Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Vol. 00 – 2 ; April, 2000

Table of Contents

Salford FORTRAN Compilers

Defined but unused local variables are better identified by the new Salford compiler than the old --- or the F95 Lahey compiler, for that matter. In any case, dozens of such weaknesses were noted for the first time. For example, variables NUMHLD and MRGN in RSTART were *"given a value but never used."* This was noted within disk file MAIN00.ERR as supplied on December 13th by Masahiro Kan of Toshiba Corporation in Japan.

Lines longer than 72 characters are warned about by the F95 compiler just as was the case with the old. For example: *"WARNING - Line has been truncated (line is longer than 72 characters)."* This was not an issue for the old translator because /no_warn73 was used as a qualifier of the compilation in order to suppress such messages. Well, the F95 translator has been improved to avoid this need for COMPLEX and CHARACTER declarations (the exceptions that were being allowed through as 80-column card images).

Compiler error files from Masahiro Kan seemed to be truncated at 4091 bytes, for some reason. For example, disk file MAIN20.ERR ended as follows: *"WARNING - Comparing floating poi"* Strange.

A formatted WRITE without the statement number of a FORMAT was found to be discouraged by the new Salford compiler. For example, MODELS author Laurent Dube had created the following encode of TEXT1 within SUBR15 : WRITE (TEXT1, '(6HMODELS)') About this, FTN95 observed: *"WARNING - The 'H' edit descriptor is an obsolescent feature."* Why Dube ever used WRITE is not understood, since a simpler equivalent is TEXT1 = 'MODELS' (the change was made). Good (more progress).

A floating-point constant that is an integer can not be stored in an INTEGER variable without a warning message, it was found. For example, LENGTH(IBR+1) = -78765. within IN5152 was warned about by the following: *"COMMENT - This assignment will result in a loss of*

precision, assigning from REAL(KIND=1) to INTEGER (KIND=3)." It is one thing to warn about unusual use. But what is this alleged loss of precision? Nonsense. Value 78765 is small enough to be converted and stored exactly in an INTEGER*4 variable. Not only that, ATP is counting on it (no change was made to the code)!

The biggest problem using the F95 Salford compiler has to do with restrictions on the order of POINTER declarations. These may comply with the F95 standard, but it has been found that Lahey is more tolerant, permitting the declarations to be delayed. As a result, the need to reorder was discovered only later, when translator output was sent to Mr. Kan for evaluation. The last of the forgotten reordering was corrected December 27th, when a dozen or so subroutines were modified out of necessity.

Execution speed of F95 Salford-compiled and linked programs is of concern following the first test by Masahiro Kan. From E-mail dated December 18th: *"I made a test comparing LF95, FTN95 and Mingw32 using an electric field calculation program. The test was done on a P5-166 under Win95. Using data TEST211.DAT, the different execution times are as follows: 1) Mingw32 GCC-2.95, compiler switch -O2, 23.0 sec; 2) Mingw32 GCC-2.95.2, compiler switch -O2, 20.89 sec; 3) Salford FTN95 58.77 sec; 4) Salford FTN95, /OPTIMIZE, 54.98 sec; 5) Lahey FTN95, 17.85 sec; and 6) Lahey FTN95, compiler switch -O1, 18.29 sec."* Of course, the Mingw32 compiler is F77 whereas the Lahey and Salford compilers are F95. These results are not good for Salford compared with Lahey: 55 seconds vs. 18 seconds, respectively. So, although mixed-mode aliasing continues to be allowed in the eventual hope that Salford execution speed proves to be greater than Lahey's, Mr. Kan warns that this is not yet assured. The Salford compiler costs much more, but is not yet known to perform as well for the end user. Yet, your Editor remains hopeful. On December 20th, Mr. Kan warned: *"you might have to spend too much time to make Salford FTN95 work with F95 ATP, and finally would be disappointed by the slow execution."* Your Editor responded: *"I do not think so. Either ATP will simulate at an acceptable rate immediately or we will learn how to make this so."* Reasoning is simple: Salford could not sell many copies of a new compiler that resulted in such poor program execution on Pentium. For newer hardware? Maybe. But not for Pentium. Slow Pentium execution would be a prescription for bankruptcy of the company.

Salford F95 ATP execution speed first was reported by Masahiro Kan in E-mail dated January 4th. For his 166 MHz Pentium with 48 Mbytes of RAM and Win95, seconds spent within the time-step loop of DC-1 follow:

```
F77  GNU  Mingw32  ATP            8.9
F95  Lahey  ATP                   8.5
F77 Salford  ATP  for  Win16      8
F95 Salford without /optimise    12
F95 Salford with    /optimise    11
```

Conclusion: better than the preceding paragraph, but still not good for F95 (new) Salford. Note lack of fractional seconds in the final three rows. Whether Salford rounds or truncates is not known. About the only good aspect was size of F95 Salford TPBIG: at 4.1 Mbytes, this is not too much bigger than the 3.5 Mbytes for F77 Salford, and decidedly better than the 6.0 Mbytes for F95 Lahey.

Mixed-mode aliasing works for integers and floating-point numbers, but not for integers and character variables, it would seem. For example, in F77 SUBROUTINE HEADL4, we used

```
CHARACTER*4  CH4IBS
EQUIVALENCE ( CH4IBS, IBSOUT(1) )
```

where IBSOUT was an integer vector. No problem. But when Mr. Kan attempted the F95 equivalent, the result was two Salford error messages: 1) *** You cannot assign an expression of type INTEGER (KIND=3) to a variable of type CHARACTER (LEN=4); and 2) *** Different types in pointer assignment - the left hand side is CHARACTER (LEN=4), yet the right is INTEGER (KIND=3). This was for CH4IBS => IBSOUT(1) where both variables were declared as POINTER. No fundamental problem, although the required changes are a little frustrating. CH4IBS was introduced years ago to avoid an F77 Salford compiler message that warned of inconsistent arguments of CALLs to DBOS file routines (e.g., WRITEF@). Now, the rules have changed. The tricks of F77 no longer apply to F95.

Fortran 95 from Lahey Computer

Lahey Computer Systems of Incline Village, Nevada, has supplied a Fortran 95 (F95) compiler named *LF95 Express* for $199. This is a continuation of the story about Lahey F95 as begun in the preceding issue. Warning: the stated great price is scheduled to rise to $249 at the end of January, 2000. This according to E-mail advertising from Lahey Computer dated December 29th, 1999.

Bob Runyan of Lahey is thanked for reviewing that initial story in the January issue. This was prior to publication, to be sure your Editor had not somehow misrepresented Lahey. Mr. Runyan's only suggestion for change was about optimization: *"You might be able to improve execution speed by trying the recommended switches at the end of chapter 2 of the User's Guide."* Later that same day, your Editor responded: *"Right. We have seen this advice, and intend to experiment later. Right now, speed is not a priority."* About a difference of tolerances between Salford F95 (used for ATP only by Masahiro Kan of Toshiba Corporation in Japan) and Lahey F95, Mr. Runyan advised: *"I'm forwarding your questions to Howell Johnson in our Development Group."*

Use of Lahey ACCESS='TRANSPARENT' on the file OPEN statement provided improved C-like .PL4 file support. Recall your Editor was able to make Watcom ATP support C-like files in FORTRAN, but it was not easy. Operation never was perfectly general, as comment cards

of Watcom DC-45 and 46 documented. Well, curiously, the Lahey ATP solution to DC-46 was bad because DC45.PL4 was incorrect. Rather than study the problem, your Editor replaced the limited Watcom ACCESS = 'DIRECT' use by Lahey's ACCESS='TRANSPARENT' during the first week of October. End of trouble. Yet, success was no surprise, it should be explained. The first ATP version to support C-like files was either David Szymanski's Unix or the DOS ATP produced by Lahey F77L. Both were in use more than a decade ago. The Lahey details seem unchanged (very nice).

Module EMTSPY recognizes special numerical value 8877.E33 Curiously, all previous compilers had no difficulty, but Lahey failed. Yet, Lahey was not wrong, study revealed. This resulted in a reform that is documented on comment cards of the module having UTPF idents WSM99SEP. At issue is the storage of integers in floating-point variables. Previously, it always had been assumed that there never was a problem. Now, the rule has been modified: Any computer can store integers exactly using floating-point storage provided enough precision exists. For large integers such as 10**33, this requirement is **not** satisfied. Exact storage requires more than the 16 digits of precision that are available using REAL*8.

Use of DISLIN for ATP screen graphics began October 29th when BPA's Dr. Tsu-huei Liu downloaded the package from Germany for a 10-day free trial. Of course, previous experimentation with graphics code for GNU Mingw32 ATP was applicable to Lahey without change. This was the primary attraction of DISLIN for Lahey ATP use. It also explains why little need be written about the project: nothing has been changed. Saturday morning was the first your Editor knew of the development. Two days later, after mastering a tricky detail of Lahey ATP linking, graphics of DC-18 and DC-57 looked perfect on the screen of Dr. Liu's PC the very first try. Very nice, and certainly worth the price that was offered later that same morning: *"Let us know the preferred way to pay you the $150 licensing fee for perpetual use of the product on this one PC. My preference would be a VISA credit card."* Dealing with the DISLIN factory certainly was easier than dealing with Salford Software (see the January issue). About file size, 286 Kbytes are saved (5995 vs. 6281) if dummy externals of DISLIN.EXT replace the real library routines. Note this is substantially larger than the 159 Kbytes for Mingw32 ATP (see mention in the October issue).

Abandonment of OpenGL is worth a few words of explanation, however. Expert William Mitchell was mentioned in the preceding issue, and his advice on October 29th was: *"Since you mentioned wanting to have the same program operate under different operating systems, you definitely want to avoid the NT graphics and go with something portable (e.g. OpenGL) or widely available (e.g. DISLIN)."* Carefully note recommendation of OpenGL but not GLUT. Lahey examples use higher-level GLUT, which unfortunately seems to require use of *mainloop* for interactive observation and modification --- a complication that is not trivial to avoid within the present program structure, and independent of operating system. The preceding day, Dr. Mitchell wrote: *"Yes, I have encountered the same problem. ... I don't really want GLUT to take over the program; I'd rather have the program work on computations and update the graphics when it's ready. ... In my case the answer was quite simple -- the PDE solver is a parallel program using PVM or MPI for message passing, so I just made the graphics routines into a separate program and have the PDE solver feed it data through PVM or MPI. This is on Unix; ... You might be able to do what you are after by using glut_timer_func, but it might require a little reorganization of your code."*

A symbolic debugger exists, and seems adequate although basic. It operates from a single command line of the DOS Window (no problem). Unlike the old Salford debugger, the Lahey debugger does allow both stepping within INCLUDE files and the examination of vectors beyond dimensioned limits. These are important --- more important that use of additional windows (available in the rich guy's alternative).

The EQUIVALENCE statement of FORTRAN allows one COMMON block to be used for both floating-point and integer storage. For byte-organized, modern versions of ATP, REAL*8 and INTEGER*4 vectors are used, respectively. Such mixed-mode EQUIVALENCE goes back to the earliest days of FORTRAN but seems not to be allowed by FORTRAN 95 if the storage is to be ALLOCATE-d dynamically. This was documented on November 9th in E-mail to Masahiro Kan: *"Unless I have missed something, we have a problem with Lahey F95. In fact, it is the same problem that I had around the start of the year with older MS PS. Recall my report to you dated January 6th [1999]. My first attempt to compile your code ALLOCATE.F90 failed because 'Bill G does not allow the mixture of reals and integers ...' ... Lahey F95 seems to complain comparably. That same attempt to equivalence a REAL*8 vector to the INTEGER*4 storage of USE resulted in the following error message ... In the case of MS PS, the problem could be overlooked since MS PS was not advertised as being an F90 compiler. But the Lahey compiler is. Unfortunately, I must conclude that the Salford capability is non-standard. It is valuable and reasonable, but apparently it is non-standard. ... Of course, all we really want is the old EQUIVALENCE. This new aliasing would be nice if it would work, but it does not seem to, for variables that have different type. Even though I did not have great hope for it, I did try to add an old-fashioned EQUIVALENCE instead of => ... Not surprisingly, the compiler objected ..."*

Lahey F95 is cheap for Linux as well as MS Windows (only WinNT is used in Portland). This point was made by Masahiro Kan in E-mail dated December 4th: *"the $199 also applies to the Linux version. It is attractive for me."* Your Editor agreed: *"I like this very much. Among other*

things, it will be interesting to compare compactness of TPBIG and execution speed." But what linker might Lahey use with Linux? Mr. Kan wondered whether possibly there might be compatibility with GNU ATP object files (an interesting thought, eh?).

The Lahey compiler offers quality trace back following most errors. This is in spite of optimization (Watcom provided none in this case, generally). For example, consider what your Editor observed on January 14th: *"jwe0019i-u The program was terminated abnormally with Exception Code EXCEPTION_ACCESS_VIOLATION. Error occurs at or near line 2586 of _over3_ Called from or near line 4631 of _main10_ ..."* The line number applies to the disk file rather than the subroutine (if two or more modules in a disk file), so location is trivial.

F95 ALLOCATE of ATP Tables

The Universal Machine (U.M.) of Prof. Hian Lauw was the first ATP component to have its storage ALLOCATE-d dynamically. Success first was reported to Masahiro Kan of Toshiba Corporation in Japan in E-mail dated November 26th: *"Earlier this morning, I completed my first realistic test of ALLOCATE for ATP. ... Answers of DC-34, 35, NEW-1, and NEW-2 agree, so the concept is proved. For Lahey, there is no ISPUM => SPUM because of the mixed mode, as we know. So I waste … storage (separate ISPUM). But answers are correct. Meanwhile, I work on the translation techniques ..."* For the historical record, it should be explained that Mr. Kan was the first to suggest reliance upon the FORTRAN 90 MODULE, USE, DIMENSION(:), ALLOCATE, POINTER, and => statements as a replacement for F77 COMMON and EQUIVALENCE to store and communicate program tables among the many ATP subroutines. It turns out F90 (and today, F95) provides both a solution and something of a problem. About the latter, substantial changes are required in the order of executable statements. For example, a USE statement to replace some COMMON block must immediately follow a SUBROUTINE declaration. It can not be preceded by some other COMMON block, or even an IMPLICIT statement. That is the first major problem. The second is mixed-mode EQUIVALENCE as explained in the Lahey story.

The new F95 Editor/Translator program (*translator* for short) F95ET.FTN is being written to accommodate both Salford and Lahey compilers optimally. If the user wants to allow mixed-mode EQUIVALENCE for Salford F95, this is possible. If not (for Lahey F95), there will be no such mixture. This is the advantage of *machine translation* (see your Editor's 1977 PICA paper) : flexibility. Even though (mis)guiding lights of DCG / EPRI EMTP never seemed to grasp importance of the concept during their early years (1984 and onward), there always were important reasons to preserve universality and flexibility. Now, a decade and a half later, an even bigger reason has surfaced: the desire to exploit Salford's tolerance of mixed-mode EQUIVALENCE in F95 form. A third choice remains F77 (the old way). Thanks to machine translation, all three alternatives are possible. While moving to F95 (either Salford or Lahey), F77 (most importantly, the free GNU Mingw32 compiler g77) is **not** being abandoned. The experimentation was completed December 1st when all test cases finally agreed following translation. I.e., machine translation was proved to be comparable to the result of hand modification (using the human mind) for the U.M. of list size 25 storage. The conversion had been automated for F77 and Lahey F95. Salford F95 will come later.

List 15 gives size of CHARACTER*1 CSTO for MODELS, and this provided the second test of F95 ALLOCATE use. Success of hand modification was demonstrated December 4th, and translator output was made compatible a day later. Changes were not trivial because of author Dube's mixed use of EQUIVALENCE-d vector CSTO and scalar CTRL within deck TACSTO. Finally, there was your Editor's own newer use within SATURA (next paragraph).

DEALLOCATE is the reverse of ALLOCATE, and it first was used on local storage to replace CSTO of List 15. Within SATURA, the problem seemed to be different lengths of each vector cell: 1-byte CSTO vs. 20-byte ARGINC. Lahey rejected such aliasing (=>) just as it rejected mixed-mode aliasing. So, for the first time, local (not involving MODULE and USE as LABCOM storage does) ALLOCATE and DEALLOCATE were used. Of course, ATP must ALLOCATE before the first use and DEALLOCATE after the last use. For modularized, small supporting programs (in this case, to service a DATA BASE MODULE request), this is both easy and efficient. If the supporting program is not used, the memory burden does not exist. While one supporting program is being used, there is no such burden from any other supporting program. So, far from representing a problem, the procedure is highly efficient, and a strength of the F95 alternative. For the case of DBM, there is the added advantage of consistent limit checking. The created local storage for ARGINC will not have the size of List 15, but rather vector ARGINC will have the length of List 6 (switches). This is an improvement.

A limiting list size ceases to have meaning when all storage that it controls has been converted to ALLOCATE of F95. Beginning December 6th, the checking and possible rejection message was disabled for List Sizes 25, 15, and 21. What began with such promise in the fall of 1993 (independent discoveries by Schultz and Meyer) has fallen victim of time. In the new world of F95, limit checking within subroutine DIMENS no longer has any use. The user can have as much storage as he wants (more precisely, as much as his operating system will give him). Note that LISTSIZE.DAT is as important as ever, since the user still must declare how much he wants. The only thing that has

changed is the response by ATP. For fully-converted lists, no longer is there possible rejection based on the numbers in the .BPA file. But the need to protect against overflow of the sizes of LISTSIZE.DAT remains. As a result, the code is not changed much. ATP has hundreds of overflow checks, and they remain unaltered.

Minimum dimensions cease to have meaning thanks to F95. For decades, minimums have been a nuisance. For example, the symbolic debugger of the 1992 Salford version 2.66 compiler disallows any examination request beyond the DIMENSION-ed limit of any array. There also would be a warning message during compilation, if a constant subscript exceeded the DIMENSION-ed limit. Well, F95 ends these concepts, since array size is determined at execution time rather than compilation time. This is good news: less help from simple-minded compilers and debuggers. Certainly the compiler can not warn about any constant. Whether a symbolic debugger might refuse to allow examination beyond actual limits will depend on the compiler. Lahey F95 does not for COMMON storage, it has been observed. Just like the DEC VAX / VMS debugger of decades past, Lahey F95 allows examination of vectors in COMMON using arbitrarily-large subscripts.

List 21 provides storage for the transformation matrices [T] of all distributed-parameter transmission lines. This was the third list size to have its storage ALLOCATE-d dynamically. Just two vectors (names SFD and QFD) were involved, and there was no EQUIVALENCE to complicate matters. The conversion occurred without incident on December 6th.

List 20 is associated with frequency-dependent line modeling. This was the fourth list size to have its storage ALLOCATE-d dynamically. A single vector (SCONST) was involved, and there was no EQUIVALENCE to complicate matters. The conversion occurred without incident on December 7th.

List 22 is associated with distributed line modeling. This was the fifth list size to have its storage ALLOCATE-d dynamically. Just two vectors (CNVHST and SEMAUX) were involved, and there was no EQUIVALENCE to complicate matters. The conversion occurred without incident on December 7th.

List 27 is associated with the Type-94 element of MODELS. This was the sixth list size to have its storage ALLOCATE-d dynamically. Four vectors were involved, but there was no EQUIVALENCE to complicate matters. The conversion was completed December 8th following a translator change (necessary).

Extraneous, unused EQUIVALENCE statements have been removed from several places in the program. At one time, these had meaning --- to lay a local vector on top of some existing COMMON block. But interim restructuring must have removed the following usage of the local names. For example, CMR and CMI of OVER12 and OVER13 were the first such uses to be removed (in this case, without incident on December 7th). For F77, there was no problem. But for F95, the problem is noticed when the associated COMMON block of LABCOM is to be changed to USE. In general, substantial restructuring is required. But not always. Sometimes (as in this case), the local storage simply can be removed without consequence. The program is being improved in the process, for F77 and well as F95.

List 30 is associated with Noda frequency dependence. This was the seventh list size to have its storage ALLOCATE-d dynamically. A single vector (NODABR) was involved, and there was no EQUIVALENCE to complicate matters. The conversion occurred without incident on December 8th. Yet, since the C language from Dr. Taku Noda is not yet supported for Lahey ATP, the test is artificial. DCNEW-14 is not being verified.

Round-off error changed for DC-53 and DCNEW-11 more than once, as one COMMON block after another was replaced. Why round-off should change is not known. Although the change has no engineering significance, it is noted in order that the phenomenon not be forgotten. To illustrate, following the conversion of List 26 vector ZNONL, the *"Variable maxima"* line had value .68841E-8 change to .68799E-8 (a floating zero since other values of the output exceed 1.E+6).

List 24 is used only indirectly. Multiplied by List 1, the product sizes those exceptional 2-dimensional matrices KKNONL and ZNONL. Modules OVER12 and OVER13 involved EQUIVALENCE of floating-point CMI to integer KKNONL, but this was found to be unused, so was removed on December 7th. Many other modules EQUIVALENCE local integer NSUBKM to KKNONL whereas ZNONL had no such complication. The conversion of List 24 storage to F95 was completed December 10th.

List 18 limits the number of power and energy requests. The two vectors BNRG and KOUTVP are involved, but without EQUIVALENCE so were easy. Testing of ALLOCATE for F95 was proved December 11th.

List 12 limits the number of output variables, and has four independent storage vectors associated with it. Conversion to ALLOCATE was completed December 15th, although special accommodation by the translator was required for single-precision FORBYT (an exception required for single-precision .PL4 files).

List 7 limits the number of 6-character alphanumeric names, and just the single storage vector TEXVEC is associated with it. Conversion to ALLOCATE was completed December 24th without incident.

Type-58 and 59 S.M. modeling involves 6 separate vectors that are dimensioned 6 different ways by means of 6

dependent list sizes. The independent limits are Lists 11, 16, and 17. This storage was converted to ALLOCATE without great difficulty on December 25th and 26th. Yet, there were two new aspects. The first was the local EQUIVALENCE of floating-point storage (vector VSMOUT) to an INTEGER COMMON block (vector ISMOUT) and this required translator modification. The second difference was local EQUIVALENCE of INTEGER scalars (IPOUT, N56, etc.) to cells of an INTEGER COMMON block (vector ISMDAT) .

List 8 stores the past history of distributed transmission circuits, and conversion to ALLOCATE was completed without incident on December 28th.

List 3 stores square matrices [R], [L], and [C] of coupled, lumped elements. Recently it has become huge because of interest in 400 coupled coils (see mention in the April, 1998, issue). Conversion of the three COMMON blocks to ALLOCATE was completed December 28th following some struggle. First, there was need to remove an EQUIVALENCE involving INTEGX in modules SUBR5 and OVER8. Second, there was the need to modify the translator to ignore LINE CONSTANTS because of two naming conflicts between LABCOM and DECK25 (both use vectors R and C) .

List 5 provides storage for [Y] and the factors of its triangularization. The two COMMON blocks dedicated to it followed List 3 on the same December 28th, thereby completing all conversion associated with large numbers of coupled, lumped elements (high-order Pi-circuits).

List 6 limits switches, and involves many vectors. Work on ALLOCATE for these began December 30th, with several UTPF segments requiring change due to the EQUIVALENCE of other vectors. Yet, operation should be efficient for Lahey because all but one involve the same (rather than mixed) mode. Most surprising was the discovery that two vectors were nearly unused, and could be eliminated. Yet, this unexpected improvement has been delayed until the entire F95 project is complete. Later need for change is being remembered by *.F95 storage of VARDIM and TAPSAV segments in the \UTPF directory. If the unused vectors were removed now, total table size LTLABL in the heading would change, and this would upset automated comparisons of DC*.LIS files by FCLAHEY.BAT Work was completed December 31st, with 17 vectors of various lengths (one through five times List 6) now ALLOCATE-d using F95. This does not count the two unused ones.

News from Outside USA and Canada

The Australian EMTP User Group is to undergo important change as explained in E-mail of the Fargo list server dated February 15th. Stephen Boroczky of TransGrid in Sydney explained the need as follows: *"Due to my recent resignation from TransGrid and the imminent retirement of Dr Brian Elliott, the administration of the Australian and New Zealand EMTP User Group has been transferred to Dr Keith Walshe of Power Quality Technologies."* The new Internet address is **kwalshe@powerquality.com.au**

The Middle East, a region of the world that presently has no ATP user group, was the subject of E-mail from Dr. M. M. Eissa of the Faculty of Engineering at Helwan University. On January 3rd, Dr. Eissa wrote: *"I have been in contact with Laszlo Prikler and he recommended to contact you."* The following day, your Editor offered the following opinion: *"Ten years ago, this would have been important. Maybe even 5 years ago. But this Internet age is different, and one must ask what the function would be. ... Text can be distributed conveniently using the Internet. So can the program itself. One does not need another user group to do this. We all are interconnected via the Internet. Several years ago, BPA was mailing paper copies of various things (e.g., Can/Am newsletters) to foreign contacts. Today, that no longer is done. What once was paper has been replaced by disk files that are distributed via the Internet. Only the Rule Book has resisted. The only complete copy still requires paper. Yet, the Rule Book, too, will yield one day to the paper-less revolution. Actually, of course, paper will not disappear. But, if a user wants a paper copy, he will be able to print his own copy from disk files. ... I do not say no. But I do say that circumstances have changed drastically since I was a strong advocate of a user group for the Middle East. Perhaps the one strong, remaining point would be common language (Arabic). Do you exchange Arabic E-mail with others of the region? ... I would be interested in Laszlo's opinion."* To be continued (more next time).

"Palestine wins .ps domain" is the title of an October 25th story found at *The Register*. A struggle was required: *"Palestine now has its own .ps domain following more than two years of battling with the IRA (the Internet Registration Authority), as well as with the UN. It required a resolution of the UN General Assembly to get the suffix approved. There are around 34,000 PCs ... in the West Bank and the Gaza strip, about 8,000 online accounts with nine ISPs ..."* Many questions come to mind. Was some other state using the name before Palestine? If so, which one? If not, why the problem? Are there other parts of the world that are less than fully independent while having their own domain names? If so, which ones?

More about the Internet and E-mail

Spectral decomposition was an unusually popular topic of discussion for the Fargo list server during early October, with many contributors offering different points of view. The original inquiry, by Maria Cristina Tavares of Sao Carlos Engineering School in Brazil, had *"Subject: Fourier analysis in NT."* The original question was specific (*"I need to make some Fourier analysis and our system is*

Windows NT. Can anyone suggest which is the best graphic pack to use?"), but the discussion evolved unpredictably. As this note is being keyed October 11th, Harald Wehrend of SEG in Kempen, Germany, just observed: *"Thank you very much for the response I've got concerning my spektral observations when modeling excitation of an RLC-network with multi-frequency signals. Some uncertainties are left for me, ..."*

Encyclopedia Britannica is a recent victim of PC technology. Using the Internet, EB is trying to salvage what remains of its once expensive and profitable product. An AP story that summarizes the development was found on the ABC News Web site October 29th. This was day nine after the grand experiment of free Internet access began. The title is *"Britannica Remains Apologetic. Encyclopedia Web Site Still Blocked."* Summary numbers make the need for change obvious: *"Sales of Britannica's printed sets have fallen off by an estimated 80 percent since peaking at about $650 million in 1990 as knowledge-seekers turn to computer versions, mostly Microsoft's Encarta. ... It is still available in the printed version, at $1,250 per set, as well as on CD-ROM."* But what about the recent experiment? *"One of the year's most-touted Internet sites remains clogged nine days after the debut of free online encyclopedias --- brought to a virtual standstill by huge worldwide demand and insufficient hardware and software."* An estimated *"10 million people ... have been trying daily to get into www.britannica.com"* and few have made it. *"The company, which says only 100,000 people have managed to reach the site's first page, admits it underestimated the early public response."* Of course, Britanica has excuses. *"But analysts say the bottom line is poor planning."* One consultant is quoted as saying; *"If they were a startup company, we'd probably be talking about them going out of business."* But Britanica is a great brand name, so interest remains high.

"Join 18 million Eudora users by signing up for a free Eudora Web-Mail account at http://www.eudoramail.com" This is the advertising line that was noted at the bottom of an incoming E-mail message on November 1st. So, an important name in E-mail-handling programs seems to have become yet another combatant in the struggle to build an audience of free E-mail users. The Web page shows a copyright by *"Who Where? Inc."* Qualcomm also is prominently shown, in the upper-left corner of the huge graphic logo; and *"Eudora Web-Mail"* is shown below the crudely-artistic, USA Today-like approximation to a mailman. About lack of cost, the service *"is free because it is advertising supported."* At least the pitch is honest. About reason for use, there is a good one: *"People who change ISPs often and don't want to keep changing their email address."*

Webvan was mentioned in the preceding issue. No question, it is revolutionary. But when if ever might Webvan be profitable? George Nichols of Morningstar wrote a story about this dated November 12th. He asks some hard questions, and reveals some amazing figures. For example: *"the company has rung up $4.3 million in net sales through September 30, and its underwriter, Goldman Sachs, forecasts losses of $302 million on revenue of $518.2 million in 2001. As for the general online-grocery market, research firm Jupiter Communications estimates revenue will be $3.5 billion in 2002, up from just $63 million in 1997. Furthermore, based on its opening-day closing price, Webvan's stock is currently in lunar orbit at 672 times estimated 1999 revenues and more than 15 times projected 2001 revenues. For a rough comparison, barnesandnoble.com BNBN, drugstore.com DSCM, and Etoys ETYS --- other e-commerce stocks that debuted this year --- have price/sales ratios ranging from 17 to 58."* Even better than Amazon, Webvan illustrates the unreal world of Internet investing. Amazon may still be losing money, but at least it already has the business. Webvan hardly has any business yet. But it has big plans.

The insurance industry is struggling with the Internet much as stock brokers were earlier (see October issue). *"Virtual Agents"* is the title of a column, mostly on this subject, by John Rekenthaler, Morningstar's research director. Dated November 12th, this begins: *"First Merrill Lynch, then Allstate. This June, Merrill Lynch upset brokerage-firm customs by introducing cheap Internet trades for do-it-yourself investors. Now the 'good hands' people are conducting a similar attack on insurance tradition. This week, Allstate announced that it was laying off 4,000 employees, forcing the 6,500 agents who are now company employees to become independent contractors, and spending hundreds of millions of dollars making Allstate insurance policies available on the Internet. ... What makes this remarkable is that while Merrill was merely responding to the reality created by Schwab, E-Trade, and the like, Allstate is attempting that rarest of business strategies: anticipating change. Currently, only 1% of all insurance purchases are made via the Net. ... When a customer comes to Allstate via the Net, they will be assigned an agent, who will be paid about one quarter of the regular commission schedule. In return, the agent is expected to be available when said customer files a claim or asks a difficult question. The agents, naturally, are wary of having their fee schedules slashed by 75%, but the company promises that they will make up in volume -- and reduced workload per policyholder -- what they are losing in price."* I.e., a new business model.

"High-tech ambulance chasing attorneys register EgyptAir domain names" is the title of a sidebar to a CBS News story dated November 17th. A link to a *Salon News* story by Anthony York explained: *"People searching for more information about the crash and investigation of EgyptAir Flight 990 are likely to wind up at a page put together by attorneys at R. Jack Clapp and Associates. ... Desjardins estimates that his company has registered 'anywhere from 20 - 40 domain names, including egyptaircrash.com, flight990.com and flight990crash.com. We've grabbed anything we can think of' that relates to the*

crash.' ... Clapp and Associates has been through this before. The firm made a similar rush to register domain names after ValuJet Flight 592 crashed in the Florida Everglades in May 1996, killing 110 people. That site has now been turned into an online memorial for crash victims, but one that sports ads from Microsoft and online travel sites. Clapp and Associates wound up representing several families in lawsuits against ValuJet."

Online banking seems more successful in England than in this country. London-based *The Register* had a short summary dated November 18th which explained: *"Up to 10 million people in the UK could be banking over the Internet by next year -- a figure far higher than any previous predictions. In an NOP survey of 1,000 adults, a surprising 41 per cent said they would use Internet banking within the next year. ... A second survey found that fewer people were visiting bank branches, opting to use cash machines instead --- pointing to a cultural change. ... Internet banking appears to make perfect sense. We've all become used to money being represented as digital figures rather than wads of cash and the Internet simply extends the principle but with the added bonus of being able to do it in the comfort of your own home. Banks like the idea too. The Internet has the capacity to slash overheads and plans to reduce the number of branches throughout the UK are already in the offing."*

"Online trading exploding; SEC releases first report on E-Trading" is the title of a story found at the ABC News Web site. Dated November 22nd, this summarizes how the Internet has affected investing in stocks, and how the Securities and Exchange Commission (SEC, the federal regulator of the industry) later might respond. *"The SEC estimates a seven-fold increase in online brokerage assets by 2003, reaching a total of $3 trillion. Since 1997, the number of online accounts has grown from 3.7 million to 9.7 million in the second quarter of this year."* One SEC Commissioner is quoted as saying: *"I think it may still be premature for extensive rulemaking ..."* The report focused on (names of topics): *"Systems Capacity, ... Suitability, ... Best Execution, ... Market Data, ... Privacy, ... Online Chat, ... Portals ..."* That was federal. Meanwhile, at the state level, *"New York's attorney general launched a campaign today to educate investors about the pitfalls of trading on the Internet and asked online brokerages to disclose more about the computer glitches that irritate amateur investors. Eliot Spitzer said that Internet brokerage firms' advertisements are giving the misleading impression that 'investors have access to both instant trades and instant wealth, neither of which is true.' ... Online stock trading is booming in the United States. Some 10 million Americans estimated to be trading at least occasionally over the Internet and online customers accounting for about a quarter of all retail stock trades. ... More than 160 firms now offer online trading, and full-service companies such as Merrill Lynch, Paine Webber and American Express recently have jumped into the mushrooming electronic market."*

AT&T@Home is the Internet service that is offered by AT&T to its cable television subscribers. The service seems to have suddenly come to Portland, Oregon, and surrounding suburbs when AT&T purchased existing cable television providers. Prompted by recent mail advertising, your Editor connected to **www.athome.att.com** on November 26th and learned some details. First, about the change of name north of the Columbia River: *"TCI is now AT&T! On March 9, 1999 our merger was complete; TCI will now be known as AT&T Cable Services."* Under *"Frequently Asked Questions,"* the following was noted: *"AT&T@Home's monthly service charge is $39.95 in most markets. This is for unlimited usage ... The installation fee is $150 ... you are not obligated to subscribe to a cable television service to receive AT&T@Home. ... AT&T@Home supports up to 3 email addresses as part of the monthly fee. ... AT&T@Home currently supports a customized version of Netscape Communicator and Internet Explorer. ... Neither television nor data signals are affected by simultaneous use."* Of course, speed is the main attraction: *"@Home's broadband technology offers speeds far greater than dial-up phone modems, ISDN and even ADSL. For example, a file that takes 9 minutes to download over a 28.8 phone modem would take 2 minutes on ISDN, compared to 2 seconds on AT&T@Home."* That is the theory, anyway (*"Actual speed experienced is dependent on several factors, including file size, server congestion, ..."*). About audio and video: *"Watch video clips on demand. Listen to CD-quality music while you surf."* About price, the printed advertising offered an important discount: *"free installation and one free month of service ... --- offers expire 12/31/99."* That is the good news, and your Editor was almost ready to subscribe. But then he noticed that the printed advertising also included a disturbing limitation as part of the fine print of a footnote: *"Upstream data transfer speed is limited to 128 kbps."* So, very good but not super for sending copies of TPBIG to others. About the *"at home"* nonsense, the fine print ends with mention of a *"license granted by At Home Corporation."* Just as with Web sites, it is hard to know who the real owners are. About the trend toward cable modems, Clark Howard recently mentioned during his daily radio show that the number has exceeded a million.

New automobiles now can be purchased economically in the USA using the Internet. Following a general recommendation by Clark Howard during mid-November, your Editor found a Wall Street Journal story on the subject dated September 29th. This summarizes well the rapidly-changing form of auto retailing : *"CarOrder.com, an Internet car-buying unit of Trilogy Inc., is expected to announce Wednesday a $100 million investment by its parent company that it will use in part to buy auto dealerships and turn them into 'e-dealers.' Separately, CarsDirect.com (www.carsdirect.com), a rival online auto-retailing site, is expected to announce within several weeks an additional $150 million in funding. CarOrder (www.carorder.com), of Austin, Texas, plans to use about*

half of the money to start buying franchises from underperforming dealers in smaller markets to create five regional distribution centers ... Eventually, the company wants to buy as many as 100 franchises." So what is the big change? CarOrder *"plans to create a virtual showroom that makes obsolete costly sales forces and parking lots full of vehicles ... The e-dealers would have a few test-drive vehicles and loading areas where cars from manufacturers' trucks are loaded directly on CarOrder trucks, which would deliver them to consumers. CarOrder will continue to acquire some cars through dealers it doesn't own but has affiliations with, even as it builds its own dealer network ... A year ago, the auto industry wondered whether people would buy a car online, with most sites simply sending sales leads to dealers for a fee. This year, direct-sales sites cropped up ..."* A lot of money is involved, and the potential is great. But *"CarOrder and its online rivals face a number of challenges."* Three serious ones are listed: 1) *"restrictive state franchise laws that in some cases ban Internet sales;"* 2) *"legal and political countermoves by established dealers opposed to Internet car selling;"* and 3) *"complicated ordering systems used by auto makers that force unwanted cars on dealers in return for their receiving hot-selling products."* The founder of CarOrder, Brian Stafford, is quoted as saying: *"we may be one of the only Internet companies with more lawyers than software engineers ..."*

"Bill Clinton offers on-line shopping tips" is the title of a critical story of *The Register* posted December 1st. The subtitle, visible in the menu, is: *"Gigolo-in-Chief bonking Martha Stewart now?"* While the British editors are appropriately skeptical of presidential sincerity, your Editor must acknowledge several good points about use of the Internet. Most importantly, echoing Clark Howard, Clinton stated: *"… always buy with a credit card. With credit cards you are protected by federal law against unauthorized charges."* What he failed to mention, however, was the need to protest unauthorized charges appropriately within 60-days (see preceding issue). He also failed to warn against use of debit cards, which Clark Howard derisively refers to as *fake VISA or Mastercards.*

Amazon.com was mentioned in the January and July, 1999, issues. The changing nature of this pioneer Internet retailer was noted in an *ABC News* story dated December 1st. *"Amazon.com Goes Upscale"* is the title of an AP story by Rachel Beck that begins: *"Forget books and videos, Amazon.com is now going after expensive stuff, like diamond rings and Rolex watches. ... Amazon.com will pay $10 million for a 16.6 percent stake in luxury goods merchant Ashford.com ... The alliance with Ashford is the latest move by Seattle-based Amazon to build itself into an Internet superstore, offering shoppers virtually anything that they'd like to buy in one online location."* So how big is Amazon? *"Ashford will have access to Amazon's 13 million customers."* How about losses (typical of Internet companies), though? *"Amazon has yet to turn a profit, but the 4-year-old company has spent freely in the last 18 months to expand from books to music, videos, auctions, toys, electronics, home improvement goods, software and greeting cards. It also has invested in online companies where it sees big growth opportunities, with stakes in drugstore.com, Pets.com and Web supermarket HomeGrocer.com."* Company statistics can be found in the "Business" section of the same Web site. When checked early in the morning of December 2nd, Amazon.com has:

```
52-week share price range:  $31 to $111
Market Value:           $28262 million
Latest Year's Revenues:   $610 million
Industry:  retail specialty
Management:  Jeffrey P. Bezos
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The table of sales and income (in this case, losses) during previous years shows spectacular growth of both:

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Millions of dollars:  Revenue   Income
Year ending 1998:       610.    -125.
Year ending 1997:       148.     -28.
Year ending 1996:        15.8     -5.8
Year ending 1996:         0.51    -0.3
```

Conclusion: Typical of Internet companies, investors in Amazon.com must have faith. With a current share price of $85, some investors already have substantial losses.

"WTO demonstrators use Web to connect and coordinate" was the title of an *ABC News* story dated December 1st. This story is about disruptive protests in Seattle by organized labor, environmentalists, human rights advocates, and anarchists. A link was labeled as follows: *"Activists are using sites like this one, posted by Seattle WTO, to coordinate their protests ..."* The story by Michael J. Martinez begins: *"Doug Hunt was gassed three times on the way back to his hotel room Tuesday night. From his room, he went online to tell the world about the WTO protests and the police response."* As the world must have seen on television, the protests were effective. Business of the city was disrupted for days. What about the property damage? *"While the rallies and protests were planned and promoted online, it appears that the violence was not. ... An independent search of news groups and Web sites turned up no mention of planning for violent acts. One site, however, urged WTO protesters to help tie up the WTO's Web servers. The site, set up by a group calling themselves the Electrohippies, called it a virtual sit-in. By clicking on the sit-in link, a user's computer would be used to request continually information from WTO servers, tying up the user's Internet connection. Hackers use similar tactics, called denial-of-service attacks, to bring down Web servers. More protests are expected throughout the week in Seattle, and more are being organized online in response to police actions."* A separate ABC News story by Jonathan Dube summarized non-Internet aspect as follows: *"Mayor Paul Schell imposed an overnight curfew in this city's downtown for a second night, as police clashed with demonstrators and hundreds of anti-free trade protesters were arrested. ... A day after World Trade Organization protesters broke windows and started fires downtown, officials --- determined to prevent more violence --- invoked a zero-tolerance policy, cordoning off 50 blocks and arresting about 400 demonstrators."* At the end of the week, a story by Martin Crutsinger clearly summarized

Clinton's problem with fellow Democrats (not opposition Republicans, generally). Dated December 4th, the AP story began: *"Talks aimed at starting a new round of global trade negotiations ended in failure, handing President Clinton a major defeat in his efforts to convince skeptical Americans of the benefits of global trade."* Labor issues were the most divisive: *"The U.S. negotiators, responding to pleas of American labor unions, pushed hard for the WTO to create a working group on labor. However, Third World nations, already opposed to the idea, turned even more vehement after Clinton gave an interview ... in which he said the working group should lead to adoption of core labor standards and those standards should be enforced by trade sanctions through the WTO."* Translation: Clinton shot himself in the foot. Organized labor of this country wants to protect its higher salaries by raising compensation elsewhere. Clinton supports this. But less prosperous countries, which have the advantage of lower labor costs, refuse to allow the WTO to reduce their competitive edge.

Can the French-speaking province of Quebec, Canada, control the language of Internet sites within its borders? A story about the dispute was posted December 12th at *The Register*. It seems there is disagreement between the provincial government (which wants to force the use of French) and the federal government (which denies the authority). *"It's only commercial sites that the Quebecois must see in French, because Article 52 of the French Language Charter mandates that all catalogues, brochures, leaflets, and commercial directories must be in French. Dealer Micro-Bytes Logiciels of Pointe Claire was intimidated into taking down most of its site after a threat of a fine, even though it was in the process of producing a bilingual site."* But, in the age of hyperlinks, how does one decide what material belongs to which site? The physical location of storage could easily be moved outside the province. Quebec might deny its residents the right to use hyper-links? It appears that the language police of Quebec might be on the losing side of the information super highway and its revolution. Nintendo and Sony are companies most recently involved. Good (no shortage of resources for legal defense, your Editor would estimate)!

Internet shopping has disappointed many families on the eve of Christmas. An *ABC News* story highlighted the problems of Toys R Us on December 24th. The problem, of course, is failure to deliver prior to Christmas. *"Toysrus has apologized and sent $100 gift certificates. It is one of many Internet retailers not on top of things, retailers that have spent heavily on the front end --- advertising to get customers to their Web sites. But with online sales expected to double this holiday season, they didn't put enough into the back end --- managing their inventories and delivering their products."* This is a fundamental weakness of any Internet store: the customer has no way of knowing that merchandise does not exist. A customer who shops at a traditional, real store takes possession of merchandise at the time of sale, typically. But this is not possible at a virtual (Internet) store, where the customer must trust a company not to sell what it does not have, or can not deliver. This seems to be like trusting airlines not to reserve more seats than they have (common practice). *"Online customers have also complained about the poor customer service of many Internet retailers. The biggest test of that service is yet to come --- when customers begin returning holiday gifts the day after Christmas."*

"Wal-Mart expands Web site; America's biggest retailer takes on Web-only rivals" is the title of an AP story found at *ABC News* on January 2nd. It seems Wal-Mart has *"relaunched its online store ... with an expanded selection of clothes, books and appliances, and personalized options like e-mail reminders about anniversaries and birthdays. Though Wal-Mart has had a Web site for several years, the revised version is expected to help the company take away business from other retailers. Wal-Mart has several advantages over online-only rivals such as Amazon.com and eToys.com ... Wal-Mart will be able to leverage its tremendous size by advertising its site in its stores and shopping circulars. Also, consumers that want to return goods bought online will have the choice of doing so at any of Wal-Mart's thousands of stores. Some online retailers, including some with offline stores, force consumers to pay shipping costs to return items for refund or exchange. ... Wal-Mart's redesigned Web site include (sic) more than 600,000 items, which is twice as much as the company had online a year ago. The site also allows shoppers to book airline reservations and re-fill prescriptions. ... Industry analysts have said Wal-Mart's new site has the potential to shake up e-commerce ... Alex Clarke said prices on the Web site will match those found in Wal-Mart's stores. Wal-Mart has 1,821 discount stores, 650 SuperCenters and 453 Sam's Clubs in the United States. It also has more than 850 stores overseas."* If your Editor owned stock in Amazon .com, he would be worried about Wal-Mart just as he would worry about Barnes and Noble (see the July, 1999, issue).

Watcom ATP for MS Windows

FORTRAN 95 (F95) provides a more immediate reason to lose interest in Watcom (or Sybase) as the supplier of a compiler to support ATP. Recall 64-bit hardware (Intel's upcoming IA-64) was mentioned in the October, 1999, newsletter. Of course, Robert Schultz is right: the IA-64 will force a change of compilers. But long before IA-64 is generally available, F95 should impact the industrial-strength ATP user. Salford and Lahey are ready with ALLOCATE for program tables whereas Watcom is not. When your Editor visited Watcom's Web site (www.sybase.com) on December 27th, he could find no mention of FORTRAN at all. Both *"Sybase products"* and *"Application development tools"* were entered and inspected, but FORTRAN was not noticed. Unless someone can find F95 for Watcom, it is hard to imagine that Watcom ATP will survive long for use by the general public. F95 ATP is coming, and it

offers a significant advantage for large and unpredictable (i.e., variable) data sets.

News About TACS and MODELS

"Slow MODELS vs. Fast TACS" was the title of a story in the October, 1990, newsletter. It documented for DC-30 how MODELS spent about twice (ratios 1.92 and 2.17 for 80386 and 68020, respectively) as long in the time-step loop as TACS for 16-MHz computers. Yes, concern about MODELS speed then was expressed, but not strongly enough, as we now know. Why? In the early years (before compiled TACS), there was no way to separate the time for TACS from the remainder. Also, a factor of two seemed manageable. But would that ratio exist today? Now, more than nine years later, the comparison has been repeated. Using more modern hardware and careful measurement, the following seconds spent in the dT loop were observed:

	DC-30A	DC-30C	Ratio
Salford EMTP, 486 DX/2	54.00	188.0	3.48
Salford 133 MHz Pentium	9.780	28.846	2.95
Lahey 200 MHz Pent. Pro	2.493	7.621	3.06

Of course, DC-30 required modification in order to be measured with useful accuracy today. The newer (Version 3.53) Salford DBOS has limited resolution to whole seconds. Also, the 200-MHz Pentium Pro is so fast that the original simulation seemed to occur in the blink of an eye. So, the original 3K steps were expanded to 50K (Tmax = 5 msec), plot points were suppressed, and nearly all printout was eliminated by IOUT = 2000. The ratios of MODELS times to TACS times are substantially bigger, but remain well under 4. Knowing that MODELS typically is an order of magnitude (factor of ten) or more slower for simple arithmetic, how is this explained? Presumably effort of the electric network dominates. Perhaps more precisely, effort to go through the motions of simulation dominates, since the electric network does not amount to much. In 1990, data was selected hastily; DC-30 was not appropriate to identify the seriousness of MODELS retardation, unfortunately.

The coexistence of MODELS and TACS in the same data case was mentioned in the July, 1995, newsletter. It also is mentioned in the following October issue, but not as expected. A general explanation is noted to be missing. Most importantly, the restriction on order of use seems never to have been stated. This was realized while responding to an inquiry on the subject by Beat Ronner of ABB-Alstom Power in Switzerland. November 19th, your Editor explained: *"All of TACS first, then MODELS second, within each time step."* I.e., TACS followed by MODELS --- not the reverse order, and certainly not any more complicated combination such as some TACS first, then some MODELS, then additional TACS, etc. *"Simultaneous use of TACS and MODELS probably is too complicated to contemplate. In theory, you can argue that it would be nice. But how could one accomplish the feat in practice? I can not imagine. Curiously, MODELS was not designed to coexist with TACS at all. MODELS was supposed to replace TACS. That was what Dube proposed to BPA. MODELS was supposed to be better --- a new, improved TACS. Unfortunately, while more flexible, use of MODELS as a replacement encountered several serious obstacles. During recent years, we have learned precisely how inefficient MODELS is numerically. Rather than be surprised that MODELS and TACS do not work together better, you should be happy that you are allowed to use more than one at a time. Coexistence was not part of the original design by author Dube."*

A static transfer switch is being modeled using ATP at S&C Electric Company in Chicago, Illinois. This according to semi-public E-mail of the Fargo list server. Dated January 7th, Dr. Mike Ennis wrote: *"We have completed extensive modelling of such a device, using the valve component or, in simpler versions, a TACS-controlled switch. The control of the switch was realized in MODELS control language ..."* This was in response to an inquiry two days earlier by Tom Hemmila of Michigan Tech in Houghton. Your Editor may not know what a static transfer switch is, but he is happy to report that ATP seems to be ready for such use.

Line and Cable Constants

Use of METRIC within LINE CONSTANTS data has been the source of isolated trouble over the years. Typically, some different combination of output requests was responsible. Well, more but different trouble was reported by Grigoris Papagiannis, Lecturer at Aristotle University of Thessaloniki in Greece. His E-mail dated November 18th explained: *"Although the matter was discussed in Oct97 and Apr98 Can/Am Newsletters, ... this conversion error still persists. ... it is obvious that the column 'Actual velocity in km/s' is in mi/s. Comparing the results with those obtained from a very old EMTP version (the M.31) there is no other obvious discrepancy."* Yes, and this prompted BPA's Dr. Tsu-huei Liu to note a comparable problem in the 2nd subcase of DC-59. Apparently for years nobody noticed or bothered to complain about the following program output:

Mode	Resistance ohms/km	...	Lossless and actual velocity in [km/sec]	
1	1.866722E-01	..	1.960825E+05	1.215484E+05
2	1.742210E-02	..	2.939309E+05	1.825923E+05
3	1.741169E-02	..	2.942189E+05	1.827652E+05

The right-most column is short by a factor of 1.609 compared with the preceding column. That was prior to Dr. Liu's correction to LCMODE later that same day. Unlike previous errors with METRIC, this one is not decades old. That *actual velocity* was added to ATP output by Messrs. Meredith and/or Schultz as explained in a story entitled *"Miscellaneous NYPA changes to UTPF"* in the January, 1994, newsletter.

Storage for CABLE PARAMETERS was split from CABLE CONSTANTS on December 16th in order to make the disk file EDIT-able on Dr. Liu's 486 at BPA. Even after killing DBOS, the original SUBR27.SPL could not be entered, so NEWCBL.SPL was created to store Prof. Akihiro Ametani's newer (1995 onward) code.

DEC ATP for VAX / Open VMS

"Compaq OpenVMS" is the common super title of a set of books about Open VMS for what once was DEC Alpha. These were found on a nearby bookshelf at BPA. Inside the cover, fine print dated January, 1999, explains: *"The following are trademarks of Compaq Computer Corporation: Alpha, Compaq, DECnet, DIGITAL, OpenVMS, POLYCENTER, VAX, VAXcluster, VMS, VMScluster, ..."* So Intel shares the trademark Alpha?

Saturable TRANSFORMER

CHANGE TRANSFORMER converts saturable TRANSFORMER data to Type-51, 52, ... data as illustrated by DC-67. However, as explained in E-mail dated December 10th, the solution has been wrong for years. Apparently no one noticed or cared enough to bother checking (the mistake was not at all hidden or complicated). In fact, two independent errors associated with frequency were corrected in OVER24 (see UTPF idents BPA99DEC and WSM99DEC). The first, by BPA's Dr. Tsu-huei Liu was discovered December 3rd following investigation that was prompted by correspondence between Gabor Furst of suburban Vancouver, B.C., Canada and Mustafa Kizilcay of FH Osnabruck in Germany. The second error was found by your Editor using trial and error while working with Dr. Liu on December 8th. The old, erroneous solution has been retained as disk file DC67.OLD and copies of both the old and the new were sent to Messrs. Furst and Kizilcay attached to a summary message on December 10th.

Brain - Damaged MS Windows

That second story about Caldera's suit (see preceding issue) is entitled *"How MS played the incompatibility card against DR-DOS."* This story from *The Register* details evidence that MS deliberately made its Windows 3.1 program incompatible with Novell's DR-DOS. The previous issue mentioned that *"Caldera wins another round."* MS had wanted the complaint about deliberate incompatibility dismissed, but Judge Benson refused. The judge is quoted as saying: *"the Court does intend to uphold the basic antitrust principle that a monopolist may not eradicate its competitors through anticompetitive means."*

"Do you think there should be alternatives to Microsoft Windows?" This question by Sam Donaldson was found on the ABC News Web page November 14th. Of the roughly 15K users who had responded, 77.7% had answered *yes* rather than *no* (the only two alternatives). Not much sympathy for Bill G on the Internet, your Editor finds.

"Wave of lawsuits hit MS" is the headline of an AP story that was found on the ABC News Web site November 23rd. This explains growing legal problems that have *"the company fighting on several legal fronts at once, raising the stakes in its antitrust battle in Washington and intensifying pressure on Microsoft to settle with the Justice Department. At least seven suits ... have been filed on behalf of computer users ... The suits in Alabama and Louisiana are federal cases, while the ones in New York and California are in state courts. New York and California are among more than a dozen states that make it easier for consumers to sue for allegedly overcharging for products. ... the broadened legal assault could compel Microsoft to tone down its aggressive behavior in the computer industry. Consider the long-running antitrust case against International Business Machines Corp. ... Although the government eventually dropped its case in 1982, ... the combined weight of the litigation compelled IBM to play it safe in the computer business, allowing rivals to move in on the company's long-held markets ..."* Well, maybe. But is that really what happened to IBM? Alternatively, were the minicomputer and microprocessor revolutions not largely responsible for IBM's decline, and the recent demise of its principal rival (DEC)? Perhaps also the demise of the DoJ case against IBM (IBM delayed, and time brought change that no one had anticipated)!

Home use of MS software that is used at work is becoming more difficult and / or expensive for BPA employees. Details are summarized in widely-circulated BPA E-mail *"From: Prill, Dale - TSI/CSB-2"* dated November 18th. *"We have a freeze on loading any MS products on home computers due to the fact that our existing agreement has now expired and we are still in the process of getting a new one signed. ... My information indicates that we will not be successful in getting an MS Corporate license as we have had in the past where anyone can use the MS suite of products at home under that license. We will likely have to pay for individual home licenses under a 5 year lease type agreement. Question remaining to be answered will be whether BPA or the individual will have to absorb this cost. Tentatively I've heard pricing like $106 / 5 yr. for individual license."*

"MS quietly dumps Windows OpenGL support" is the title of a story in *The Register* dated November 29th. It explains why OpenGL no longer is a good bet. The story begins: *"Fahrenheit, the joint Microsoft-SGI project 'to define the future of graphics' has crashed in ruins, with Microsoft to all intents and purposes pulling its support for OpenGL and throwing its weight behind Direct3D."* Why? *"... SGI indicated that the rift between the two companies*

may have been Linux-related." Of course, SGI is Silicon Graphics, the high-end workstation maker. About future releases of MS Windows: *"OpenGL support was pulled from the Win2k beta some months back."* Anyway, no great disappointment in Portland, where DISLIN already had been chosen over OpenGL (see Lahey story).

Red Hat is a dominant supplier of Linux, and it has been mentioned before. Readers may be interested in summary statistics, which are typical of so-called *Internet companies*. Red Hat does not yet represent much competition for MS. The company is losing money, and losses grow along with the business --- if not faster. *"Red Hat revenues up – losses way up"* is the title of a story at *The Register* that was posted December 20th. *"For the three months ending 30 November, Red Hat recorded revenues of $5.4 million, up ... 64 per cent"* compared with *"the same period last year. ... Back then, Red Hat lost $100,000. This time, its loss reached 3.6 million ..."* This is progress?

European governments seem no more satisfied with MS than the American federal or various state governments. *"EU antitrust probe into Win2k threatens MS core strategy"* is the title of a story found at *The Register* with date February 9th. But why now? *"The European Commission has for the past couple of years been determinedly sitting on its hands in accordance with its arrangement with the US antitrust authorities ..."* Well, no longer, it would seem. The story refers to *"today's announcement of an EU antitrust investigation into Windows 2000."* What is the significance? *"It's bad news for Microsoft that EU competition commissioner Mario Monti is now breaking ranks, before the DoJ has completed its action, and its possibly even worse news that Brussels is focussing on Win2K. ... The EU investigation is covering far broader territory ...."*

Need for > 32 Bits of Counting?

The 32-bit limit on Intel counting has been seriously challenged for the first time --- by Jeremy Caplin of National Grid Company in England. The discussion began with semi-public E-mail of the Fargo list server dated December 16th: *"I am attempting to run a ferroresonance study for over 200 seconds with a time step of 10**-8. I get error KILL= 81, number of time steps exceeds INTINF. I have increased INTINF to its maximum value, 2E9 ... I have tried breaking the study up into 200 consecutive 1 second runs using MEMSAV=1 and START AGAIN. This still fails with the same error message. ATP appears to stop if TMAX / DELTAT > INTINF ..."*

True. As your Editor explained the following day, *"it is not the number of time steps simulated that is the problem. Rather, it is 32-bit counting of the step number. This is inherent to 32-bit Intel architecture. Of course, the long-term solution is 64-bit architecture and supporting software such as has been offered for years by DEC (now Compaq) Alpha. As for Intel, it will come eventually. Robert Schultz of the New York City area first mentioned Intel's IA-64 (see the October and January newsletters). About Alpha, what user knows for sure that integers can count well beyond 32 bits? I am not talking about the theory; I mean the practice. Who has written, compiled, linked, and executed a test counting program? Please confirm the change required for FORTRAN (it is assumed that INTEGER*4 becomes INTEGER*8)."*

Might Mr. Caplin ever reach the end of his simulation? It is possible, although it would take a long time --- even using modern hardware. On December 17th, Mr. Caplin documented the rate: *"The longest I have done is 180 consecutive runs using START AGAIN, each run 1 second long with a DELTAT of 1E-7. ... This run took about 4 days on a Pentium II 400 MHz."* Your Editor responded: *"Well, at least you have relatively-modern hardware. You might have a chance. Let's see, ten million steps in 4 days means 2 billion steps would take 800 days. As Robert Meredith might observe, 'no way in heck would the software run long enough for this to be a problem' (great quote from the July newsletter)."*

Wraparound of the step number was devised as a temporary solution while we all wait for Intel to break the 32-bit barrier to indexing. As your Editor explained on December 17th: *"Last night, I modified code to have step INTINF followed by step 1. The error stop was replaced by a warning message: >>>> Warning. Number of time steps = Tmax / dT = xxxxx exceeds INTINF = xxxxx The step number will roll over to unity on the step following this limiting value."* For the record, corrected Watcom ATP was supplied by E-mail on December 23rd.

The power company name was unknown to your Editor, so Mr. Caplin explained: *"National Grid runs the HV transmission network in England and Wales. We own all the 400 and 275 kV transmission system, and control the dispatch of the separate generating companies to meet demand. Under the UK regulation system we are not allowed to own generation or LV distribution. We are also in the process of taking over NEES in New England."* Readers will recall the mention of Scottish Power in the October issue. Apparently NEES is the second (and unnamed, and smaller) of the American power companies purchased by the *Brits* (Pat Buchananese). Meanwhile, American money flows into Internet stocks at unbelievable prices. Fascinating. Whether the rate payer actually gains from this restructuring of the power industry (doubt first was heard from Robert Meredith of the New York City area) remains to be seen. The jury is still out on this very important detail. Of course, that does not stop the lawyers, politicians and bureaucrats, who plod slowly forward by trial and error with deregulation on this side of the North Atlantic. Great Britain is ahead of the USA on this matter.

Comings and Goings

Dr. Humberto Henao *"did the pioneering work on power electronics simulation using ATP between 1987 and 1990. His Ph.D. thesis was not in GRACSY Laboratory but it was done between the Mediterranean Institute of Technology (Marseille, France) and the National Polytechnic Institute (Grenoble, France) and presented in 1990."* This clarification formed the start of semi-public E-mail from Professor Gerard-Andre Capolino, Director of GRACSY Laboratory at Universite de Picardie-Jules Verne in Amiens, France. Dated December 8th, this responded to a casual and imprecise mention of Dr. Henao's thesis plus the work of one other person. Prof. Capolino included 19 English-language references after noting that Flibraries are less inclined to stock his and Dr. Henao's French-language publications. In the end, there did not seem to be much in dispute. In E-mail dated December 17th, Prof. Hernan E. Tacca at Universidad de Buenos Aires in Argentina explained circumstances surrounding the reference to Dr. Henao's work. He concluded: *"We thank Prof. Capolino for the additional suggested readings about simulation on power electronics using ATP. We will consult this suggested bibliography if available. Finally, I hope that the following information may be useful for ATP users involved in scientific research: 1) Most of the French doctoral theses may be obtained as microfilm (microfiche) from Atelier National de Reproduction des Theses (Univ. Pierre - Mendes)"* in Grenoble. Another *"way to procure French technical documents is to contact the Service Culturel de l'Ambassade de France. 2) The University of Buenos Aires is a non-profit organisation. All the files written by Mr. Cano Plata are available and may be widely used with the sole condition of mentioning the author's name and his organisation. Also the whole dissertation is available, but only in Spanish."*

The success of Prof. Capolino's department should be noted. Previous mention can be found in the July, 1995, issue. Now (December 8th), your Editor learns the scope: "I moved from Marseille to Amiens in 1994 to start the department of electrical engineering. Starting from 2, we are 41 nowadays." Amazing. Congratulations, professor!

Power Company Politics and Religion

Power Technologies (PTI) in Schenectady, New York, has undergone major change, and at least one contributing user of ATP (Dr. Gary Thomann) seems to have been lost in the process. This should remind readers that restructuring of the industry is not limited to power companies. November 29th, E-mail from Daniel Durbak of PTI came from **stoneweb.com** (an unrecognized address), so BPA's Dr. Liu inquired about possible change. The answer follows: *"PTI has been a wholly owned subsidiary of Stone & Webster since the merger in August of 1998. Yes we are still PTI & I am still here. Gary is not unfortunately, ... As far as the e-mail change, pti-us.com still works but the new stoneweb is preferred."* Addendum December 27th: Dr. Thomann sent E-mail, and shortly thereafter he was re-licensed to use ATP as an individual (he is self-employed as a consulting engineer). Addendum January 12th: Dr. Thomann sent an E-mail note that served to document use of different E-mail address **gthomann@nycap.rr.com**

Parsons Brinckerhoff is another old consulting company that illustrates restructuring. Jalal Gohari mailed a business card that shows a huge pb for a logo, but no Parsons and no Brinkerhoff. Later, E-mail dated January 6th from **pbworld.com** summarized changes: *"Yes, the company is the same and it is composed of several different (more than 20) companies. My group was relocated to our new office at Newark. Others are at the New York Office."* This was in reply to Dr. Liu's observation about the business card: *"your company name is now PB transit & Rail Systems, Inc. Also, the address is different. Instead of New York City, it now is Newark, New Jersey"* (a suburb of the city, across the Hudson River).

The term *wacko environmentalist* has been used more than once in the past without documentation. Anyone wanting to pursue the concept is referred to Web site **www.junkscience.com** which has motto *"all the junk that's fit to debunk."* The purpose is to document various distortions of science: *"Junk science is faulty scientific data and analysis used to further a special agenda. The junk science 'mob' includes the following groups: The media may use junk science for sensational headlines ... Personal injury lawyers may use junk science to bamboozle juries into awarding huge verdicts. ... Social activists ... may use junk science to achieve social and political change. Government regulators may use junk science to expand their authority and to increase their budgets."* Etc. (the list is long).

RTO is the latest acronym associated with the control of electric power in the Pacific Northwest. Recall the Oregon plan to purchase BPA (the July, 1999, issue). Well, an RTO would be different, and BPA is promoting the concept. Quoting from an E-mail announcement distributed to all BPA employees on January 19th, BPA Administrator Judi Johansen described a meeting: *"... to informally explore what the various companies are going to do in response to FERC's final rule providing for voluntary formation of regional transmission organizations (RTOs) by December 2001. ... The RTO concept is modeled after one of many structures previously approved by FERC, which allows for multiple forms of ownership (both for profit and not for profit) in an RTO structure. Under this proposal, BPA's transmission assets would remain federal and owned by BPA but would be operated by an RTO. ... However, the RTO itself would be a not-for-profit private corporation organized under state laws that would operate the*

transmission assets not only of BPA but also of the participating IOUs." About other acronyms, IOU stands for *investor-owned utility* and FERC is the Federal Energy Regulatory Commission.

Stu Cook Uses Apple Macintosh

Disk file naming is more sophisticated and higher level for Macintosh than for DOS. November 12th, Mr. Cook explained why variable KTRPL4 is ignored: *"There is no disk symbol on the Mac. A full pathname to a file could be 'My Disk:Fruits:Citrus:Oranges'. A partial pathname to the same file could be ':Fruits:Citrus:Oranges'. The file system on the Mac is not case sensitive so 'Oranges' and 'orangeS' refer to the same file. The disk or volume name can be up to 27 characters and the directory and file names up to 31 characters. This is changing and longer -- like 255 character -- names will be allowed. Any character except the colon can be used in a name but the use of non-printing characters such as 'null' is discouraged as it can give users great grief."*

DISLIN from Lindau , Germany

Java output of DISLIN was the subject of semi-public E-mail dated November 27th. The usefulness of such possible output of GTPPLOT was mentioned by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. First, he explained that he found the following in the DISLIN manual: *"JAVA applets files created by DISLIN can be compiled with Java and then displayed in a browser."* But what would this be used for? Why prefer Java? An explanation was provided later that same day by Russell Patterson of TVA in Chattanooga, Tennessee: *"I found this information on the web ... www.newbiesguide.com/newbiejava.html ... In the past, web pages could only display text, pictures and hyperlinks. Now, with the advent of Java, web designers can include interactive programs on web pages. Java is a computer programming language developed by Sun Microsystems which is specifically designed to run on the web. When you browse a web page that uses Java, an applet (i.e. a small applications program) is downloaded to your computer at the same time as the page's text and graphics. Once the Java applet is downloaded, it runs right on your computer. Java applets have the ability to display information right on the web page or open up a separate window. ... Java applets can be embedded right onto web pages ... Java programs can run on a variety of computers and operating systems … you don't need to worry about catching a virus. Java's built in security features prohibit applets from accessing your hard drive."* So, the question remains: what is the practical use in the ATP world?

That EIGHTH.AUX window shown in the preceding issue is worthy of clarification. Yes, the color figure appeared immediately when pasted using **Shift-Insert**. But it was missing in the "Print Preview" display, and also in the PostScript output that was to be sent to Adobe distiller. Your Editor complained about this to Bernd Stein in E-mail dated May 20th, 1999. But later that same day, BPA's Dr. Tsu-huei Liu solved the problem. Later that same day, she documented what she did in an E-mail message of her own: *"After I checked the 'Drawing objects' box under 'Print' tab in 'Options' of 'Tools' in MS Word, the picture appears in 'print preview', and is printed correctly from the printer, too."*

ATP Education in Florida & Idaho

Prof. Dennis Carroll of the University of Florida in Gainesville plans to teach his ATP short course March 6-9, 2000. This will be the 12th successive year, as announced by participating graduate student Carlos Mata in E-mail of the Fargo list server dated January 24th. The biggest change from one year ago is a return to the university campus from that resort town on the Florida coast. About this, Prof. Carroll observed: *"I have mixed feelings about last year's course at Cedar Key. Most of the 1999 class seemed to ignore the beautiful surroundings, and preferred to stay in the classroom after hours to work on their pet projects. Sometimes the instructors had to forcibly adjourn the late sessions to get enough rest for the next day. But the course last year did end up pretty well. We had about 12 very dedicated students, with 5 or 6 from outside the U.S. We may not do as well this year due to our very late start."* For technical information, Prof. Carroll can be contacted at **dcarr@ece.ufl.edu**

Video recording for ATP education was anticipated by Prof. Ned Mohan following his 1995 short course here in Portland. See discussion in the October, 1995, newsletter. Nothing more was done with the idea, however, because Mohan's course was not given again (see high prices for New York City hotels in the October, 1996, issue). But what about others? News of an alternative course was provided by Ralph Folkers of Schweitzer Engineering Laboratories in Pullman, Washington. His semi-public contribution to the Fargo list server explained the following on January 24th: *"The University of Idaho at Moscow offers EE 524, Transients in Power Systems, which emphasizes EMTP. You can check out the course content at* ***www.ee.uidaho.edu/ee/power/EE524/*** *I took the course last semester via videotape and enjoyed it very much. The text is 'Electric Transients in Power Systems' by Greenwood ... a very good book. Lots of the homework matches hand calculations to EMTP output."* This was in response to a question about alternatives to Prof. Dennis Carroll's just-announced Florida short course. Allen Windhorn of Kato Engineering in Mankato, Minnesota, had observed: *"I would love to go to a class such as this, but I probably won't be able to take the time off and the expense to do so. Does any school offer a class on EMTP remotely, either by videotape, Internet,*

CCTV, or other means?" Your Editor's observation to Prof. Mohan on January 26th was this: it is interesting to observe that the old technology of video tape has beaten the newer technology of the Internet and CD-ROM (see story about FREEP in the April, 1997, issue) to the market place for purposes of ATP education.

Prof. Brian K. Johnson provided the following clarification from address **bjohnson@ee.uidaho.edu** in the evening of that same day: *"The EE524, Transients in Power Systems course is a 15 week (~45 hours of lectures) course at the University of Idaho. The students are required to get a licensed copy of ATP through the appropriate channels for their location. I teach the course assuming the students have a current version of ATP, and used the latest version of ATPDraw last fall as well. I have also considered taping a shorter course just on learning ATP, but I wasn't sure if the demand would justify the effort. I'm open to suggestions on that topic. The EE524 class is offered through the Univ of Idaho Engineering Outreach program. The course is video-taped each time it is taught on campus, which is every other fall semester at this point. Students can enroll to either take the class live on-campus, or by videotape through the outreach program. Tapes are sent out once a week, in groups of three lectures. The outreach students do the same assignments and submit them to me by mail, fax, e-mail attachments, etc. and the graded work is returned by mail. The students designate a local exam proctor to oversee the exams. I usually give take-home exams so the outreach students can contact me if they have questions. I usually put handouts on the Web page for students who want to work ahead. The tapes are also available in semesters that the course isn't taught live. And the course doesn't have to be taken for university credit, if someone wanted to view the tapes more as a short course."*

Hoidalen Improves ATPDRAW

New ATPDraw was announced in semi-public E-mail of the Fargo list server dated November 5th. In this, Prof. Bruce Mork of Michigan Tech explained: *"Hans Hoidalen has now made V2.1 of ATPDraw available ... If you already have V2.0, it may be simpler to update using the 'patch' file (updated atpdraw.exe file). ... Hans writes that he's made the following changes/upgrades: The following bugs are corrected: 1) Round off error for small numbers; 2) JMarti fitting data EpsTol/Normax on correct format; 3) Steady state settings for type 94 components (1 and 3 phase); 4) Copt unit error in help file; and 5) Line model frequency scan supported for Semlyen lines (only newer version of ATP)."*

Implied decimal points of floating-point numbers of ATP are avoided by ATPDraw. This advantage was learned by reading E-mail dated December 9th from Laszlo Prikler of T.U. Budapest in Hungary to Beat Ronner of ABB-Alstom Power in Switzerland. Recall the problem of FORMAT statements as explained in Section I-H of the Rule Book. Prof. Hermann Dommel sometimes used input data specifications such as 3E6.2 rather than the more natural 3E6.0 (note the 2 will scale by a factor of 100 if the user fails to key a decimal point). For reasons of historical continuity, neither EMTP nor ATP altered this practice. But ATPDraw author Hans Hoidalen removed such scaling, and your editor approves. To summarize, ATPDraw adds its own decimal point in the natural location, if the user fails to supply one. Good!

Frequency Scans and Harmonics

The pocket calculator died while trying to evaluate the following expression that involves loop count KNT within a $PARAMETER declaration:

```
0.01* ( EXP( LOG(10.0) / 10.0 ) ) ** (KNT-1.0)
```

This was prior to a substantial addition that was made to POCKET on November 5th. Of course, the user might wonder about practicality. The parentheses between the 0.01 on the left and the double star on the right involve only constants, so could have been evaluated ahead of time (i.e., replaced by a constant). But that would be informed avoidance. There is no reason why the pocket calculator should not be able to handle the expression shown, which represents geometric spacing of the frequency in Hz with 10 points per decade as illustrated in the 7th subcase of DCNEW-25. About what was wrong, the value of the parentheses on the left of the double star were not properly saved from the accumulator prior to the evaluation of the exponent KNT - 1.0 on the right. The compiler then used the POWER command without appropriately restoring the accumulator ahead of time. On the other hand, avoidance of the problem was easy (the lower-level, 3-line equivalent can be found within the 7th data subcase).

Loop number MAXKNT of the pocket calculator is calculated internally by ATP for FREQUENCY SCAN data as illustrated by the 7th subcase of DCNEW-25. Prior to a minor correction to SUBR5 on November 10th, however, the number of passes was one short for cases of geometric spacing. I.e., the final step that would reach user-specified F-max was missing.

Year 2000 Compliance of ATP ?

The Millennium Award for Y2K Stupidity was won by BPA's computer establishment. The competition was not even close. First, BPA politicians conspicuously declared that the entire agency was Y2K-ready. Who would have expected anything less from these tree-trimming experts (see the April, 1997, issue as well as RANDYWLD.LIS)? But shortly thereafter, BPA's computer establishment proceeded to demonstrate how unsure it was by disabling effective use of the Internet. Why was this not a surprise? Well, these are the same people who, in the early days,

reportedly kept the Internet out of BPA for security reasons (see *mandated* in the July, 1994, issue). This time, second-hand reports are not needed; E-mail documents the stupidity. First, there was a message *"From: Coleman, Jay - KGI-2"* dated November 17th. This had *"Subject: Firewall blocking during Y2K moratorium."* It explained that *"Executable files (.exe, .dll, .com) as well as compressed files are being blocked from being downloaded from the internet during the Y2K moratorium (Nov 15 until Jan 15). Please advise your users that if they need an exception, they need to contact Kevin Dorning, and then depending on the issue, they may need to submit the 'clean management' form."* Later, it was explained that the prohibition applies to E-mail, too. A message *"From: Roth, Brian - CIMS"* later that same day explained: *"this filtering applies to email as well. I was unaware of this until a user reported a .zip file he was expecting to receive from an outside source got stripped by eSafe. He was left with the impression that this was virus infected ..."* Conclusion: as technical competence of BPA engineering continues to sink (Dr. Hauer's observation in the January issue), there is no shortage of incompetent management.

The 2-digit discontinuity in records was common during the '60s and '70s, it had been pointed out. Computers then were used for the accounting of tax and retirement money. Then, it would have been common to process records of persons born in 1899. If Y2K was supposed to be a problem of such programs today, why do newspaper archives not report problems from decades past? The more one thought about potential trouble of using only two digits for the year, the more unlikely most of the warnings of trouble seemed. As an act of defiance to bureaucratic Y2K stupidity, your Editor is continuing to use just two digits for the volume number of Can/Am newsletters. The January issue, published during November of 1999, was given volume number zero, it will be noted.

January 1st, *ABC News* offered several stories as alternatives to news about Y2K troubles. Apparently there was no news of Y2K troubles of consequence anywhere. One story was entitled *"Y2K bug did not bite."* From the story *"World still turning; millennium passes, fears abate ..."* the following summary was obtained from the caption of the photograph at the top: *"For those who expected the worst, the dawn of 2000 was a bust."* So, how much money was wasted by all-caring American politics and bureaucrats? A staggering sum. The first site mentioned by ABC is *"the government's $50 million Y2K command center."* Later, there is mention of *"the U.S. military, which spent an estimated $3.7 billion to make its computerized systems Y2K compliant."* Stupid, stupid, stupid. Never has more money and effort been spent by more persons on less. What about the rest of the world, most of which did not waste such absurd sums? Was significant trouble evident anywhere? Apparently not: *"... as midnight passed in Asia, Africa and Europe and no ill reports emerged ..."* The real Y2K problem was the same as the problem of earlier years. This was as nicely summarized on New Year's Day in E-mail from Orlando Hevia in Santa Fe, Argentina: *"The Y2K effect, as I see it: headaches due to alcohol, eyes and fingers burned by pyrotechnics, and car accidents due to alcohol. This is the same as the 1999 effect (or 1999-n for n=0,1,2...)."*

Windows 95 dating to early 1996 caused minor annoyance as the new year began. The first symptom that was noticed by your Editor, working at home, was a bad date on a file that had been EDIT-ed using the **real** operating system (MS-DOS). Output of DIR showed date 01-04-80 and the DATE command produced output *"Current date is Fri 01-04-1980."* In 1995, Bill G's programmers could not imagine the coming of year 2000? In comparison, how stupid was that IEEE PES COMTRADE committee (see the July, 1999, issue)? Anyway, as corrective action, the date was reset manually and the file was re-edited (re-touched) to produce the correct date. Later in the day, the same procedure was found necessary for Dr. Tsu-huei Liu's 486 DX2/66 at BPA (a DOS-only computer; no Windows). Then a second DIR showed correct date 01-01-00. Most importantly, Vernon Buerg's old freeware LIST then correctly showed a 4-digit year of 2000 in 2-column mode, and it correctly sorted files chronologically. Also, Salford DBOS version 1.66, which dates to 1992, correctly returned 00 as the two year digits, and your Editor's VINTAGE.BAT that reports UTPF changes worked correctly. The only non-correctable problem seems to be with Mike Albert's FC, which has a 1990 copyright date. This uses two digits for the date, and these two digits seem to be digits of the 20th century. For example :

```
dc1.lis   310865   1-01-100   5:31a
dc1.sal   310865   2-06-99   5:27a
```

Yet, unlike Windows 95, FC is freeware, so it is unreasonable to complain. Also, FC is twice as old, and will not have another problem for 900 years. Conclusion: the Y2K test has been applied to all software used at home for ATP development, and the MS Win95 package as sold early in 1996 was found to be less than fully-compliant.

"No Y2K cyberterror threats after all -- FBI" is the title of a story at *The Register* posted January 8th. The opening paragraph explains that the American federal police (the Federal Bureau of Investigation, FBI) *"reports no unusual cyberterror activity under cover of the Y2K rollover, despite months of sensational warnings and apocalyptic predictions involving doomsday religious cults, white supremacists, conspiracy paranoiacs and hostile foreign powers."*

"Not a single investment expert had the faintest idea what effect Y2K would have on the stock market. (Be sure to send me the exception if you know anyone who called for a gigantic fourth-quarter 1999 technology rally.) Next time you ask an expert to know the unknowable, please recall the Y2K farce." This observation is by John Rekenthaler, Morningstar's research director, in his January 12th article.

Branch Data Input Restructured

"Why use $INSERT for a small file?" This was a parenthetical question in the January issue. November 13th, while reviewing a pre-publication draft, two reasons were provided by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. Let's make sure everyone understands. There **are** two good reasons. First, imagine a big file with only a small part that might change. Why edit the complete file when instead one can edit a small $INSERT file? Alternatively (secondly), it might not be a question of editing. That small file might be generated automatically by a program. Thinking about it, this is precisely what is done in the 7th subcase of DCNEW-25. As mentioned in the preceding issue, the concept of embedding TO SUPPORTING PROGRAM within the FREQUENCY SCAN loop first was proposed by Mr. Hevia. For the 7th subcase, LINE CONSTANTS is the program that creates the file.

Interactive Plotting Programs

HFSPLOT is a 126-Kbyte program from Gabor Furst of suburban Vancouver, B.C., Canada. As he explained, *"HFSPLOT is a DOS program developed using a Qbasic Professional compiler. It was first demonstrated at the Prague EEUG meeting in November 1998. It has been on the Michigan ftp site as part of HFS.ZIP since February 1999. It can be called from the DOS screen or from Windows 95/98 by double clicking HFSPLOT.exe. The latest version with some improvements in the user interface for file selection and enabling to use C-like files in addition to wide10 files, was sent to the Michigan ftp site ... packaged into HFS.ZIP which contains also six HFS examples shown at the Lamezia Terme EEUG meeting and the HFS Rule Book pages."* The copy received in Portland on November 19th produced the following summary of operation as part of its output: *"The .PL4 file used must have been created from an HFS run with the wide10 or C-like option in the STARTUP file¸ and the POLAR OUTPUT VARIABLES option. The file directory used may not have more than 15 PL4 files. HFSPLOT will generate for up to four variables selected: 1) wave shapes; 2) the total rms of the waves; 3) THD% as per IEEE 519 and DIN; 4) TIF as per IEEE 519; 5) residual TIF (zero sequence harmonics); and 6) K factor for transformer derating."*

GTPPLOT is the interactive plotting program from Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. Since that report dated October 1st (see the January issue), many changes have been made. Author Hevia summarized these in E-mail dated February 23rd, from which the following ending to 1999 is drawn. In chronological order, changes begin on October 12th: *"1) The FILE command now allows the user to send FILE u:\directory*.pl4; and 2) The command KIZILCAY was added to generate data for Dr. Kizilcay's F-dependent model to be used with Dr. Noda's ARMAFIT."* Second, dated November 5th: *"3) The CHOICE command screen was enhanced for FS and HFS cases; and 4) The DERATE plot was modified. Only currents are allowed for a DERATE plot."* Third, dated November 13th: *"5) The NOZERO option for no zero in y-axis protection was enhanced; 6) The CACHE command protection was enhanced; and 7) FACTOR and OFFSET are reset following a # command."* Fourth, dated November 21st: *"8) Voltage from bus to bus (option -5 in ATP) now is correctly managed; and 9) The FOURIER command now allows the peak value of the plot to be set manually."* Fifth, dated November 24th: *"10) The TIME command can be applied to X-Y PLOT; 11) The CHOICE command shows the actual .pl4 file; and 12) For Windows NT, the environment variable GTPPLOT allows to install the package in any directory ..."* Sixth, dated November 30th: *"13) The JAVA output format was added. The NOJAVA parameter in gtpplot.ini controls this format; 14) The MATLAB command was added. Up to 20 variables plus time, or all the variables if MATLAB ALL is sent; and 15) The RELAY command was improved. Up to 20 variables plus time, or all the variables if RELAY ALL is sent."* Seventh, dated December 1st: *"16) MATLAB output file names were changed; and 17) The MATHCAD command was added. Up to 20 variables plus time, or all the variables if MATHCAD ALL is sent."* Eighth, dated December 2nd: *"18) The MATHCAD character separator was changed to TAB (ASCII 09); and 19) The time variable in MATLAB output files now is labeled 't'."* Ninth, dated December 21st: *"20) The MATKA command was added. Up to 20 variables plus time, or all the variables if MATKA ALL is sent, will be written in MATHEMATICA format; and 21) FS and HFS cases can be correctly processed by MATKA, MATHCAD and MATLAB commands."* Tenth, dated December 25th: *"22) The LOGY command was added for logarithmic y axis; 23) The FOURIER command was enhanced. If the user sends a negative time and a negative frequency (this must be a harmonic of FREQFR), only this harmonic will be plotted as a time function (a sort of tuned meter); 24) The ADF command was added, to read ADF (ASCII Data Files) with PLOTXY (Massimo Ceraolo's contribution) format; and 25) The COMTRADE command was enhanced. Up to 20 variables plus time, or all the variables."* Eleventh and finally, dated December 31st: *"26) The AGFPLOT command was added. This command allows plotting ARMAFIT (Dr. Taku Noda's fitter) graphical output."*

European EMTP User Group (EEUG)

The 1999 annual meeting of EEUG (the European EMTP User Group) was held in southern Italy November 8th and 9th. Various names unfamiliar to your Editor identify the area: Lamezia Terme airport, Gizzeria Lido, and the University of Calabria. More about the last of these (the local meeting host) later.

Very long days were the experience of persons actively involved with EEUG management. The following timetable was supplied by Chairman Mustafa Kizilcay in E-mail dated November 14th: 1) 9:00 to 17:00 --- EEUG Meeting itself, which included 2 presentations by the professor; 2) 17:00 to 19:30 --- Executive Board meeting; and 3) 20:00 to midnight --- official dinner. That was for Monday, November 8th. The following day seems only slightly less fatiguing: 1) 9:30 to 18:00 --- EEUG Meeting and Members' Meeting; 2) 18:00 to 19:00 --- Executive Board meeting; and 3) 20:30 to 23:00 --- Dinner with the course participants. This was not the end, either. The following day, there was a short course (more about this later), and the preceding Sunday was a full day ending with *"Executive Board meeting from 19:00 till 00:30."*

Local support for the meeting was described in glowing terms by the EEUG Chairman: *"The organization for the meeting was perfect. Prof. Daniele Menniti and his power systems group were hospitable and very friendly. Each request was met very quickly by his assistants. The proceedings were bound with a printed (in color) cover. ... The proceedings were distributed in a nice blue bag with an EEUG banner overprinted. They organized for each evening a dinner at a different restaurant."* Preceding advertising had identified the organizer as Prof. Daniele Menniti of the Dept. of Electronic, Computer and Computer Science Engineering Faculty at the University of Calabria. Later on November 14th, E-mail from another attendee, Gabor Furst of suburban Vancouver, British Columbia, Canada, seconded the Chairman's favorable assessment: *"The organization was excellent, the local university people did a superb job, everybody enjoyed it ..."*

Swimming in the Mediterranean Sea during lunch time may have contributed to the enjoyment of some. No question, this was different from preceding November meetings in central or northern Europe. When your Editor expressed his surprise and skepticism about temperature, Prof. Kizilcay responded: *"Oh, yes. The water temperature was around 73 degrees F. It was a sunny day, so we enjoyed swimming."* To conclude, Prof. Dennis Carroll had his Florida resort course during March of last year, and EEUG followed with its resort meeting during November.

Attendance was depressed, unfortunately, with only 28 members present for the Monday meeting. Also, only 15 students attended the Wednesday short course, according to Gabor Furst. The EEUG Chairman seemed to attribute the decline primarily to unfortunate and uncontrollable competition from large, preceding meetings: *"IPST and IEEE Powertech held in Budapest in July and September."* Your Editor wonders if location also was a factor. Gizzeria Lido may be an attractive location during November, but it is on the southern tip of Europe, requiring air travel for the average member. Anyway, few seemed to complain. The EEUG Chairman observed: *"I think less attendance ... caused a better and more friendly atmosphere."*

Miscellaneous Intel PC Information

The WTO meeting in Seattle (see explanation elsewhere) failed to reach agreement on a number of important issues affecting the Internet and computer software. *"WTO: Everything you need to know about the Battle in Seattle"* is the title of a 5-page article by Graham Lea posted on *The Register* December 6th. An important acronym is TRIPS (Trade-Related Intellectual Property Rights). In the case of the Internet, the issue is taxes: *"... the US had been expecting to extend the moratorium on tariffs on electronic commerce, keeping e-commerce tax free."* About history: *"the WTO was established in 1995, although the idea of an international trade body had evolved from a discussion at the Bretton Woods conference in 1944. This however foundered until 1947 when the General Agreement on Trade and Tariffs (GATT) took on the role. There were eight GATT negotiating rounds, ending with the Uruguay round from 1986 to 1994, where dumping, non-tariff barriers and intellectual property issues began to be discussed. The US and several developed countries had held out against the establishment of the WTO until it had been agreed that intellectual property protection would be included in what became known as TRIPS."*

Packard Bell is retreating from the retail market that it once led (see mention in the October, 1996, newsletter). This just shows how quickly fortunes change in the PC business. Recall NEC had taken control after PB had financial problems. Well, that $8 billion (estimated 1997 business) gamble seems to have failed. *"NEC fires 80 per cent of Packard Bell staff"* is the headline of a story found at *The Register* on November 3rd. This begins: *"NEC has pulled the plug on Packard Bell -- at least as a retail-oriented operation ... The company will continue with just 300-400 staff."* Where does this leave NEC outside Japan? *"The WSJ suggests it's looking at Internet sales."*

Dell is the top PC maker in the USA according to a November 3rd story by Jeremy Lopez of Morningstar. The story explained how Compaq had fallen to second place at the time. Measured as a percentage of units shipped during the 3rd quarter of 1999, the leaders are: 1) Dell at 18.1%; 2) Compaq at 15.9%; and 3) Gateway at 9.2%. Like IBM before it, Compaq has a problem with cost: *"Compaq spends a much higher percentage of its sales on operating costs than its peers do."* Bob Brinker regularly talks about Dell having a different business model (i.e., way of doing business). How different? Compaq *"has averaged more than 30 days of inventory, whereas Gateway and Dell tend to be below 10 days."* In general terms, Dell and Gateway will not build a computer until they have an order from a customer. This seems to be the new, winning concept: custom-built computers.

"Lebanon bans Intel Inside" is the title of a story of *The Register* that was posted December 13th. The story begins: *"Customs officers stopped fifteen containers of Intel processor products from entering Lebanon at the end*

of last week. The reason? Lebanon is still technically at war with Israel, and Intel has fabrication facilities in Israel. Under a law passed during the height of the Lebanese troubles, anyone collaborating with Israel is liable to the death sentence. ... Other countries which have a similar ban include Egypt."

Promotion of Alpha by Compaq was the subject of a story of *The Register* that was posted December 13th. Might Alpha be preferred over IA-64? The relationship between Intel and Compaq is unusual. *"Intel is still fabricating Alpha parts for Compaq (Digital) under a 10 year agreement that the US government imposed a couple of years ago. ... Intel and Digital's deal was brokered by the Federal Trade Commission, although many at the time thought the former had bought the latter."* Compaq seemed to further commit itself to Alpha rather than Intel shortly after Christmas. *"Big Q claims Alpha thrashes Itanium-Merced"* is the title of a story that was posted at *The Register* on December 28th. *"The document cites facts, figures and benchmarketing to demonstrate that pound for pound, the Alpha outperforms Intel architecture. ... it clearly shows Q is going to attempt, at least, to give Intel a run for its money."*

Miscellaneous Small Items

NEW LIST SIZES (NLS), introduced in the October, 1993, issue, underwent a fundamental improvement on January 15th. Although trouble with F95 Lahey ATP execution provided motivation, the change is universal, and it affects all versions. It is as follows. If and only if an NLS declaration is located in the first subcase of a file of stacked data cases, that information will be extracted and used as an alternative to LISTSIZE.DAT or limiting dimensions as program execution begins. DC-47 provides an illustration of this first alternative. There is a saving of one dimensioning operation and some extraneous output (from the start of the .LIS file through interpretation of the NLS data). For example, the characteristic interpretation *"Skip previously-used dynamic dimensioning data"* no longer will be seen. In its place is a single comment card: *"C NEW LIST SIZES Dimensioning cards following this request have been removed."* Even this trace will not be seen if comments are being removed by NOCOMM = 1. That is the big change. On the other hand, NLS use as part of the 2nd or later subcase is unaffected. This is illustrated by the 4th and 5th subcases of DC-22.

LWORK of List 31 was mentioned in the April, 1999, issue. At the time of design, use of KILL = 1 was expected, but this is not what was observed by BPA's Dr. Tsu-huei Liu when she produced overflow using NEW LIST SIZES (NLS) as part of a first data subcase. Several sophisticated modifications were found to conflict, as demonstrated using DUM47 (DC-47 with too large List 31: 360K rather than 240K). A warning message about the overflow, produced within DIMENS, was correct. But execution was not properly halted following this because detection was too early. This was due to the NLS reform dated January 15th, 2000 (see preceding paragraph). Yes, the use of NLS at the start of execution is better, but only if the associated numbers (list sizes) are legal. If illegal, ATP might have had trouble halting execution. The situation was complicated because it depended on several details such as whether DISK or BOTH were being used. Rather than terminate execution, sometimes the program would attempt to return to the opening prompt that might never have been issued, causing trouble. About this latter extension, see mention of PFE and Bernd Stein in the October, 1999, issue. Several sophisticated modifications interacted with confusing effect prior to modification by your Editor and Dr. Liu on February 18th, when correct termination was demonstrated using DUM47. Dr. Liu did ask why execution was terminated rather than there being a continuation to a second or following subcase. Yes, continuation would be possible, but it would require further modification that might lead to further trouble. The problem is this: it is dangerous to allow execution to continue without valid limits on tables. What can the program assume? Now that NLS dimensions are being loaded at the start of execution, it no longer is necessary to have LISTSIZE.DAT available. So, we can not always load valid dimensions from this possible source. Yes, limiting dimensions always exist, and are known, but these have been observed to cause trouble if tables are to be dumped using a computer with inadequate RAM. For MS Windows NT, adequate may be more than the average user possesses (see Dan Durbak's report about NT and 32 Mbytes of RAM in the October, 1998, and January, 1999, issues). It just seems too complicated to handle all possible cases intelligently. It seems easier and safer simply to terminate execution if there is an error using NLS numbers. This is what now should happen following change at the bottom of STOPTP (see WSM00FEB UTPF idents).

The saturable TRANSFORMER has its Type-98 pseudo-nonlinear inductor represented by a linear inductor during any phasor solution. But which inductor? The Rule Book mentions use of I-steady and PSI-steady as read from columns 27-38 of the leading data card. But, as explained January 3rd to Beat Ronner of ABB-Alstom Power in Switzerland, this is true only if there is a nonlinearity. For the case of either one or zero points of the saturation characteristic, there is no Type-98 element to store the I-steady and PSI-steady values. A series R-L-C branch (if one point) or nothing (if no point) is used instead, and this ignores I-steady and PSI-steady. Mr. Ronner is to be thanked for his careful observation and reporting of behavior that he did not understand. In the absence of a better idea, your Editor decided to do nothing more than issue a warning message about inconsistent I-steady and PSI-steady. As first observed January 15th, the new warning is seen twice in output of DCNEW-21: *"Warning. PSI-steady and I-steady are defined even though there is no characteristic. Ignore PSI-steady and I-steady."*