



TSO-SPEAKEASY NEWSLETTER #5

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DELTA

The 3E DELTA processor is undergoing final test runs here at Argonne. This version contains fixes for almost all the known computational errors in the 3E processor. A list of the known remaining errors is included in a later section of this Newsletter. In addition it has temporary fixes to improve the linkage technique. The most important change though is the improved overlay structure designed by Steve Pieper. I/O activity is dramatically decreased and real time response is noticeably improved when executing in the program mode. Frank Serduke has provided a linkule for matrix inversion that is used by this processor. It is now possible to invert complex matrices. Checks for singularity and loss of significance are much improved.

The DELTA processor includes many new features (needless to say). The most noticeable is an improved prompting scheme for the EDIT mode and the addition of an edit command mode. The HOLDING mode is automatically entered when an error is encountered while executing a SPEAKEASY program to enable a user to correct and continue a calculation.

We shall begin distributing DELTA very soon. This may be done through the Argonne Code Center if arrangements can be made in time. If not, we will attempt one more distribution by our time-consuming mechanism.

Enclosed is a paper submitted to SIGPLAN showing the use of DELTA.

New Linkules

With each new release we send out tapes containing our latest linkule library. These are, therefore, often linkules available to you that are still undergoing tests. In general, these linkules are not documented and are therefore not really usable. When they are considered fully validated, HELP documents will be provided for you and your users.

An example of such a linkule is the one called TSO in your current library. This linkule (written by Steve Pieper) allows you to enter the TSO command mode while in SPEAKEASY. The version available to you is usable, but an improved version will be available with the DELTA release. We hope to have the documentation available by the time the tape is sent out. Other linkules that might be useful are

LINEPLOT	a graphic drawing linkule for terminal output
ROWINDEX	try these on a 2-dimensional object to see what
COLINDEX	they do

Len Harding at The University of Michigan was somewhat disappointed to find that SPEAKEASY could not link to any Fortran routine without the user being forced to write an interface routine in Fortran. Two experimental linkules have therefore been added to do just that. To use these linkules it is necessary that all allocation of space, tests for consistency and selection of the types of arguments be carried out in SPEAKEASY before invoking the link. In-place arguments are not allowed and only single number functional returns are permitted. The linkules FORTSUB and FORTFUN are identical except that FUN returns the scalar answer. The library to be searched for the routine is called LINKLIB. If LINKLIB pointed at SYS1, FORTLIB then

```
A = 1
FØRTFUN (DEXP:A)
```

will return

2.718.

Note the routine being linked to must still be self-contained. If you attempt to call DSIN, for instance, there will be trouble since that routine calls IBCOM. Anyway have fun with these.

LINEPLOT is used as follows:

```
VSIZE=60           (this means use 60 columns)
VSCALE=-2, 2       (limits on the plot)
X=GRID(0, 10, .2)
Y=SIN(X)
Z=COS(X)
LINEPLOT(Y, Z)
```

USERS

The command USERS should show you who also is using TSO at that time.

TSO

This command will put you into the TSO command level. The version you have may cause you severe difficulties if you make errors. Try to be correct in your TSO commands. An error sometimes results in the user being Logged Off! A null line will get you back to SPEAKEASY.

The SPEAKEASY Reference Manual

The entire set of manuals describing SPEAKEASY is being reissued as a single volume. It will include 1) the Introduction to SPEAKEASY, 2) SPEAKEASY-3: The SPEAKEASY System, 3) SPEAKEASY-3: Linkules and Interfaces, and 4) a new version of The SPEAKEASY HELP Documents. The volume will be available from the National Technical Information Services and will cost about \$8. It should be ready sometime in July. Unfortunately, we are just about out of all documentation here at Argonne so we will have to scrape along with what we have for new installations until July. (We do have adequate numbers of the Introduction and several preprints of less formal documentation.)

MTS

A version of SPEAKEASY is operating under MTS. This version was adapted by the people at Wayne State University. MTS is a different operating system from OS, in particular the library structure of SPEAKEASY has had to be adapted to that system. This is being done in a way that should leave the operation of the system from the user viewpoint as close as possible to the standard release.

PDP-10

An adaption to the PDP-10's is now being investigated by the people at Western Michigan University. Since this is not a byte oriented machine, the translation to the FACOM is being used as a starting point.

The SPEAKEASY Meeting, September 24 & 25, Argonne, Illinois

I have scheduled a meeting here at Argonne for Monday and Tuesday, September 24 and 25. This will be the first opportunity for the user communities of SPEAKEASY to assemble to discuss problems of common interest. Although many of you have already expressed interest in this get-together, I should like to have some help in deciding its format. First of all, will you be able to attend: If so, what topics would you like to have scheduled for discussion? Will you be willing to lead one of the sessions? If so, which one? We can make use of the rather varied facilities here at Argonne to our advantage if we wish, and we shall surely make use of the talents in Argonne's Applied Mathematics Division. I have enclosed a form that I should like to have returned so that I can plan the meeting. Please feel free to alter it so that it reflects your ideas.

ERRORS IN SPEAKEASY-3E

The following is a list of all of the known errors in the DELTA release of SPEAKEASY-3E.

- 1) `FRACPART(X)` and `INTPART(X)` give erroneous values if $|X| > 1.E11$.
- 2) `A, B, C` where `A, B, and C` are any SPEAKEASY expressions will print only `A`. (On the other hand `X = A, B, C` makes an

array of A, B, and C.

- 3) One cannot compare 8-byte literals.
- 4) The relational operators .EQ. and .NE. may not be used with complex numbers.
- 5) X .AND. 'B' results in 'B' being placed in X.
- 6) Two-dimensional objects when used as indices produce rather meaningless results.
- 7) The line

ARRAY(I) = 5

where ARRAY has not previously been defined as an array does not define ARRAY to be an array. (A(I) = 5 does define A to be an array if necessary.) This same error occurs if any SPEAKEZ word or linkule (MFAM, RATIONAL, etc.) are used in place of ARRAY in the above (various error messages may also be printed).

- 8) If A is a one-dimensional object, A(I,) will function the same as A(I) instead of printing an error message.
- 9) RETURN cannot appear on an IF (. . .) card in the program mode.
- 10) PROD does not work for complex arrays.
- 11) Many error messages do not really mean what they say. They should merely be viewed as an indication that something is wrong. Some examples are:

"LOOP NOT ACTIVE" on a statement containing
ZEROS(F:X) means F has no zeros.

"NO UPPER FOR BOUND" on a statement containing a
logical operator may indicate that one of the operands
was complex.

"ERROR NUMBER 111" means an array or matrix is
being defined with zero or negative size.

"ERROR NUMBER 41" means there are no 2 dimensions
given for MATRIX.

- 12) USE MEMBER X LIBRARY Y will cause an abend if there is no file named Y. If X is not a member of Y then nothing is done and no error message is printed.
- 13) FREE Z will not work if Z is complex but one has returned to the real domain will not work.
- 14) In TSO an underflow or overflow results in an abend.
- 15) X(3) = 'B' does not work. (In general many things cannot be done with 8-byte literals.
- 16) HELP does not work in the batch version. (The command LISTMEMBER XXXX HELP may be used instead.)
- 17) PUNCH, READ, and WRITE do not work in the DELTA release for TSO.

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