EESy Solutions

Engineering Equation Solver Newsletter ***No. 4, Fall, 1997***

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.

New Internet Site

F-Chart Software has established a new website at www.fchart.com. Demonstration copies of EES and FEHT (our finite-element analysis program) can be downloaded from the website, along with new example problems.

WCB/McGraw-Hill Academic License

F-Chart Software and WCB/McGraw-Hill have reached an agreement in which academic versions of EES will be exclusively distributed to educational institutions by WCB/McGraw-Hill. Under the current plan, academic versions of EES will be provided at no cost to educational departments that adopt selected WCB/McGraw-Hill textbooks including: *Thermodynamics: An Engineering Approach* 3rd edition by Yunus A. Cengel and Michael A. Boles and *Heat Transfer: A Practical Approach* by Yunus A. Cengel. Educational problems that employ innovative applications of the EES Diagram Window have been developed for these two textbooks. Existing academic licenses provided by F-Chart Software are not affected by this agreement. F-Chart Software will continue to distribute commercial versions of EES.

What's Coming

EES is continuously being updated to add new features and eliminate bugs. Our next scheduled update will be in Spring of 1998. An update notice will be sent to each registered owner. Here's a summary of some of the features that you can expect to find in the next update.

Menu Speedbar

A menu speedbar has been implemented to provide one-button access to the most commonly applied menu commands.

Subprograms (32-bit version)

Subprograms are basically stand-alone EES programs that can be called from the main EES program or from other subprograms. The format of a Subprogram is identical to that for an EES Internal Procedure. A Call statement is used to call the Subprogram, just as for the Procedure. The difference between a Procedure and a Subprogram is that a Subprogram is composed of equalities whereas the Procedure is composed of assignment statements. Consequently, a Subprogram provides iterative solutions, when needed, and order independent equation input, just as in the main part of EES. In addition, each local variable in a Subprogram has a guess value, lower and upper bounds, and formatting information. Each subprogram can have up to 5000 local variables.

Subprograms may be stored as library files, just like Internal Functions and Procedures. The library files can be automatically loaded if they are placed in the USERLIB subdirectory. Subprograms can significantly increase the capabilities of large EES problems.

New Property Data Routines

The thermodynamic property data routines have been modified to allow calculation of the thermodynamic properties of zeotropic mixtures. In a zeotropic mixture, the temperature may change during a constant pressure phase change. Property data for refrigerants R407C and R410A have been provided thus far.

A external procedure called JANAF has been developed to provide the specific heat, specific enthalpy, and specific entropy (3rd law reference) of many substances, including intermediate combustion species, as a function of temperature. The JANAF procedure is currently distributed with EES so you may already have it.

Uncertainty Analysis

The propagation of uncertainties from measured values to a calculated result can be determined with the new Uncertainty Propagation command in the Calculate menu. The partial derivatives of the calculated variable with respect to the measured values are also calculated and displayed.

Multiple Sets of Default Variable Information

The Default Variable Information command in the Options menu allows the guess values, bounds, display format and units for variables to be automatically set based on the first letter of the variable. It is now possible to have multiple sets of Default Variable Information by using the Load and Store buttons that have been added to the this dialog window. Store will store the currently defined defaults in a file having a .dvi filename extension. Load will load a previously-stored file and apply the defaults to all existing and new variables. The EES_DFLT.dvi file contains the variable defaults EES will apply when it is started.

Conveniences

Text items and lines/arrows on the plot windows can now be cut, copied, and pasted.

The column widths in the Parametric, Lookup, and Arrays tables may now be individually changed.

EES will automatically load the HELLO.EES file if it finds this file in the EES main directory. You can place messages, directions, or any information you wish in this file.

Lines and arrows can now be placed on the Diagram window.

The height and width of the Variable Info dialog can be changed by 'dragging' an edge of the window to its new size.

Two new directives have been added: $Warnings On/Off controls the setting of the Warnings Option in the Preferences dialog. $Arrays On/Off controls whether arrays variables are displayed in a separate Arrays table.

The Lookup, Interpolate, and Differentiate functions will now accept an ASCII Lookup file, in addition to the binary .LKT file that was accepted in previous versions.

Delayed – but coming soon

One of the most powerful features of EES is its ability to interact with external programs. Two external programs of considerable interest are REFPROP 6 and AWMIX. REFPROP 6 is a highly-accurate database of thermodynamic and transport properties for refrigerants and refrigerant mixtures developed and distributed by the U.S. National Institute of Standards. An interface program that allows EES to obtain property data from REFPROP 6 has been developed and it will be available from F-Chart Software when NIST releases REFPROP 6. The REFPROP 6 release is expected in late 1997. AWMIX is an external routine providing accurate property information for ammonia-water mixtures based on correlations devloped by Dr. Reiner Tillner-Roth of University of Hannover and Dr. Dan Friend of NIST. Release of this external routine has been delayed until early 1998.

Did You Know?

Pressing the right mouse button when there is selected text in the Equations window will place comment braces {} around that text. If the selected text already is enclosed within comment braces, they are removed.

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

EES will display variable names with a dot or bar in the Formatted Equations and Solution Windows by adding _dot or _bar to the variable name. For example, m_dot will display as $\dot{m}$ and T_bar will display as $\overline{T}$. T_infinity will display as T_∞.