expressions like " $10 + 2 \cdot x(t) = \dots$ ".

You can use any constants. Names of constants must be different from variable names.

<Example>

Equation of spring: $F = -kx$

$F = mx''(t) = -kx \rightarrow x''(t) = -(k/m)x$ input "*"

$x''(t) = -(k/m) \cdot x$ <- input this

Dependent variable name in right side must be form like " x' , x , ...". You cannot input like " $x'(t)$, $x(t)$, ...".

Differential equation of five order form is:

$x^{(5)}(t) = f(t, x, x', x'', x''', x^{(4)})$

You can use any variable names. Variable name can be like " xx , $x1$, var ".

Please see Operators, Functions, Constants too.

Input form is almost same as "BASIC".

Mathbrain analyze order and variable name from left side of equations automatically.

*Notice " $2x$ " means " $2 \cdot x$ ". " x^2 " means the name of variable " x^2 ". You can't input like " $2(x+1)$ ". Input " $2 \cdot (x+1)$ " please.

*Notice Mathbrain does not distinguish capitals from small letters. Please use different name if you need.

3) How to input simultaneous differential equation:

To calculate simultaneous differential equation, input equations from upper edit box and check "simul" check box.

Mathbrain can calculate differential equations in 10 elements simultaneously.

All dependent variable name must be different names. All independent variable name must be same name.

<Example>

$x'(t) = f(t, x, y)$

$$y''(t)=g(t,x,y,y')$$

4) To calculate plural differential equations:

Mathbrain cannot calculate plural differential equations in one operation. If you want to calculate plural differential equations to the same window, please fix those to simultaneous equations, and set graph strobe plot mode or use Calc to Current Window.

Mathbrain can calculate simultaneous differential equations and simultaneous function equations at the same time. In this case, differential equation must be inputted upper edit box.

<Example>

You cannot input like this

$$y'(x)=-x*y$$

$$y'(x)=-2x*y$$

Please input like this

$$y'(x)=-x*y$$

$$z'(x)=-2x*z$$

and check simul check box.

Input functional equation

Differential equation

Supported operators, Functions, Constants

*Please see sample files!

- 1) Select "Function" from "Equation Type".
- 2) How to input function expressions of first order:

Form:

Dependent variable name(Independent variable name) = f(Independent variable name)

<Example>

$$y(x)=x^2$$

Function equation does not need initial conditions.

If you use parametric equations, please check "simul" check box.

<Example>

$$y(x)=\sin(x)$$

$$y(x)=\cos(x)$$

Mathbrain draws two graphs. Variable name must be the same name.

- 3) How to input parametric equations:

To calculate parametric equations, input equations from upper edit box and check "simul" check box.

Dependent variable name must be different name and independent variable name (parameter) must be the same name.

<Example>

$$y(t)=\sin(t)$$

$$x(t)=\cos(t)$$

- 4) How to calculate plural function equations:

Mathbrain can calculate plural function equations at the same time.

<Example>

$$x(t)=x^2$$

$$x(t)=2x^2$$

$$x(t)=3x^2$$

$$x(t)=4x^2$$

$$x(t)=5x^2$$

$$x(t)=6x^2$$

Mathbrain draw six graphs.

Variable name must be the same.

Case of parametric equations:

<Example>

$$y(t)=\sin(t)$$

$$x(t)=\cos(t)$$

$$y(t)=\sin(t)$$

$$x(t)=\cos(t)$$

Check first and third "simul" check box.

Map equation

Differential equation

Function equation

Supported operators, Functions, Constants

[*Please see sample files!](#)

1) Select "Function" from "Equation Type".

2) How to input:

If right side has dependent variable in function equation, graph becomes map.

<Example>

$$x(t) = x * (1 - x)$$

This equation means " $x(t+1) = x(t) * (1 - x(t))$ " mathematically.

Map need initial conditions.

3) How to input parametric equations:

Same as function equation.

<Example: Enon map>

$$x(t) = 1 - a * x^2 + y$$

$$y(t) = b * x$$

check first "simul" check box.

4) How to input plural map:

Same as function equation.

Definite Integral

Differential equation

Functional equation

Supported operators, Functions, Constants

[*Please see sample files!](#)

1) Select "Integral" from "Equation Type". "Integral" can be calculate only in first edit box.

2) How to input integral expression:

Form:

Dependent variable name(Independent variable name) = f(Independent variable name)
Independent variable means variable of integral.

[<example>](#)

$y(x)=x^2$

Initial condition if not needed.

3) Input calculate range. It means range of definite integral.

4) Smaller step gives exact answer, larger step gives faster time.

Mathbrain draws graph first, and begin integral calculation. If you don't need graph, please press cancel button.

Mathbrain expresses numerical solution like this:

Integral [$y(x)=x^2$] {-5.000000e+000,+5.000000e+000}

Answer=+8.333333e+001

Set conditions dialog box

Press Set condition button in main window or select Set condition command (Calc menu) to present Set conditions dialog box.

Calculation range

Set calculation range of independent variable in Set conditions dialog box. Max value must be larger than Min value.

Calculation Step

Set step in Set conditions dialog box. To calculate differential equations, manual step is recommended.

Auto step is $(\text{Max}-\text{Min})/1000$.

Smaller step gives exact answer, larger step gives faster time.

When step is decreased and solution does not change, the step is exact.

Please refer to about 0.05 first.

In case function equations, step has no relation to exact answer. Set step to draw smooth line graph. In almost cases, auto step makes no problems.

Initial conditions

Set initial conditions to calculate differential equations in Set conditions dialog box. All variable you need to set is expressed in list box automatically. Default variable values are "0".

Graph setting dialog box

Press "Set Condition" button in main window or select Set condition (Calc menu) to present Set conditions dialog box.

Graph & Animation is the second page. Set axes, types and ranges.

Set constants

Press Set condition button in main window or select Set condition (Calc menu) to present Set conditions dialog box.

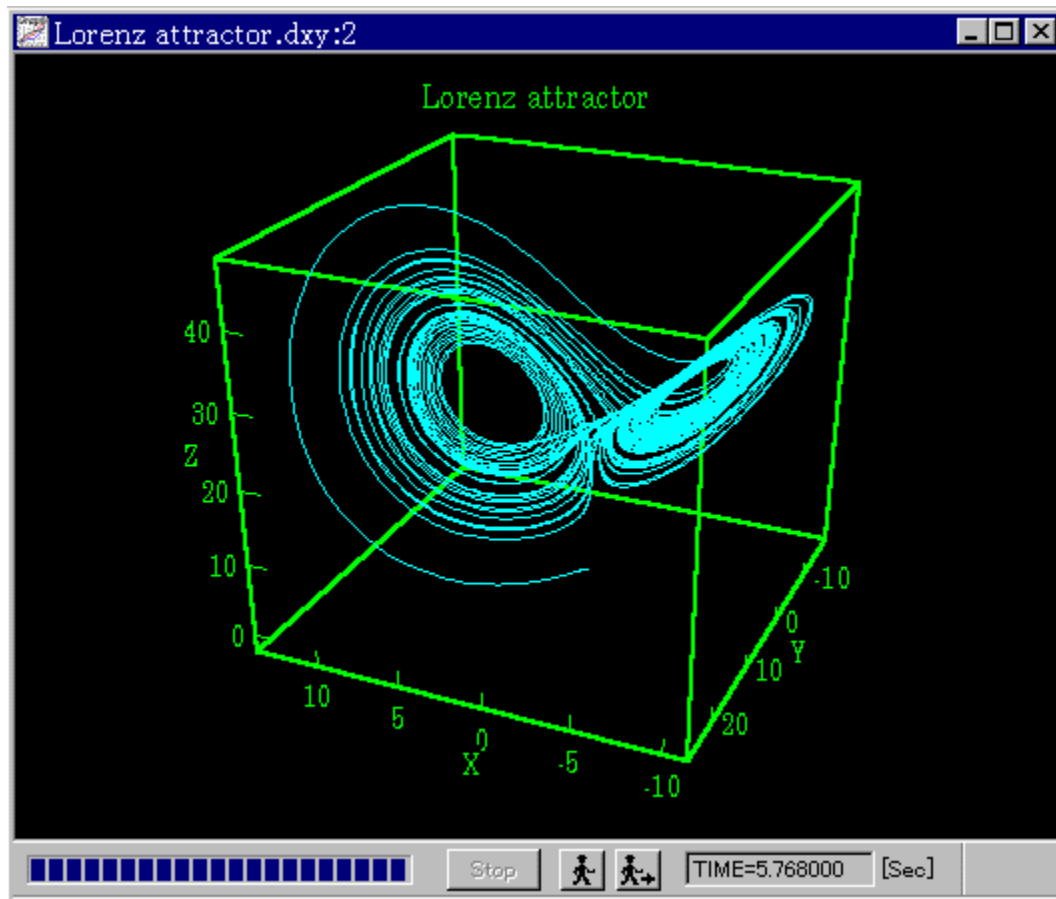
Set constants if you use constant values. Set constants values dialog is third page.

Start calc

After completing equations and conditions, select Star calc command (Calc menu). This command creates new window and starts calculation. If you want to draw current graph window, select Calc to Current Window command (Calc menu) or Clear and Calc command (Calc menu).

Graph window

Mathbrain opens Graph window when Start Calc command or New Window command is selected.



Mathbrain draws graph real time.

Select Size command to change window size. When main window is maximized, graph window which Mathbrain opens is maximized too.

If you want to draw graph after setting window place, size, and aspect rate, select New Window command and set place. After window setting is completed, select Calc to Current Window.

Printing aspect rate becomes same as graph window aspect rate.

You can move graph title and labels by drag. Double click to express Labels & Title dialog box. After changing labels or title, select Redraw command.

Select Preferences command to change width of lines or colors of lines.

Bottom control (from left): Stop Calc, Clear and Calc, Calc to Current Window, Time. You can move the place of control. Select Size dialog box to set default place.

You can use Save Graph command, Copy command and Print command in this window.

Answer window

Answer window expresses numerical solutions. Numerical Value must be checked to open this window.

Solutions format is like "1.0000e+005, 2.5000e-010". "1.0000e+005" means 1.0000×10^5 , "2.5000e-010" means 2.5000×10^{-10} .

While calculating, only one line is expressed. When calculation is finished, all answers are expressed.

Mathbrain expresses values of independent variable and all dependent variables.

Mathbrain expresses values of axes's expressions too.

You can Copy and Save Answers in this window. Saved answer can be read by other applications, like MS-Excel. It is space divided texts.

You can paste copied answers to editor or word processor.

You cannot input words in this window.

If you don't need to draw graph, set space in all graph axes to calculate faster.

File

<u>New</u>	Creates a new document.
<u>Open</u>	Opens an existing document.
<u>Close</u>	Closes an opened document.
<u>Save</u>	Saves an opened document using the same file name.
<u>Save As</u>	Saves an opened document to a specified file name.
<u>Open Graph</u>	Opens an existing graph file.
<u>Save Graph</u>	Saves an graph to a specified file name.
<u>Save Answer</u>	Saves an numerical answers to a specified file name as text format.
<u>Print</u>	Prints a document.
<u>Print Preview</u>	Displays the document on the screen as it would appear printed.
<u>Print Setup</u>	Selects a printer and printer connection.
<u>Exit</u>	Exits Mathbrain.

Edit

Undo Reverse previous editing operation. It only used in main windows and numerical answer windows.

Cut Deletes data from the document and moves it to the clipboard. It only used in main windows and numerical answer windows.

Copy Copies data from the document to the clipboard.

Paste Pastes text from the clipboard into the document. It only used in main windows and numerical answer windows.

Select All Select all numerical answers in numerical answer window.

Calc

Start Calc
calculations.

Calc to Current Window

Clear and Calc
current window.

Stop Calc

Set Conditions

Output
or off.

Opens graph window and starts

Starts calculation to current graph window.

Clears window and starts calculations to

Stops calculation.

Sets calculation conditions.

Switches numerical solution outputs on

Graph

New Window

Opens new window without calculation.

Preferences

Sets graph preferences. (Colors, width of lines, grids, etc)

Redraw

Redraw graph.

3D-View Point...

Presents 3D view point selector.

Tool

Calculator Express calculator

View

Toolbar

Shows or hides the toolbar.

Status Bar

Shows or hides the status bar.

Window

Main	Activates main window.
<u>Size ...</u>	Sets window size,etc.
<u>Cascade</u>	Arranges windows in an overlapped fashion.
<u>Tile</u>	Arranges windows in non-overlapped tiles.
<u>Arrange Icons</u>	Arranges icons of closed windows.

Help

Help Topics Offers you an index to topics on which you can get help.

About Displays the version number of this application, system information and registration information.

Register This command presents a Register dialog box to register Mathbrain.

Supported operators, functions and constants in Mathbrain

The following operators, functions and constant values can be used in Mathbrain

1, Operators

$-, +, *, /$	four operations
$\%$	remainder ($5\%2=1$)
$^$	power ($3^2=9$)
$()$, $\{\}$, $[]$	parenthesis,...
$;$	note ($y'(x)=-y$; This is a equation.)

***Notice** All spaces are ignored. (" $2\ x+5$ " \rightarrow " $2x+5$ ")

2, Functions

$\text{sqrt}(x)$	square root
$\text{sin}(x)$	sin
$\text{cos}(x)$	cos
$\text{tan}(x)$	tan
$\text{asin}(x)$	arcsine
$\text{acos}(x)$	arccosine
$\text{atan}(x)$	arctangent
$\text{sinh}(x)$	hyperbolic sine
$\text{cosh}(x)$	hyperbolic cosine
$\text{tanh}(x)$	hyperbolic tangent
$\text{exp}(x)$	exponential
$\text{ln}(x)$	lognat (base is "e")
$\text{log}(x)$	logcom (base is "10")
$\text{abs}(x)$	absolute value
$\text{fact}(x)$	factorial ($\text{fact}(5)=5*4*3*2*1=120$)

***Notice** All functions calculates circular [radian] measure. Input " $x*(\pi/180)$ " to change degree measure.

3, Constant values

π	$\pi(3.14159265\dots)$
e	$e(2.71828\dots)$

***Notice** " $2x$ " means " $2*x$ ". " x^2 " means the name of variable " x^2 ". You can't input like " $2(x+1)$ ". Input " $2*(x+1)$ " please.

***Notice** Mathbrain does not distinguish capitals from small letters. Please use different name if you need.

Specifications

The differential equation Mathbrain can calculate:

Differential equation of 100 order, and 10 elements simultaneously.

Maximum length of variable names and constant names: Unlimited

Maximum tokens: 1024

Maximum variable names in equations: 256

Maximum constant names in equations: 256

Method of computation and precision

Differential equations : Runge-Kutta rule(4 dimension)

The number of maximum step: 1.7×10^{308}

Precision: 64 bits (double).

The range Mathbrain can calculate: -1.7×10^{308} to 1.7×10^{308} . +INF or -INF is expressed when calculation overflows.

Mathbrain Registration

Mathbrain is a shareware.

Two kinds of registration, private registration and site license registration, are available at your option.

Private Registration:

Registration fee is **US\$48.00** for one person.

Private registration is for the use of a registered person only, and other persons cannot use the application even on the same computer hardware. Registered person can use it on more than one computer at any place.

Site License:

Site License is for the use on a registered computer hardware.

Any person can use the application on the same computer if it is registered.

Site License fee:

2 to 4 computers: _____ computers at US\$45 each = _____
5 to 9 computers: _____ computers at US\$40 each = _____
10 to 24 computers: _____ computers at US\$35 each = _____
25 to 49 computers: _____ computers at US\$25 each = _____
50 to 99 computers: _____ computers at US\$20 each = _____

Before Registration:

You are requested to agree upon above conditions for use and following ones.

1. Registration fee you remit is not reimbursable regardless of its reasons.
2. Please pay your utmost attention not to disclose nor expose your password to any other third persons. Password will become a identifier.

Upon registration it is automatically assumed that you have agreed upon the conditions for use and the above. **Registration will be made by your input of your password and name in the customer registration page of the help menu, and thereafter all functions of the application will become available.**

How to order:

Payment advise

By E-mail

By mail

Payment advise by E-mail

1. If you use internet mail, please pay your registration fee into the following bank account.
Bank charge will be borne by you.

To save bank charge you may pay registration fees into the bank account for several persons at once by informing the author by internet mail that your payment will cover more than one person.

CITIBANK N.A YOKOHAMA BRANCH
ACCOUNT NUMBER: 99202557
NAME: TSUDA EISUKE
ADDRESS(If needed): 1F, Yokohama Fukoku Seimei Bldg., 6-87 Ohta-cho
Naka-ku, Yokohama-shi 231, Japan

2. After your payment is finished, please advise the author of your payment by internet mail in the following manner be addressed to e-tsuda@qb3.so-net.or.jp.

Subject: Mathbrain registration

Mathbrain Private Registration _____ users at \$48 each = _____

Mathbrain Site License

2 to 4 computers: _____ computers at \$45 each = _____

5 to 9 computers: _____ computers at \$40 each = _____

10 to 24 computers: _____ computers at \$35 each = _____

25 to 49 computers: _____ computers at \$25 each = _____

50 to 99 computers: _____ computers at \$20 each = _____

Total payment _____

Customer registration fee has been paid from (name) branch of (name) bank on (month) (date).

Name of the person who paid: (name)

Name of the person for registration and internet e-mail address: _____

The author will send you your password by internet mail after the payment into the bank account is confirmed. You can complete registration by your input of the password and your name into [registration page](#) of the help menu.

If you don't receive any information from the author for two weeks after your internet mail, please send the author notice again.

You are expected to send your payment advise to the author for sure. Otherwise, there is no other way left for the author to send password back to you.

Payment advise by Mail

1. If you use mail, please pay your registration fee into the following bank account. Bank charge will be borne by you.

To save bank charge you may pay registration fees into the bank account for several persons at once by informing the author by mail that your payment will cover more than one person.

CITIBANK N.A YOKOHAMA BRANCH
ACCOUNT NUMBER: 99202557
NAME: TSUDA EISUKE
ADDRESS(If needed): 1F, Yokohama Fukoku Seimei Bldg., 6-87 Ohta-cho
Naka-ku, Yokohama-shi 231, Japan

2. After your payment is finished, please advise the author of your payment by mail in the following manner be addressed to

Eisuke, Tsuda.
2-11-6 MOURIDAI, ATSUGISI, KANAGAWAKEN,
246-0037, Japan

Subject: Mathbrain registration

Mathbrain Private Registration users at \$48 each = _____

Mathbrain Site License

2 to 4 computers: _____ computers at \$45 each = _____

5 to 9 computers: _____ computers at \$40 each = _____

10 to 24 computers: _____ computers at \$35 each = _____

25 to 49 computers: _____ computers at \$25 each = _____

50 to 99 computers: _____ computers at \$20 each = _____

Total payment _____

Customer registration fee has been paid from (name) branch of (name) bank on (month) (date).

Name of the person who paid: (name)

Name of the person for registration and address: _____

The author will send you your password by mail after the payment into the bank account is confirmed. You can complete registration by your input of the password and your name into registration page of the help menu.

If you don't receive mail from the author for three weeks after your mail, please send the author notice again.

You are expected to send your payment advise to the author for sure. Otherwise, there is no other way left for the author to send password back to you.

Copy

You are free to copy Mathbrain on the internet or to deliver it to third persons as far as you don't change the application's content. However, for your these actions, you are required to attach the archive files which the author made and to advise the author of your copying.

Also in case that you record Mathbrain in floppy disk or CD-ROM as a supplement to magazines, the author needs your prior advice.

Newest version and Information

Newest version and Information is uploaded following internet home page.

<http://www02.so-net.or.jp/~t3-n/mathbrain/>

About author of Mathbrain

[Design, Programming, Copyright] E.Tsuda

E-mail: e-tsuda@qb3.so-net.or.jp

Home page: <http://www02.so-net.or.jp/~t3-n/mathbrain/>



[Splash picture design] R.Kagaya.

About program:

This program is written by C++.

Compiler: Microsoft Visual C++.

I'm very happy if you give me your impression of Mathbrain.


Print command (File menu)

Use this command to print a graph. This command presents a Print dialog box, where you may specify the range of pages to be printed, the number of copies, the destination printer, and other printer setup options.

Printing aspect rate becomes same as graph window aspect rate.

You can copy and paste to other applications and print in any place of papers.

Shortcuts

Toolbar: 

Keys: CTRL+P

Clear and Calc

Clear and Calc command (Calc menu)

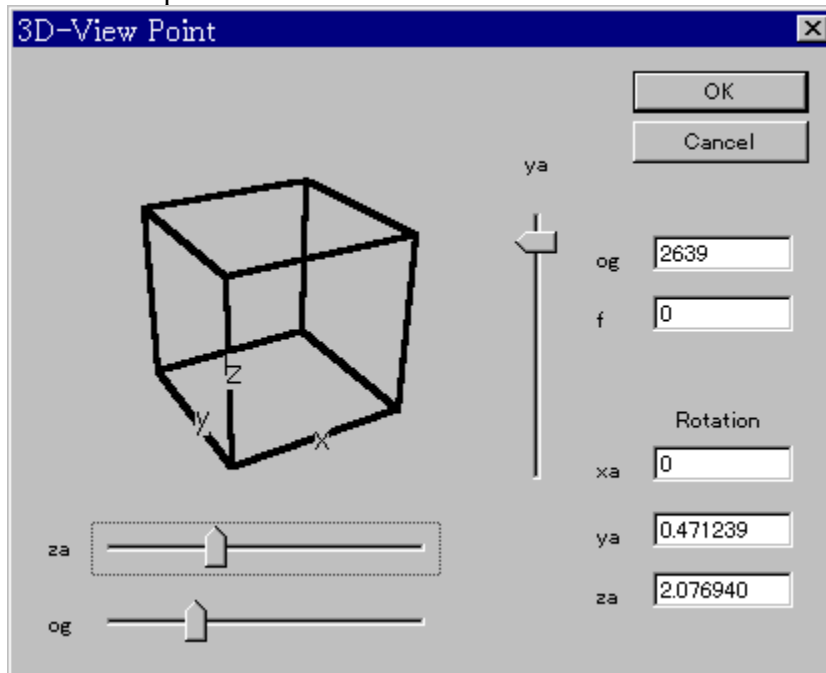
Use this command to clear current window and start calculation.

Shortcut: F7

This edit box expresses the time calculation expended. If you use Mathbrain for benchmark test, finish all programs and set off screen saver.

3D-View Point

Select view point



"xa" is rotation around x-axis.

"ya" is rotation around y-axis.


"za" is rotation around z-axis.

"og" is distance to the graph.

"f" is eye height.

You can input expressions in edit box like " $\pi/4$ ".
Numerical values is radian scale.

Shortcuts

Toolbar: 

Keyboard: F11

Print dialog box

The following options allow you to specify how the document should be printed:

Printer

This is the active printer and printer connection. Choose the Setup option to change the printer and printer connection.

Setup

Displays a Print Setup dialog box, so you can select a printer and printer connection.

Print Range

Specify the pages you want to print:

All Prints the entire document.

Selection Prints the currently selected text.

Pages Prints the range of pages you specify in the From and To boxes.

Copies

Specify the number of copies you want to print for the above page range.

Collate Copies

Prints copies in page number order, instead of separated multiple copies of each page.

Print Quality

Select the quality of the printing. Generally, lower quality printing takes less time to produce.


Print Progress Dialog

Print Preview command (File menu)

Use this command to display the active document as it would appear when printed. When you choose this command, the main window will be replaced with a print preview window in which one or two pages will be displayed in their printed format. The print preview toolbar offers you options to view either one or two pages at a time; move back and forth through the document; zoom in and out of pages; and initiate a print job.

Printing aspect rate becomes same as graph window aspect rate.

Shortcuts:

Toolbar: 

The print preview toolbar

Print

Starts printing.

Zoom In

Zoom In.

Zoom Out

Zoom Out.

Close

Returns to main window.

Print Setup command (File menu)

Use this command to select a printer and a printer connection. This command presents a Print Setup dialog box, where you specify the printer and its connection.

Print Setup dialog box

The following options allow you to select the destination printer and its connection.

Printer

Select the printer you want to use. Choose the Default Printer; or choose the Specific Printer option and select one of the current installed printers shown in the box. You install printers and configure ports using the Windows Control Panel.

Orientation

Choose Portrait or Landscape.

Paper Size

Select the size of paper that the document is to be printed on.

Paper Source

Some printers offer multiple trays for different paper sources. Specify the tray here.

Options

Displays a dialog box where you can make additional choices about printing, specific to the type of printer you have selected.

Network...

Choose this button to connect to a network location, assigning it a new drive letter.

New command (File menu)

Use this command to create a new document in Mathbrain.

About 17 main input windows can be opened in Windows95. When the resource is lacking, it becomes impossible to open a new window. In the case, close unnecessary windows.

You can open unlimited number of main windows in WindowsNT. It depends on memory.

You can open an existing document with the Open command.

Shortcuts

Toolbar:



Keys:

CTRL+N

Open command (File menu)

Use this command to open an existing document in a new window. You can open multiple documents at once. Use the Window menu to switch among the multiple open documents.

You can use drag and drop too.

About 17 main input windows can be opened in Windows95. When the resource is lacking, it becomes impossible to open a new window. In the case, close unnecessary windows.

You can open unlimited number of main windows in WindowsNT. It depends on memory.

You can create new documents with the New command.

Shortcuts

Toolbar:



Keys: CTRL+O

Close command (File menu)

Use this command to close all windows containing the active document. Mathbrain suggests that you save changes to your document before you close it. If you close a document without saving, you lose all changes made since the last time you saved it. Before closing an untitled document, Mathbrain displays the Save As dialog box and suggests that you name and save the document.

Shortcut

Toolbar:



Save command (File menu)

Use this command to save the active document to its current name and directory. When you save a document for the first time, Mathbrain displays the Save As dialog box so you can name your document. If you want to change the name and directory of an existing document before you save it, choose the Save As command.

Shortcuts

Toolbar: 
Keys: CTRL+S

Save As command (File menu)

Use this command to save and name the active document. Mathbrain displays the Save As dialog box so you can name your document.

Mathbrain saves all settings except for font name of labels.

To save a document with its existing name and directory, use the Save command.

Open Graph command (File menu)

Use this command to open and display a graph file. You cannot edit opened graph file.

Exit command (File menu)

Use this command to end your Mathbrain session. You can also use the Close command on the application Control menu. Mathbrain prompts you to save documents with unsaved changes. It isn't possible to End while computing. End Mathbrain after ending computing.

Print dialog box

Printer setup

Save Graph command (File menu)

Use this command to save displayed graph to file as enhanced meta format. Saved files can be read by other software which can read enhanced meta files such as **MS-PowerPoint** or **MS-Office 97**.

Save Answer (File menu)

Use this command to save the numerical value answer in active window as the text form (space end form).

Saved files can be read in **MS-Excel** or other software.

Copy command (Edit menu)

Copying graph:

It copies activated graph to clip board as enhanced meta format.

Copied graph can be pasted to applications.

"Attention" Some 16bit (for Windows 3.1) applications does not support enhanced meta format.

Copying numerical solutions:


It copies numerical solutions as text format. Copied answers can be pasted to editors, word processors.

When you want to select all answers, select Select all command.

Copying equations:

It copies equations as text format.

Shortcuts

Toolbar: 

Keys: CTRL+C

Start Calc command (Calc menu)


Use this command to create new graph window and start calculation. If numerical solutions is checked, it creates numerical solutions window too.

You can operate while calculating. If you want to stop calculation, select Stop calc command (Calc menu).

While calculating, you cannot calculate other equations. If you want to calculate two equations at the same time, run two Mathbrains.

When the resource is lacking, it becomes impossible to open a new window. In the case, close unnecessary windows.

Shortcuts


Toolbar: 

Keyboard: F5

Stop Calc command (Calc menu)


Use this command to stop calculation.

Shortcut

Toolbar: 

Keyboard: ESC


Output command (Calc menu)

Select answer output. Graph Numerical Solution. Graph is always checked.

Graph is always checked.

Mathbrain create numerical answer window too. When calculations are finished, all answers are expressed.
When numerical values is checked, calculation becomes slow.

Shortcut

Toolbar: 

Star Calc to current window command (Calc menu)

Use this command to start calculation to current graph window. Mathbrain over writes graph without clearing window.

Color order is setted value in Graph preferences dialog.

You cannot change graph range.

Shortcut: F6

Set Conditions command (Calc menu)

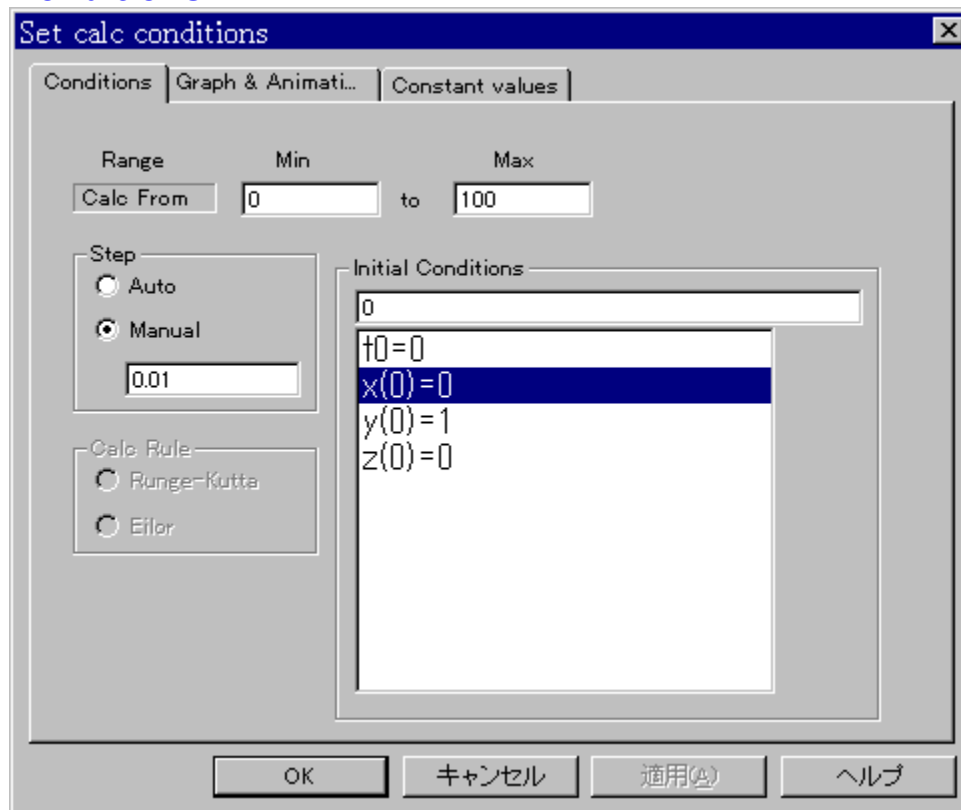
Use this command to present Set conditions dialog box, Conditions, Graph & Animation, Constant values.

This command is same as Set Conditions button in main window.

Shortcut:

Keyboard:F9

Conditions



Calc range:

Input calculation range (Max value and Min value). You can input expressions in edit box. When the initial condition of independent variable is larger than Max value, please input **negative step**.

Example: 0 to 2pi, -100 to -50

Step:

Step means increment of independent variable.

Step can be auto or manual. Auto step is "(Max-Min)/1000" .

Smaller step gives exact answer, larger step gives faster time.

When step is decreased and solution does not change, the step is exact.

Please refer to about 0.05 first.

In case function equations, step has no relation to exact answer. Set step to draw smooth line graph. In almost cases, auto step makes no problems.

Calc rule:

Now, only Runge-kutta rule is available.

Initial conditions:

Set initial conditions of differential equations. All variables which is needed to set are expressed in list box automatically.

Click the variable you want to set and input numbers.

Please input **only numbers**. You cannot input like " $y(0)=10$ ". Please select " $y(0)=...$ " and input "10".

When edit box focus was killed, the value is entered. You cannot cancel this operation.

Graph & Animation

The screenshot shows the 'Set calc conditions' dialog box with the 'Graph & Animation' tab selected. The 'Conditions' sub-tab is active, showing options for 2-D and 3-D graphs. The 3-D Graph option is selected. Below this, there are four columns labeled 1, 2, 3, and 4 for setting axes. Column 1 has X-Axis set to 'x', Y-Axis set to 'y', and Z-Axis set to 'z'. Columns 2, 3, and 4 are empty. The 'Draw Mode' section has three options: Standard Graph (selected), Strobe plot Graph, and Animation Graph. The 'Graph Range' section has two options: Auto (selected) and Manual. The 'Auto' mode shows the following ranges:

	Min	Max
X-Axis	-11.3293042	13.81321253
Y-Axis	-19.3567883	26.62107107
Z-Axis	-2.29778822	48.25678515

The dialog box also includes buttons for OK, キャンセル (Cancel), 適用 (Apply), and ヘルプ (Help).

2D-Graph,3D-Graph:

Please select graph dimension.

3D graph needs z axis.

X-Axis,Y-Axis:

Please select or input variables or expressions. You can input expressions like " $10 \cdot \cos(t)$ ".

Ex: $10 \cdot \cos(th)$

When you set more than two axes, please set strobe plot graph or animation graph.

Draw Mode:

Please select draw mode below.

1, Standard graph draws line graph.

2, Strobe plot graph draws point. Plot period can be setted. When "0" or space is setted, Mathbrain draws all points.

3, Animation graph draws animations by small circle. You can set draw period. If animations are too fast, set smaller step and set larger period. Period must be positive and integer value.

Graph Range:

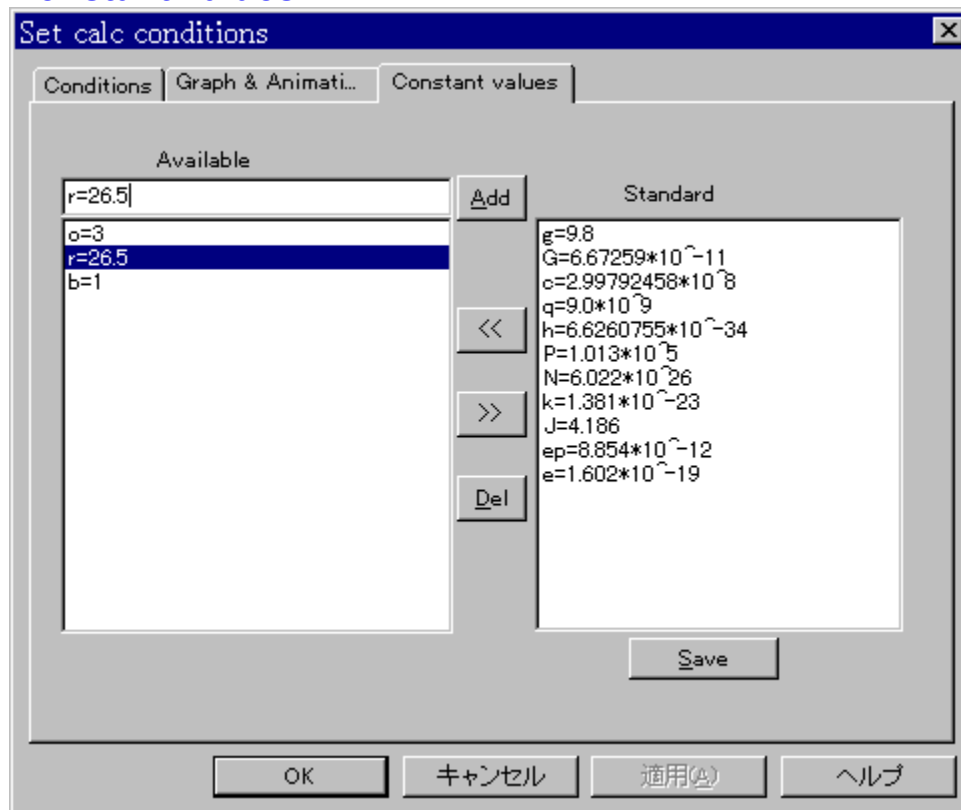
Auto mode is recommended. Mathbrain fits graph.

In manual mode, please input graph ranges in all axes. Manual mode is faster.

If you already know graph range or calculate the same equations as same conditions, select manual mode.

Otherwise, Mathbrain calculates for fitting graph every time.

Constant values



Available:

Please input constants you want to use. Input format is "Constant's name = value", like "g=9.8".
Constants name cannot begin from number like "2g". ("2g" means "2*g".)
Value can be expression.

Examples:

m1=10
m2=20^2
aa=sin(50)
const=5*pi

Press Del button to delete constants.

Standard:

You can add from standard constants list. Select constants and press "<<" button.

Add to standard constants:

If you want to add constants to standard constants, please select constant you want to add from available constant, and press ">>" button.

Standard constants are saved to disk as "const.dat". "const.dat" is text format. You can edit it by editors or word processors.

By copying "const.dat" to other computers, saved constants can be used in other computers.

"Const.dat" format:

Constant's name = value (L.F)

Examples:

a=1
b=10

Default standard constants:

g=9.8
G=6.67259*10⁻¹¹
c=2.99792458*10⁸
q=9.0*10⁹
h=6.6260755*10⁻³⁴
P=1.013*10⁵
N=6.022*10²⁶
k=1.381*10⁻²³
J=4.186
ep=8.854*10⁻¹²
e=1.602*10⁻¹⁹


New Window command (Graph menu)

Use this command to create new empty window and use Calc to Current Window command.

Preferences command (Graph menu)

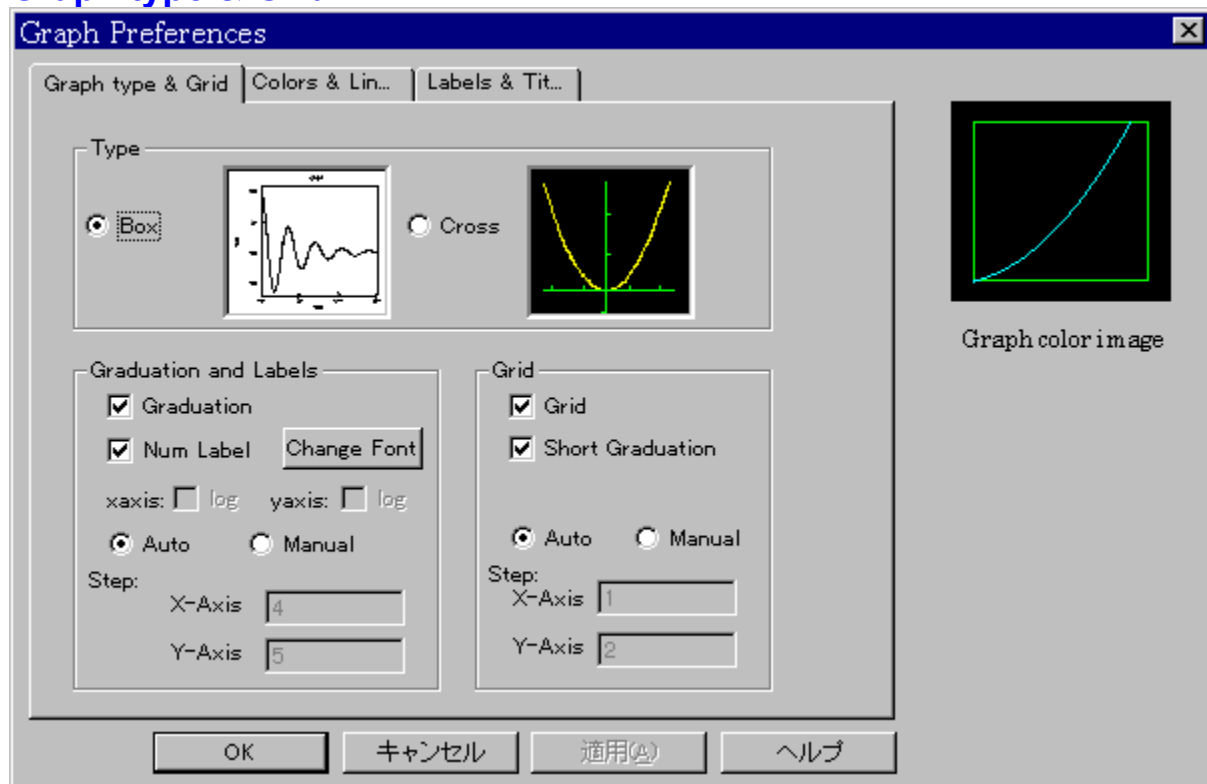
Use this command to present Graph preference dialog box. Graph type & Grid Colores & Lines
Labels & Title

Shortcuts:

Toolbar: 

Keyboard: F8

Graph type & Grid



Type:

Please select Box or Cross.

Graduations and labels:

Please check to draw graduations and labels.

Auto mode is recommended. In manual mode, input step value.

Grid:

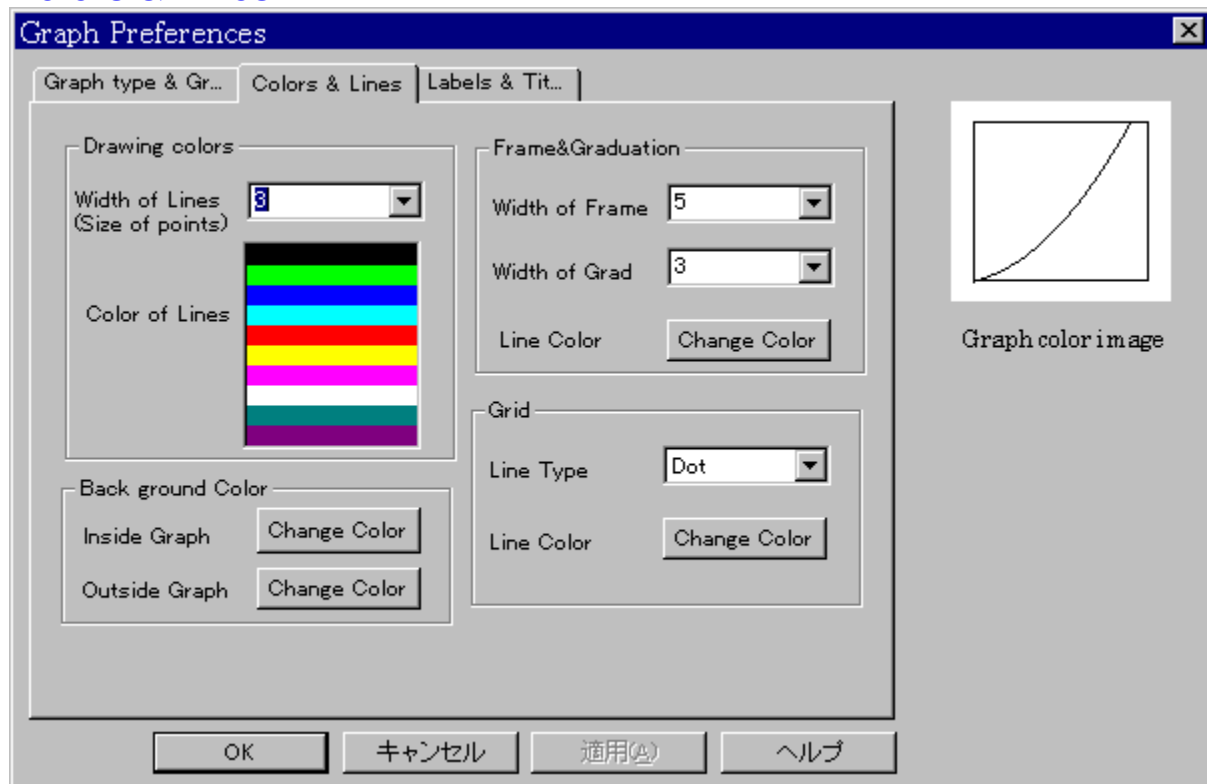
Please check to draw grids.

Auto mode is recommended. In manual mode, input step value.

If you want to change line type or color, set in Colors & Lines page.

These setting is enabled from next calculation.

Colors & Lines



The width of lines is logical(Printer's) width. Width "0" means "1" in any devices.
In 8bit color mode, only pure color can be drawn. 16bit or higher recommended.

Drawing Colors:

Width of lines

Please input or select the width of lines. In strobe plot mode, this value means size of points.

Color of lines

Please set colors by double click. This color order is drawing color order.

Back ground color:

Inside graph

Inside of frame

Outside graph

Outside of frame

You can see the color image in dialog box.

Frame & Graduations:

Width of Frame

Width of frame line

Width of Grad

Width of graduation line

Line color

Color of frame and graduation.

Grid:

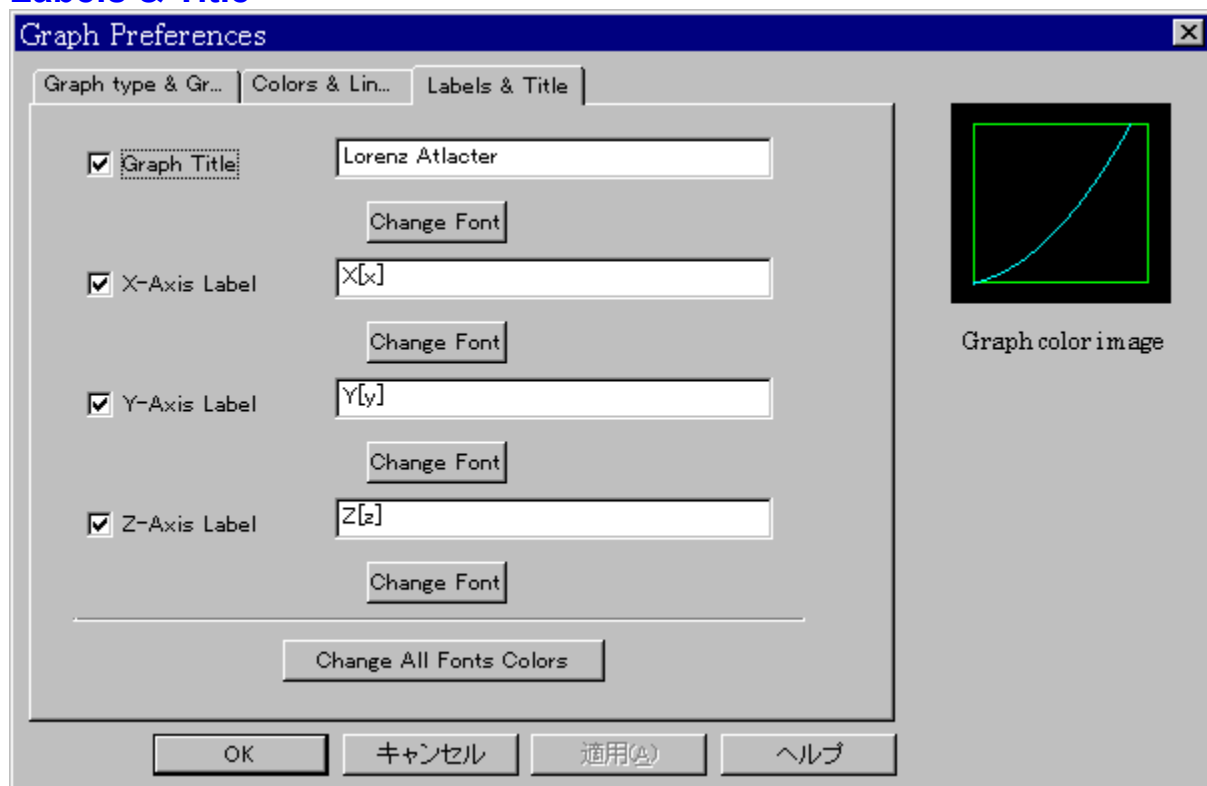
Line type

Type of line. Width is "1". Width is fixed.

Line color

Color of grid line. Default color is gray.

Labels & Title



Graph Title:

Please check and input graph title to express title.

X-Axis Label:

Please check and input graph title to express x axis label.

Y-Axis Label:

Please check and input graph title to express y axis label.

Z-Axis Label:

Please check and input graph title to express z axis label.

Each font can be changed by Change Font.

Change All fonts' color:

Use this command to change all fonts color in one operation. When back ground color is changed, you have to change fonts' color.

Redraw command (Graph menu)

Use this command to redraw graph window when you changed graph title or labels.

Shortcut: F10

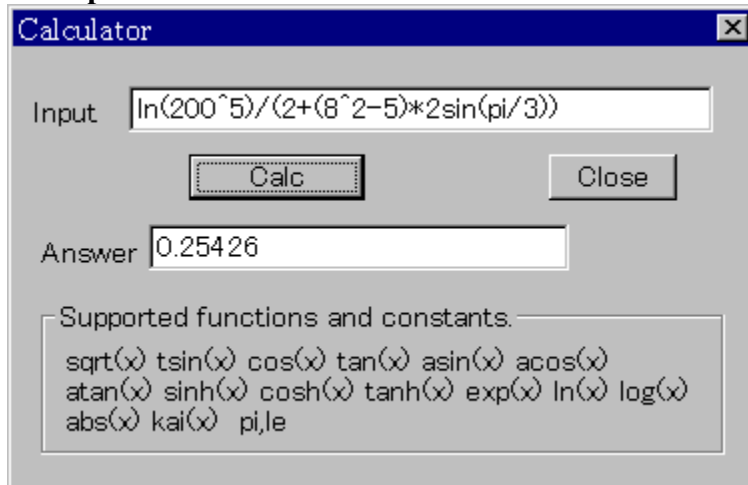
Calculator command (Tool menu)

Use this command to present calculator. All functions and constants which Mathbrain supports can be used.

Input form is almost same as "BASIC".

One document can have one calculator. This dialog box is modeless.

Example:



Shortcut

Toolbar:



Toolbar command (View menu)

Use this command to display and hide the Toolbar, which includes buttons for some of the most common commands in Mathbrain, such as File Open. A check mark appears next to the menu item when the Toolbar is displayed.

Status Bar command (View menu)

Use this command to display and hide the Status Bar, which describes the action to be executed by the selected menu item or depressed toolbar button, and keyboard latch state. A check mark appears next to the menu item when the Status Bar is displayed.

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Cascade command (Window menu)

Use this command to arrange multiple opened windows in an overlapped fashion.

Tile command (Window menu)

Use this command to arrange multiple opened windows in an tiled fashion.
It is good way to compare graphs.

Shortcut

Toolbar: 

Window Arrange Icons Command

Use this command to arrange the icons for minimized windows at the bottom of the main window. If there is an open document window at the bottom of the main window, then some or all of the icons may not be visible because they will be underneath this document window.

Set Window command (Window menu)

Use this command to express Set Window dialog to set size of windows etc.

Window size dialog box



Graph window size:

Please input the size of graph window from 200-758.

Main window size:

Select main window size. Small window is recommended in low resolution graphic.

Num widow size:

Please input the size of numerical answer window from 200-758.

Place of progress bar:

Please set the place of progress bar.

Default button:

Use this command to set default (758) size.

Save button:

Use this command to save all window settings.


Help Topics command(Help menu)

Use this command to present help.

About command (Help menu)

This dialog box expresses copyright, licensed user name, and system informations.

Shortcut

Toolbar: 

Register command (Help menu)

Please input your name and password author send you by e-mail or mail after paying your registration fee.

When both is inputed, regisitation is completed and all functions are workable.

[Shareware information.](#) [How to order?](#)

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