EESy Solutions

Engineering Equation Solver Newsletter *No. 8, Fall, 1999*

Welcome

EESy Solutions is a newsletter developed to provide news, tips, and tricks relating to Engineering Equation Solver. **EESy Solutions** is provided at no cost to all registered users of EES. Our intent is to publish the newsletter twice yearly. We encourage user contributions so send us your comments and questions.

Visit our Internet Site

F-Chart Software's website at www.fchart.com provides demonstration copies of EES and FEHT (our finite-element analysis program). In addition to a revised manual in Adobe Acrobat format, the website now provides several external programs that extend the capabilities of EES.

Are you Missing Icons?

Some users have reported that the icons in the toolbar below the menu bar are blank. The explanation for these missing icons is that Microsoft revised a system library in a manner that is incompatible with older versions. Recent versions of EES are designed to operate with the latest version Windows. To correct the problem, download the file 401comupd.exe from the EES Goodies section of our website. Execute this file to update your operating system. The problem will be gone the next time you execute EES.

WCB/McGraw-Hill Academic License

New academic versions of EES are now exclusively distributed by WCB/McGraw-Hill. Academic versions of EES are provided at no cost to educational departments that adopt selected WCB/McGraw-Hill textbooks including: *Thermodynamics: An Engineering Approach* 3rd edition by Cengel and Boles; *Heat Transfer: A Practical Approach* by Cengel; *Thermodynamics* 6th edition by Wark and Richards, and *Fluid Mechanics* 4th edition by White. Educational site licenses can also be obtained from WCB/ McGraw-Hill independent of any textbook adoption. F-Chart Software distributes the commercial and professional versions of EES and provides technical support for all versions.

What's Coming

EES is continuously being updated to add new features and eliminate bugs. Our next scheduled update will be in Spring of 2000. An update notice will be sent to each registered owner. If your address has changed or you wish to check to see if you are registered, send a FAX or e-mail to f-Chart software with your address, e-mail, and registration number. Here's a summary of some of the features that you can expect to find in the next update.

<u>High Accuracy Property Data</u>

High accuracy thermodynamic property data have been implemented for carbon dioxide, methane, ethane, propane, isobutane, n-butane, neon, nitrogen, oxygen, helium, R32, R134a, and ammonia, based on the Fundamental Equation of State. The major advantage of the high accuracy formulations is that they provide accurate property values at high pressures in the compressed liquid regime as well as at conditions near the critical point. The Martin-Hou property correlations provided in earlier versions of EES fail to provide accurate thermodynamic properties at these conditions. Transport property correlations have also been revised and their ranges have been extended.

<u>Property Plot Enhancements</u>

The capabilities of the Property Plot command in the Plot menu have been expanded. EES can now plot lines of additional thermodynamic variables on the each plot. The pressure-enthalpy plot, for example, can now include lines of constant temperature, entropy, and quality.

<u>Integral Table</u>

A new directive called $IntegralTable allows intermediate values of specified variables during numerical integration with equation-based Integral functions to be automatically placed in an Integral Table. The values in the Integral Table can be plotted, printed, or copied, just like the data in any other table. This capability makes it much easier to solve differential equations since it is no longer necessary to set up a Parametric table.

<u>Diagram Window Improvements</u>

The capabilities of the Diagram window for the Professional version of EES have been greatly expanded. For example:

1. 'Hot areas' can be set in the Diagram Window which, when clicked, bring up a child Diagram window. Now 'hot areas' can be placed on child Diagram windows as well to create 'grandchildren'. Hot areas can be placed on these windows as well. Navigation buttons are provided on all child Diagram windows to allow easy access to any Diagram window. The Windows menu shows the Diagram windows in an outline hierarchy.
2. Link buttons can be placed on the Diagram window or child Diagram windows. The action taken by the Link button can be to start any Windows program, to open an EES file, to open a selected file in a EES Distributable program, or to show any child Diagram window.
3. A Help button can be placed on the Diagram window or child Diagram window. When the user clicks the Help button a help document will be displayed. You can design your help documents to be ASCII text files, Windows help files or HTML files.
4. The Diagram windows now provide tools to draw colored lines, rectangles, and ovals. The graphic items can be moved, scaled, selected, and aligned in a manner very similar to that used in popular drawing programs. It is no longer necessary to import a drawing into the Diagram window, although that capability is still supported.

Professional Version

The Professional version can solve up to 10,000 simultaneous equations. The number of rows in the Parametric table is limited only by available memory. Self-contained distributable programs can be created. The license cost of the Professional version is $800 for a single user version and $300/user for site licenses with 10 or more users. If you wish to upgrade to the Professional version, the cost of your current Commercial version will be subtracted from the Professional license cost.

Did You Know?

EES will accept variables as well as numerical values for the guess value and lower and upper limits in the Variable Info dialog.

Pressing the right mouse button while editing values in the Variable Info dialog will display a pop-up menu that provides Cut, Copy, and Paste.

A cross-hair cursor can be displayed on any Plot window by holding the Ctrl key down. The coordinates of the cursor are shown in the Plot Window title bar.

A range of array variables can be specified using array range notation, e.g., X[1..10]. This capability is useful when passing many arguments to a function, procedure or module.

If you hold the Shift key down while clicking the OK button in the EES splash screen, the Hello.EES program will not be opened. You can also delete the Hello.EES file if you do not wish to have it loaded at startup.

To enter µ as in µm, hold the Alt-key down and type 230 on the numeric keypad. Alt-248 displays the degree symbol °.

The Residuals window provides a great deal of information. In addition to showing residual values, it indicates the equation blocking and calculation order used by EES. The variable(s) that are being determined by each equation or block are shown in bold. The block number shown in the Residuals window indicates the order in which EES is solving the set of equations. Block D is used to identify variables that are set in the Diagram window. Block T indicates that the variable is set in the Parametric Table. Block 0 is used for equations having a single unknown which are solved individually. The order in which equations having block 0 appear is the order in which they are solved. After the block 0 equations are solved, EES will simultaneously solve all equations in block 1, then block 2, and so on until all equations are solved.