F-Chart Software

No. 25, Fall 2013

EESy Solutions

Engineering Equation Solver Newsletter

Inside this issue:

Welcome	1
EES Web Server	1-3
Dual Output Units	4
The Minor Loss Library	5
Significant Figures Output	6
The $VarInfo Directive	7
EES Training Opportunities	7
Some Additional Changes to EES	8
Instant Update Service	8

Welcome

This is the 25th issue of EESy Solutions, a newsletter that is developed to provide news, tips, and other information to users of the Engineering Equation Solver software. EES has been a commercial software for more than two decades. If you have missed any of the previous issues of EESy Solutions they can be downloaded from http://fchart.com

Mastering EES is a 700 page ebook that provides the best source of information on the use of EES. The ebook is available for $25 from http://fchart.com/ees/mastering-ees.php. In EES versions 9.373 and newer, the Mastering EES menu item will automatically open the ebook when it is selected from the Help menu, provided that the Mastering EES.pdf file has been installed in the EES directory. The book is in its 21st printing. The latest version will automatically be downloaded from our website when you open it from this menu item.

The EES Web Server

The EES Web Server is an extension to the EES program that allows users to access EES programs from the internet using any browser program (e.g., Firefox, Internet Explorer, or Safari) and on any device that supports the browser (e.g., a laptop, iPhone, or iPad). EES does not need to be installed on the device.

The EES Web Server (EESws) is an extension to the Distributable EES program capability of the Professional Version of EES. EES distributable programs allow your programs to be made available to non-EES users. A graphical user interface is created using the Diagram Window and the program is converted to an executable program that can be freely provided to users who do not have EES. Distributable programs can be made available through email, internet download, or other means. Users can enter input information, initiate the calculations, and view the results entirely from an attractive Diagram Window interface. Users do not have to know the details of the calculations. In fact, it is possible to hide all of the equations so the user can not see them.

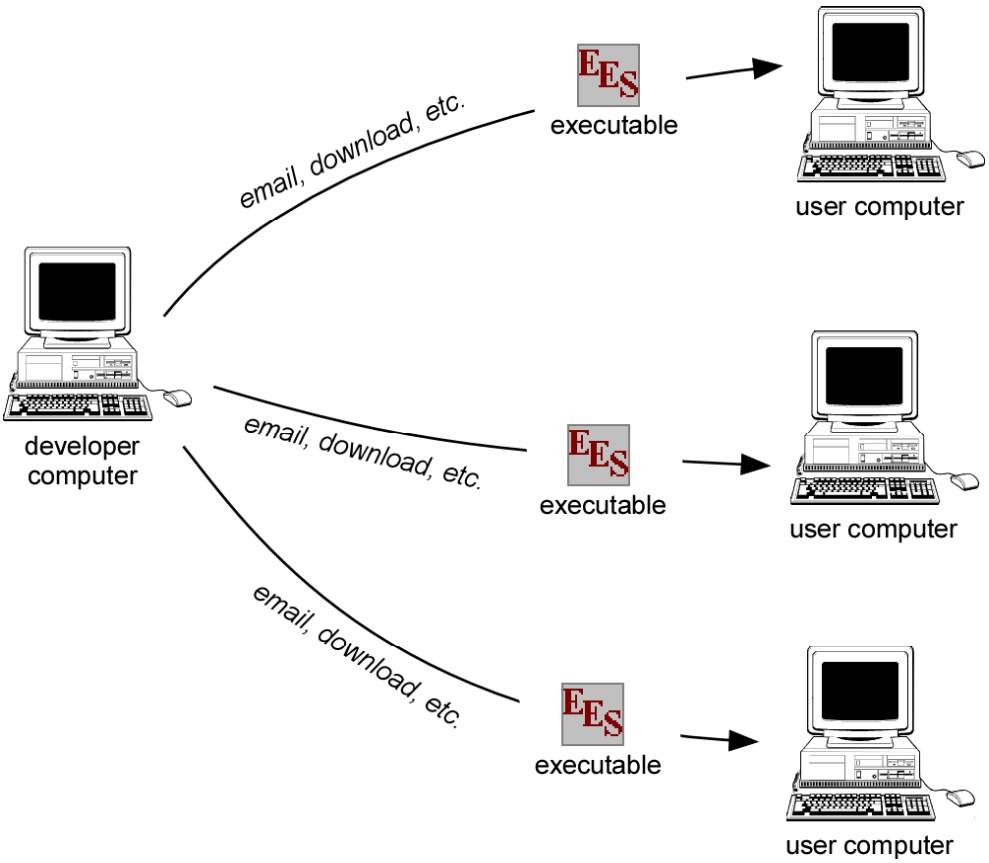
EESws takes the Distributable program concept to its next logical step, allowing multiple users to remotely access an EES program with a user interface through the internet.

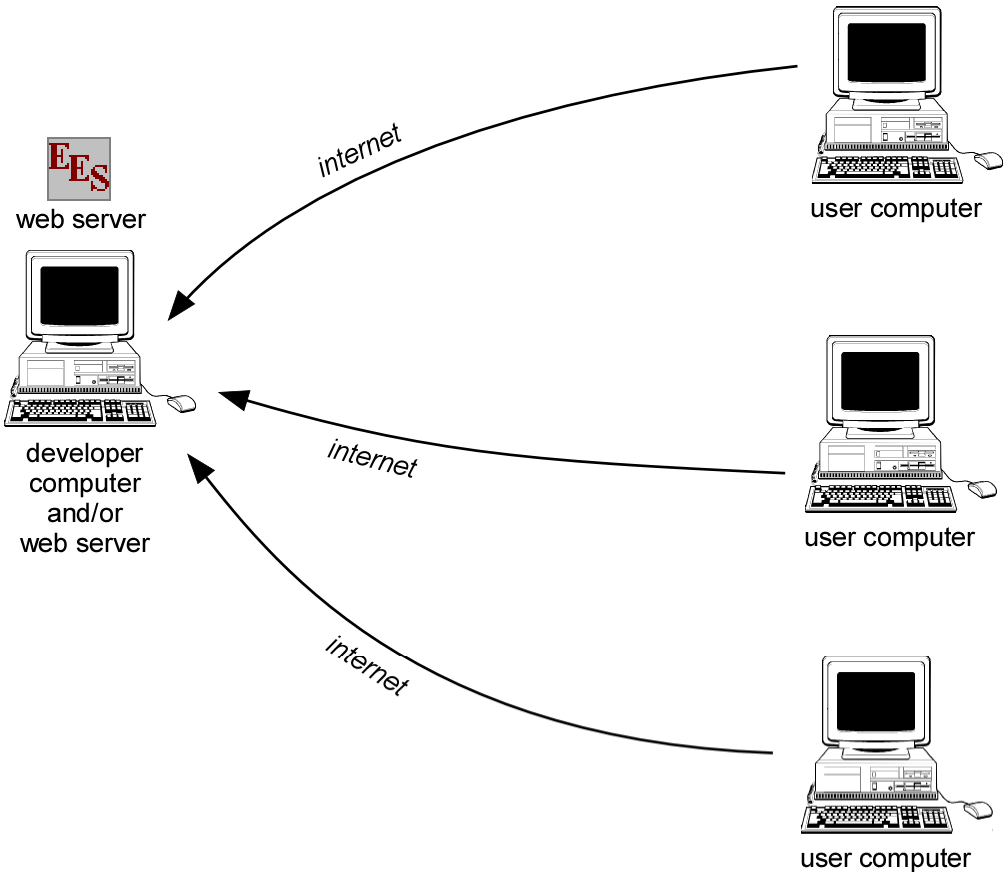
EES Web Server

An EES distributable program (i.e., an executable) must somehow be delivered to each user. This can be accomplished by download, email, or other means.

Once delivered, the developer loses control of these executable programs. Updating or correcting a distributable program requires that a new version be obtained. Unless an expiration date is provided, distributable programs may continue to be used long after they are relevant.

Finally, users install and use distributable programs individually—without accessing your company's or institution's web





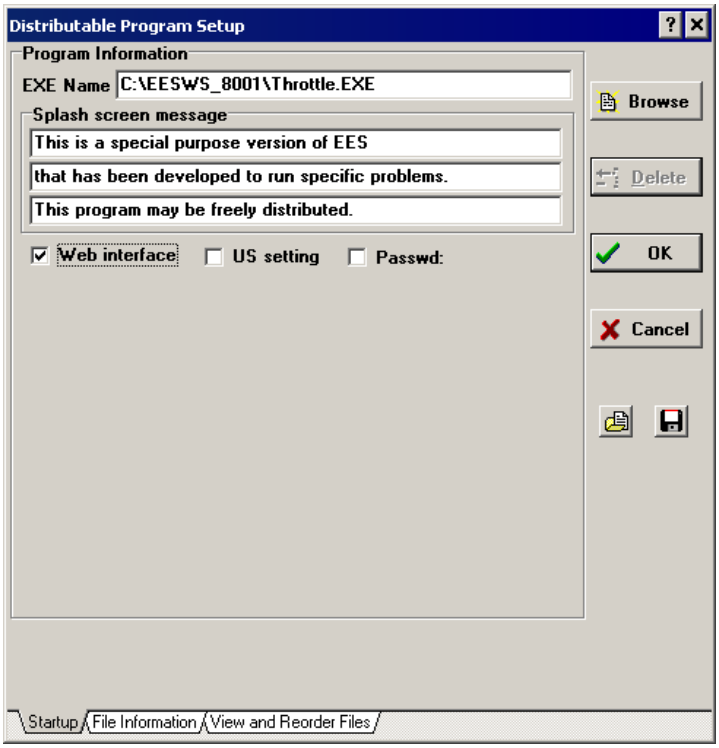
The EES Web Server allows users to remotely access an EES program through the internet. The program is placed on a web server at your company or institution.

All users will access the version of the program that resides on the server computer. The program can be updated and changed easily. If necessary, the program can be stopped and removed from the web site when it is no longer relevant.

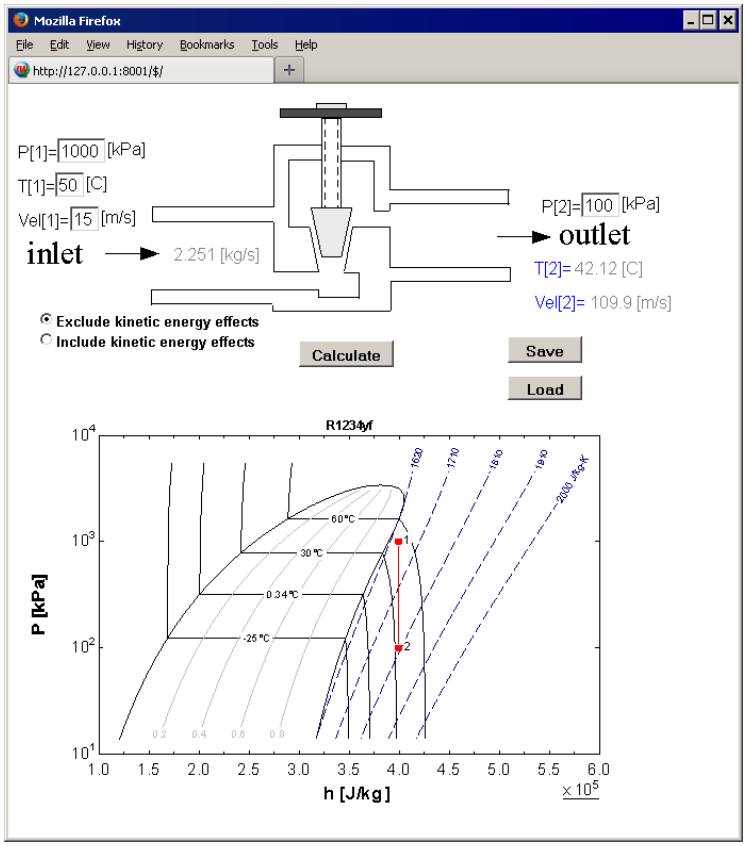
Another advantage of this approach is that users must be routed to your web page in order to gain access to your EESws applications—increasing traffic on your site and improving the visibility of your company.

EES Web Server

The EES Web Server program is an extension to EES that can be downloaded from FChart.com. EESws is free, but it only recognizes port 8001—each port can run a single EESws program on your web server. You can change the program whenever you wish. There is no limit on the number of concurrent users that can access the program from the internet. Additional ports (which allow additional EESws programs to be run) are available for purchase.



Detailed installation instructions for generating an EES web server can be accessed from http://fchart.com/ees/eesws.php. Essentially, you must create a distributable program in the normal way asdescribed in Chapter 17 of the Mastering EES ebook. There are some features of the Diagram Window that are not currently supported by EESws and these features must be avoided when building your distributable (e.g., Child Diagram windows, Greek symbols, and sliders). When building the distributable program, selecting the Web Interface, checkbox, as shown above, will generate and IMG directory and a .dly file ithat provided instructions to the EESws program to build a web page emulation of the Diagram Window and provide communication between the web page and the EES program.

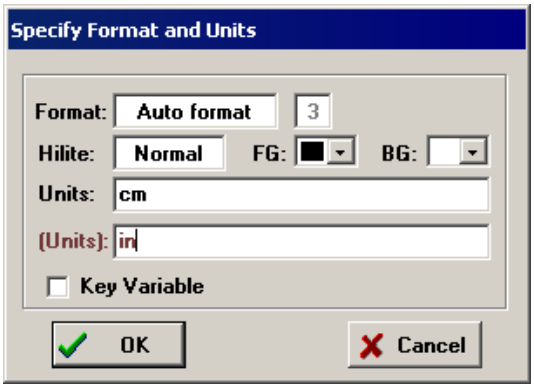


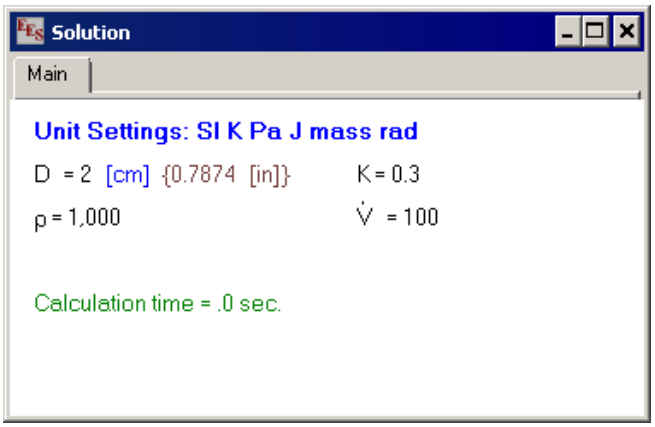
The EESws web server program itself can be downloaded free of charge from http://fchart.com/ees/eesws.php and installed on any Windows-based Internet-connected computer in order to provide a server for the EES web-connected program. Note that the Professional version of EES must also be installed on the server computer.

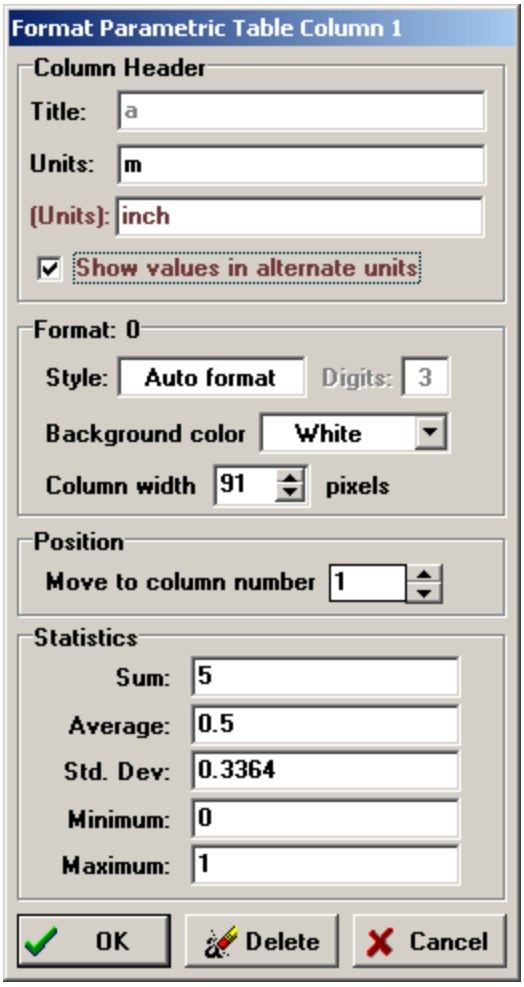
The result of using EESws is a web-page that operates exactly as the Diagram Window does in the original EES program. Users can be given the IP address to access the web-page and run the EES program from their browser program, without having EES installed on their computer.

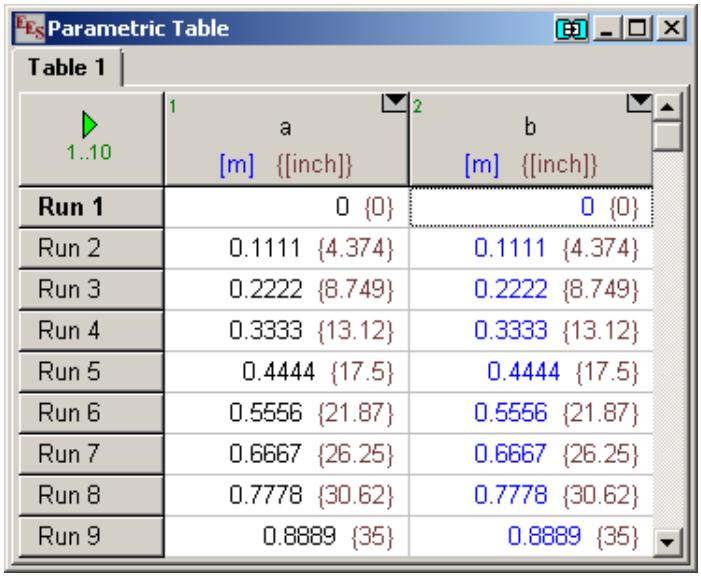
Dual Output Units

A dual unit feature has been added to EES. It is now possible to specify a second (alternate) unit for each variable. The alternate units are used only for output purposes—the primary units are used in all calculations. The value of the variable will be displayed in both primary and alternate units (in brown) in the Solution Window. Dual units can also be used in Parametric, Array, Lookup and Integral Tables.







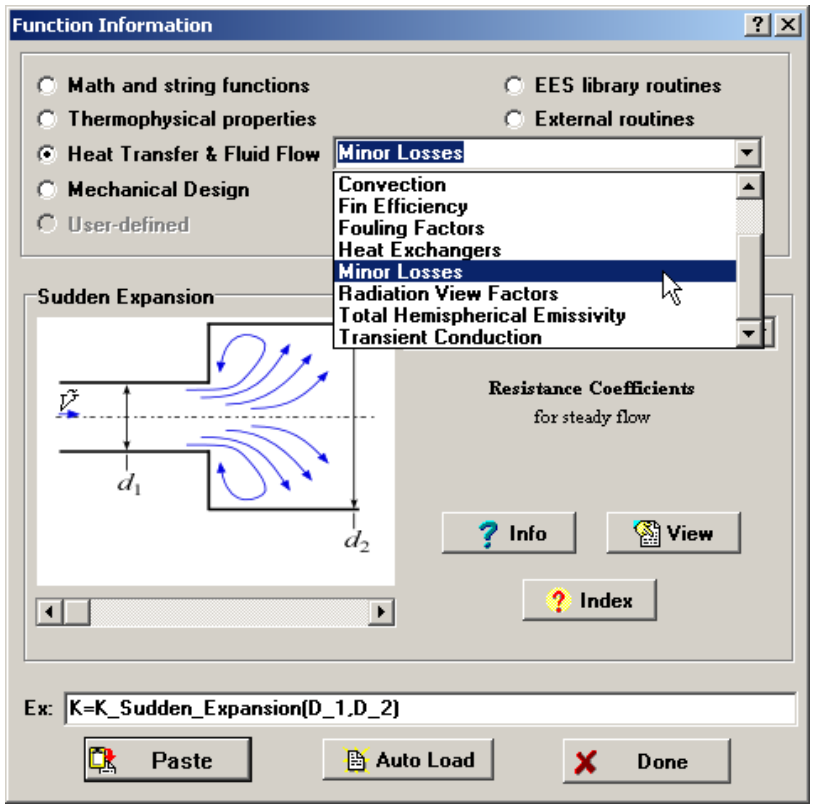


The Minor Loss Library

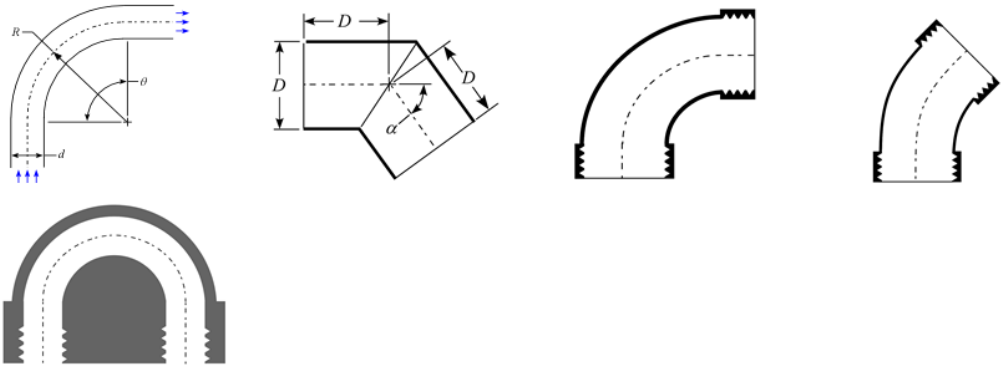
Minor pressure losses are incurred when fluid flows through a change in geometry or direction. Typically, minor losses are calculated in terms of a minor loss coefficient, *K*, which is defined as the ratio of the pressure loss to the velocity head of the flow. Minor loss coefficients have been measured for common flow geometries and the minor loss library in EES includes many of these.

The minor loss library is accessed from the Heat Transfer & Fluid Flow selection in the Function Information dialog. Scrolling through the lower window provides a visual representation of the available functions. Select Index in order to see all of the minor loss functions that are currently available.

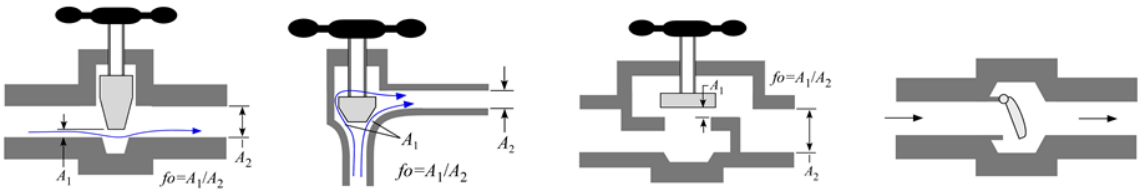
The minor loss library, like all of the functions in EES, continues to grow.



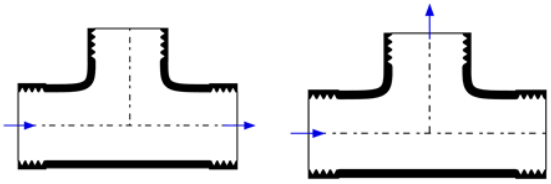
Bends and Elbows



Valves



Tees

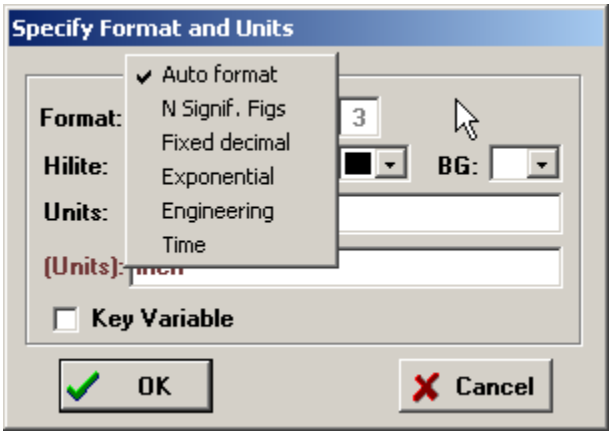


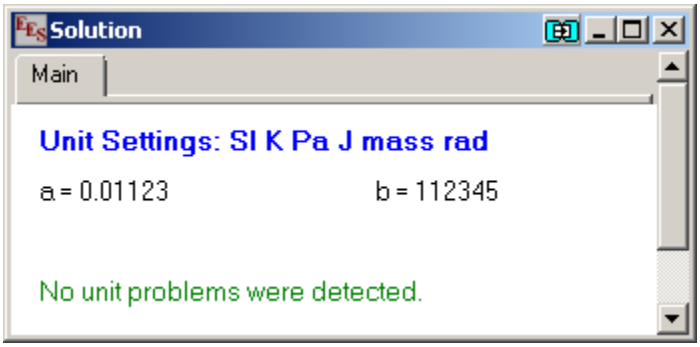
Significant Figures Output

Output options in EES for numerical values have included:

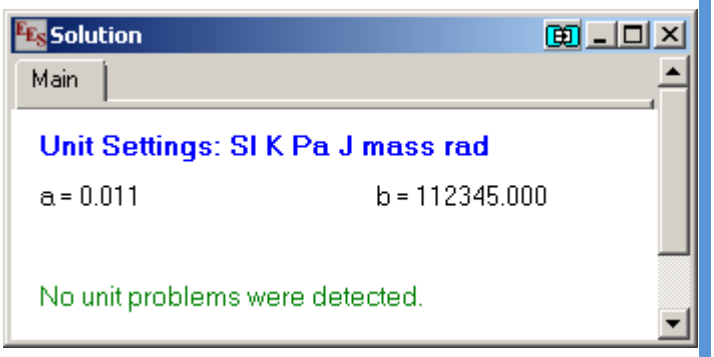
- Autoformat
- Fixed Decimal
- Exponential
- Engineering
- Time

A new output option has been added that displays numerical values in terms of a specified number of significant figures. This option is particularly useful for variables that represent data.

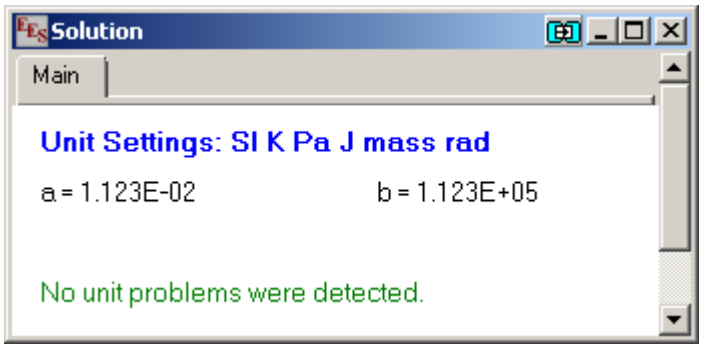




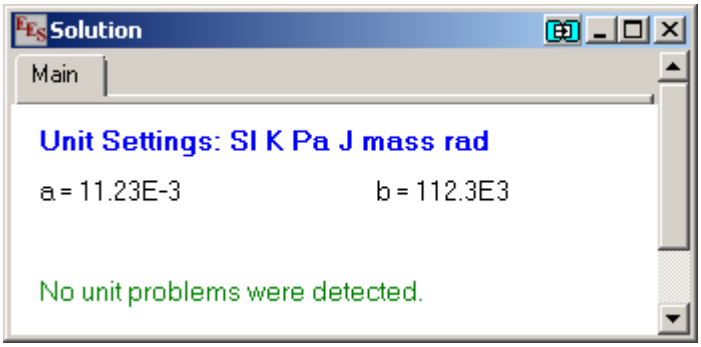
Auto format



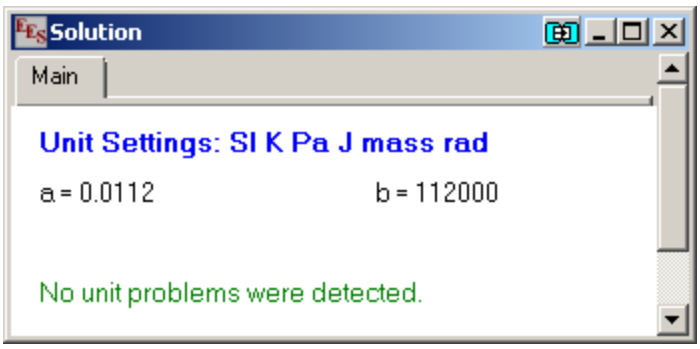
Fixed decimal (3)



Exponential (3)



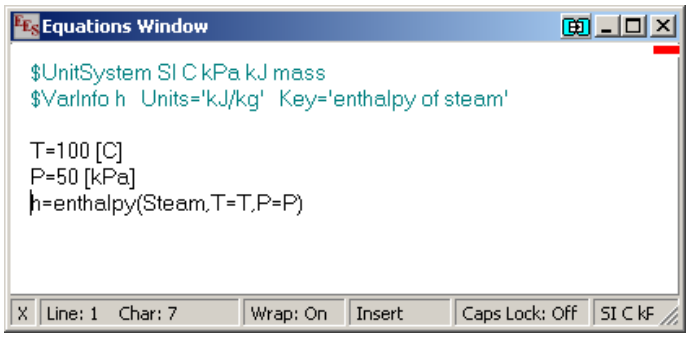
Engineering (3)

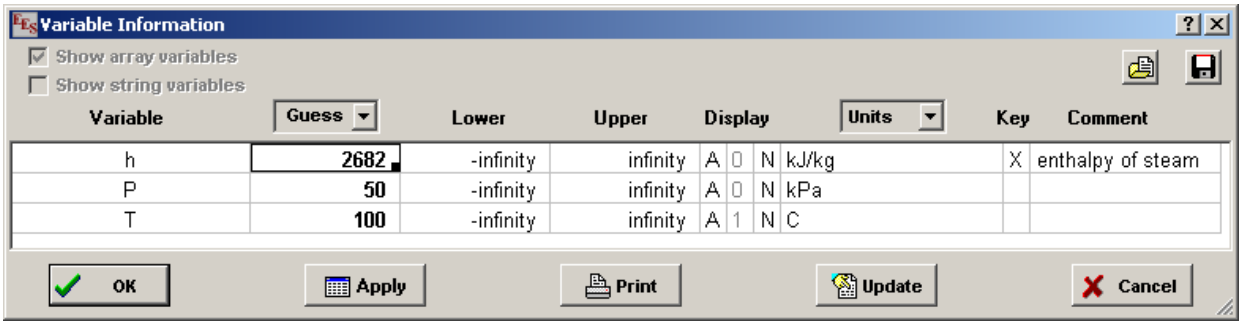


N. Signif. Figs (3)

The $VarInfo Directive

The $VarInfo directive allows variable information (including guess values, limits, units, etc.) to be entered directly in the Equations Window rather than from the Variable Information Window. The $VarInfo directive is particularly useful when EES commands are being entered from a macro or text file.





EES Training Opportunities

EES is used in many companies, organizations, and academic institutions. Most users are aware of the basic features—solving equations, Parametric Tables, plotting, and the powerful property routines. However, fewer users are aware of the more powerful features of EES such as optimization, integration, uncertainty propagation, complex algebra and subprograms. Even more advanced features available in the Professional version, such as the Diagram Window, animation, executables, web-based executables, directives, and macros, can enhance the capabilities of the program and open the door to a wide range of applications.

Our staff are available to provide a 1 day EES short course tailored to new users or experienced EES users. The cost is $1500 plus travel expenses. Contact Greg Nellis by email to arrange a training session (info@fchart.com).

EES Training Seminar

- Introduction to EES
- Thermodynamic and Transport Properties
- Functions and Procedures
- Curve Fitting and Interpolation
- Convergence and Debugging
- Optimization
- Integration
- Uncertainty Propagation
- Subprograms and Modules
- Libraries
- Heat Transfer Library
- Complex Algebra
- Directives
- The Diagram Window
- Animations
- Distributables
- Macros
- Communicating with other programs

Some Additional Changes to EES

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http://fchart.com

- The || operator can be used to concatenate strings. Unlike the Concat$ function, the || operator allows multiple strings to be concatenated.
- The Alter Values dialog used to fill in columns of a Parametric Table will now accept EES variables that have been set to fixed values in the First Value and Increment/Last Value fields.
- The Debye_T and IntK functions return the Debye temperature and integrated thermal conductivity, respectively, of incompressible substances that are contained within the EES library.
- The Debye library provides the Debye functions for specific heat capacity and internal energy.
- Side-by-side bar plots can be generated.
- High accuracy thermodynamic property and transport data are provided for R236fa (replacing the less accurate property data previously available using the substance R236fa_MH).
- The $ExportPlot directive provides an easy way to save a plot to a file after each calculation. Plots can be saved in .bmp, .emf, .gif, .jpg, or .tif formats.
- When the file name provided to a Help button in the Diagram Window begins with http://, the default internet browser will be started and pointed to the URL that is provided as the file name. This capability allows help for the Diagram Window to be placed on a website.

Instant Update and Technical Support Service

EES uses a different model for updating than most other programs. Each time that there is a change in the EES program, either to correct a problem or to add a new feature, the version number is incremented by 0.001 and the latest version of EES is placed on our website. Although the program has become very robust and stable, there have been many new versions of EES released since the last EESy Solutions was distributed.

Any user who has a current subscription to our Instant Update Service can download the latest version. All new non-academic licenses of EES are provided with one year of Instant Update Service. The fee to continue Instant Update Service after the first year is 20% of the current cost of the program per year. Contact F-Chart Software if you wish to re-subscribe to the Instant Update Service.