EESy Solutions

Engineering Equation Solver Newsletter   *No. 1, Spring, 1996*

Welcome

This is the premier issue of **EESy Solutions**, 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.

Windows 95 Compatibility

Unless you were living on another planet, you know that Microsoft released Windows 95 last year. Tests of EES operating under Windows EES revealed only two problems. The blue lettering that EES uses for comments in the Equations Window did not display properly. This display problem could be circumvented by turning off the option to display comments in blue with the Preferences command (or Display Options in older versions). A more serious problem was that EES refused to produce printed output on some printers. Both of these problems were corrected in Version 4.128. If you are experiencing either of these problems, you will surely want to update. See below for details.

Power Mac Compatibility

Apple Computer set off in a new direction with the release of their Power Mac computer line. The Power Mac computer uses a new microprocessor which is essentially incompatible with the 68000 family of microrocessors used previously. However, the Power Mac is able to run software written for the 68000 microprocessors (without a math co-processor) in emulation mode. What this means for EES is that the EES+ program, developed to run on 68000 microprocessor without a math coprocessor will operate on the Power Mac. The EES program will crash unless calls to the floating point processor are emulated by the shareware program, Software FPU, or similar commercial products. In either case, the execution speed of the 68000 versions of EES on the Power Mac is slow. If you are using a Power Macintosh, you should consider updating to the newly released native-code Power Mac version, which provides extraordinarily fast execution speed.

New Releases

For the past few years, EES has been incrementally updated to add new features and to eliminate bugs. In recent months, however, both the Macintosh and Windows versions of EES have undergone major revisions to take advantage of new machines and operating systems. Registered owners of EES should haved received an update notice. If you were not notified of the update, we may not have your address; contact F-Chart Software. Here is a summary of the changes.

Windows Version

Starting with version 4.20, EES has been rewritten using Borland's Delphi. The program has an entirely new look and feel, as well as many new features. The File menu now provides a list of eight recently-accessed files. The font and font size used in all windows and on printed output is user-selectable. The Equations window provides a word-wrap option. The Parametric, Lookup, and Arrays tables have new controls to allow easier automatic entering of values, copying and pasting of selected cells, column interchange, and improved formatting. Multiple linear regression (in addition to the single-variable curve-fitting provided in earlier versions) can now be automatically done using the data in any of the three tables. In addition, there have been literally hundreds of less visible changes such as an the increase in the number of variables to 2500 (from 750 in earlier versions), more accurate thermodynamic and transport data, additional fluid property data, improved error protection, and smoother, faster operation.

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Macintosh Version

The major development for the Macintosh version is the introduction of the native code Power Mac version. Starting with version 4.20, there are now three Macintosh EES programs: EES+ for the 68000 machines without a math coprocessor; EES for 68000 machines with a 688XX math coprocessor; and EES_PPC for the Power Mac. The Power Mac version, compiled with the Metrowerks Code Warrior Gold compiler, provides extremely fast execution speed on Power Mac machines. However, the Power Mac internally represents floating point numbers with a 64-bit format whereas the older versions used either an 80-bit or 96-bit representation. Consequently, EES+ and EES versions also were revised so that they can read and write files with the same format as the Power Mac version. All three versions can read files written by older versions of EES. However, the files written by the newer versions of EES cannot be read by the older version, so some care in updating is warranted. In addition to the development of the Power Mac version, a number of new features have been added. Multiple linear regression (in addition to the single-variable curve-fitting provided in earlier versions) can now be automatically done using the data in any of the three tables. The upper limit on the number of variables has been increased to 2500 (from 1000 in earlier versions). Additional fluid property data have been added and the accuracy of existing thermodynamic and transport property data has been improved.

Refrigerant Property Data - REFPROP

You may be aware that, as of January 1, 1996, refrigerants such as R-11 and R-12 which have been proven to be harmful to the ozone layer can no longer be sold in the United States. EES will continue to provide thermodynamic and transport properties for these and many other pure refrigerants. However, a number of the promising refrigerant alternatives in use or under consideration are blends of two or more components. Although EES does not directly provide properties for refrigerant blends, these properties can be accessed by EES from REFPROP, the National Institute of Standards and Technology (NIST) refrigerant properties program.

One of the most powerful features of EES is that it can call external programs written in Pascal, C, C++, or FORTRAN. Directions for writing external programs are provided in Chapter 6 of the EES manual. The NIST REFPROP program is written in FORTRAN. A FORTRAN interface program has been developed to allow REFPROP to be called from EES, combining the NIST property data base with the equation-solving and other features of the EES program. If you are involved in modeling refrigeration systems, you will find the EES/REFPROP interface to be of considerable interest. Contact F-Chart Software for pricing.

Books Using EES

A book entitled *Absorption Chillers and Heat Pumps* by K.E. Herold, R. Radermacher, and S.A. Klein will be published early this year by CRC press. This book is somewhat unusual in that all of the example problems have been solved with EES, making use of the EES ammonia-water and LiBr-water property functions. A special version of the EES program is provided with the book.

The equations in *Solar Engineering of Thermal Processes*, written by J.A. Duffie and W.A. Beckman, and published by J. Wiley and Sons have been coded into EES internal functions. Contact Professor Beckman at University of Wisconsin if you are interested in obtaining a copy of these functions. Course outlines and special problems are also available. e-Mail: beckman@engr.wisc.edu.