Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Salford FORTRAN Compilers

The following is a continuation of considerations related to use of the F95 FORTRAN compiler from Salford Computer in England. The preceding issue explained that FTN95 is being used for the support of ATP by Masahiro Kan of Toshiba Corporation in Japan. The compiler was purchased by JAUG (the Japanese ATP User Group).

Virtual scratch files have been lost, at least initially. Recall the first use was reported in the July, 1992, issue. Unfortunately, the F95 compiler does not honor the DBOS switch USE_VIRTUAL_SCRATCH_FILES@ so one can only hope that I/O will be smooth and fast without such special help. Anyway, that is the thinking as usage begins January 6th. Just as in 1996 (see the July issue), the CALL to the DBOS utility is being commented out. Also, the recovery of 50% or more of unused space (within the LIMCRD limit) has been disabled within SYSDEP. Later, if disk I/O is found to be a bottleneck (e.g., see the VAX/VMS problem in the April, 1993, issue), or if use of the paging file is found to vary noticeably and linearly with LIMCRD, the subject should be reviewed. Local circumvention could be patterned after what was done years ago for Watcom WRIT10 by either Robert Meredith or Robert Schultz of the New York City area (see the April, 1998, issue). Until then, the advice is to avoid much larger LIMCRD than necessary. Remember, 100K card images might cost a full 8 Mbytes of the Windows paging file.

The DIR response to the opening prompt is not being supported, initially. If use is attempted, a warning message will result. That is all. No menu of files will result.

Service for **Ctrl-Break** no longer is being provided within ATP. F77 ATP used SET_TRAP@ of DBOS for this, but apparently this external is not satisfied by F95 linking. See mention in the July, 1996, newsletter. So, just as four years ago, the feature has been omitted.

The /CHECK option and Intel assembly language combined to produce the first erroneous Salford execution. This was reported by Masahiro Kan in E-mail dated January 3rd: *"The test with a very simple case showed that it is a compiler bug. Without the /CHECK option, it worked normally, but with the /CHECK option, it didn't."* About the Intel assembler, this was SUBROUTINE MOVE from Robert Schultz of the New York City area (see the January, 1994, issue). At first, the Salford error was not believed to be an important issue for ATP because /CHECK will not normally be used. But the following day the trouble became more serious. Mr. Kan explained: *"It was found that the compiler bug for MOVE also occurs with the /DEBUG option. I plan to report it to Salford."* Yes, the symbolic debugger **is** important to ATP developers.

Fortran 95 from Lahey Computer

Quadruple precision REAL*16 and COMPLEX*32 is an interesting possibility that is offered by Lahey. The switch is **-quad** and compilation and linking are fast enough, although the resulting TPBIG.EXE is bigger: 7601 vs. 5905 Kbytes. The Lahey manual advises that quadruple precision *"will usually result in significantly slower executables."* This is confirmed by the total time for RUN.BAT (all standard test cases) which increased from about 3 minutes to about 25 minutes. Of particular interest are those subcases that involve extra precision for output of the time-step loop, such as the 2nd subcase of DC-5. For step zero, the SEC value is .4751131886501941899367 and presumably all of these digits are significant! Compare with the old (REAL*8) value of .4751131886501943 (it would appear that the ending 1943 really should be a 1942). Branch flows of the phasor solution commonly show signs of the greater precision in the form of different zero or near-zero values. Some former near-zero values now are exact zeros, and vice versa. Of course, near-zero values are much smaller. For example, for the same data subset, Q at the first end of branch (SEC, TERRA) was reduced from respectable .129E-15 to -.156E-33 Optimal encoding sometimes is troubled, resulting in GARBAGE output. But this is just an occasional display problem that has not yet been studied. To conclude, Lahey quadruple precision seems to be a valuable new tool for the study of data cases where inadequate precision might be suspected.

Speed of Lahey ALLOCATE --- used in place of COMMON block creation --- was summarized in E-mail to Masahiro Kan dated November 23rd. *"I constructed \LAHEY\ALL1.F95 and ALL2.F95 These are for LISTSIZE.BPA and *.FGH ... On the 200-MHz Pentium Pro, execution of either seems instantaneous. I suppose this means 1/5 of a second or less. For the more than 30 Mbytes of ALL2, I consider this very good."* Mr. Kan responded with confirmation for the Salford F95 compiler the following day: *"My test was done using a 166-MHz Pentium with 48 MB memory. ... 1) ALL1 was instantaneous for the first and later run; and 2) ALL2 required about 2 seconds for the first run, and was instantaneous for the second or later run."*

-NZERO or -ZERO was added to both compilation and linking commands, but the large 6398-Kbyte size of TPBIG.EXE remained unchanged. This testing was performed January 11th following Dr. Tsu-huei Liu's notice of the compiler switch on Page 29 of the *User's Guide*. Default is said to be -ZERO which *"will cause all variables and data areas to be initialized to zero at program load time ..."*..Well, maybe. But those variables must not include COMMON blocks or their MODULE replacements, since such size is far greater than the 3 Mbytes of excess (6.4 Mbytes vs. 3.4 Mbytes for F77 Salford). The fact that -NZERO made no difference is consistent with the belief that local variables are zeroed whether we want such treatment or not (generally, we do not). This is comparable to /ZEROISE of F77 Salford.

The quarterly Lahey newsletter arrived May 9th in the form of ordinary E-mail. This was Volume 16, Issue 1, Spring 2000, which began with an explanation: *"This is the first edition to be published and distributed electronically. We have tried to provide the information in this newsletter in as non-intrusive a manner as possible. However, if you don't want to receive future issues of the newsletter, unsubscribe instructions can be found at the end of this letter."* So, it appears that free paper and mailing of news from Lahey has ended. Your Editor is not surprised. Recall Can/Am abandonment of free printing and snail mail for its own newsletter is nearly 4 years old (see the October, 1996, issue for the announced end of service).

Linux support for multiprocessor computers and networks is an interesting subject that is treated at length in the Spring Lahey newsletter. The story title is *"Using LF95 Linux Express for Linux Clusters."* Recall computer expert David Szymanski had interest in the subject using MS software, as mentioned in the October, 1996, newsletter. Well, years later, Lahey provides compilers for both MS Windows and Linux; and it seems that the Linux alternative is better. The report begins with a definition: *"MPICH is an implementation of MPI (message passing interface) that allows Linux LF95 Express users to create parallel applications that can run on more that one processor. ... We have reports of people using LF95 with MPICH on 64-node systems, with faster performance than other Fortran compilers. The word is spreading fast."* There is a reference to **anl.gov**, which is the domain name used by Argonne National Laboratory outside Chicago, Illinois. The story ends as follows: *"Although you can use MPICH on systems with a variety of characteristics, performance is best when all the machines have identical hardware and software configurations, as in a Beowolf cluster. ... MPICH provides a significant breakthrough in the availability and cost of high performance computing. LF95 and MPICH, when used with a larger cluster can provide supercomputing capabilities at a fraction of the cost of today's supercomputers."*

F95 ALLOCATE of ATP Tables

List 26 involves only 3 small working vectors, but was the cause of considerable struggle because of numerous EQUIVALENCE statements involving dependent vectors. More than 24 hours had past before conversion finally was validated at the end of January 1st. One change was made to the translator to handle exceptional NRELAY for widexx .PL4 files, and 14 UTPF segments were modified. Perhaps the most interesting and unexpected change was for the pocket calculator as used by the DO loop of DC-58. Recall this was radical development inspired by Prof. Juan Martinez at the University of Catalunya in Barcelona, Spain. It was found that the pocket calculator was being called before its storage had been created!

Supporting programs are not yet participating in the FORTRAN 95 (F95) ALLOCATE revolution, it should be mentioned. They might later, but will not initially. The average user may not understand why, but there is a good reason that has to do with history. Today, all computers of practical, current consideration offer virtual memory management, and this is exploited. That is, the alternative of overlaying no longer is being used. But when translation procedures first were established (late 1973), all computers being used required overlaying. Supporting programs differ from simulation in that they are located in different primary-level overlays. In theory, they can not (must not) be used at the same time. As a result, COMMON blocks for supporting programs are named and handled differently, too. This is the reason for excepting supporting programs initially. Also, there is a lack of practical need. Supporting programs require only a small fraction of the working space of the most demanding simulation. The tables that grow without obvious limit (common phrase used by your Editor) provide storage for simulation, not supporting programs. No one yet has offered a practical need for more than 100 coupled conductors of LINE CONSTANTS or more than 38 coupled phases of CABLE PARAMETERS (the latter mentioned in the July, 1997, issue). Sudden problem: Ashok Parsotam in New Zealand (see mention elsewhere). Reasoning requires modification (continued next issue).

Initialization (zeroing) of F95 numerical storage is a special problem that first was realized on January 8th. Whereas COMMON blocks of F77 automatically started with zero content, not so for ALLOCATE storage. In a reply to your Editor the following day, Masahiro Kan explained: *"No, I think, there isn't. As for C also, there is no way to initialize a malloc storage. ... For allocated storage, the compiler cannot know where it is, because the area is allocated and the address is determined after the program starts."* As a result, special counter measures for F95 were required to ensure the continued efficient operation of Robert Schultz's turbo table dumping and restoring (see the October, 1993, issue). Details remain classified, however.

DECK10 contains 23 non-LABCOM vectors (mostly associated with the EMTP load flow) that were successfully converted from COMMON to ALLOCATE form on January 10th and 11th. Several changes to the translator were required, although changes to the UTPF were simple enough (just 3 segments involving F95 Salford-conditional aliasing). There also is a new SUBROUTINE MAKE10 because modularization of associated operations seemed like a good idea.

List 2 involves 15 vectors of the branch table, and the conversion of this storage was completed January 13th after substantial struggle. No change to the translator was required, but use of vector KBUS required modification because it was being used as a dummy working vector prior to execution of the ALLOCATE statements. Location is tricky since creation can not occur at the start of execution. Prior to vector creation, there is the input of dimensioning information from LISTSIZE.DAT But this, in turn, is delayed until STARTUP has been loaded. Eventually, the problem was solved by conversion from KBUS to KBUDUM in OVER1 and the conversion from KBUS to LOOPSS in RFUNL1 and RESTART. The only disadvantage of this is installation-dependence of RFUNL1 (changes must be made in a different file for each different program version). Yet, this price seemed lower than that associated with the uncertainty that would have resulted from changed location. Location remains unchanged. Another modification was the removal of a bad subscript in SSOUT for F-scan usage (e.g., 5th subcase of DCNEW-21). The negative subscript had been tolerated by all F77 versions for many months, but was illegal for Lahey F95.

List 1 limits electric network nodes, and the single exceptional ALPHANUMERIC vector BUS was considered first. Surprisingly, this revealed trouble, but only for DC-47. For the first time, it was concluded that NEW LIST SIZES required DEALLOCATE use prior to the second ALLOCATE of each vector. What the special relationship between BUS and DC-47 might be is not known. Neither is it known why DC-47 was troubled but DC-22 (which also used NLS) was not. Anyway, addition of DEALLOCATE solved the problem provided a time delay was added. This is the final peculiar detail. At the end of the final ALLOCATE a pause was added. Without this, execution invariably failed quickly. With the added PAUSE, or with an alternative half second of time delay, execution was normal. Needless to say, this is weird, and a little disturbing.

Reform associated with NEW LIST SIZES (NLS) was summarized in the April issue. This change solved the problem of F95 Lahey ATP execution: the just-mentioned DEALLOCATION of DC-47 no longer is performed. This is the situation of practical production use: a single data subset as opposed to stacked data subcases. As for use in a 2nd or later stacked subcase, trouble never was seen, so it is hard to know whether operation is better or worse. For

the record, the experimental PAUSE has been replaced by a time delay of | D4FACT | seconds (value 1.0 is being used in STARTUP).

Too large a subscript for ALLOCATE storage will result in Lahey ATP error termination. This was learned early in the conversion. But only during the List 1 conversion was it learned that zero was tolerated. Cell N1 or N2 equal to zero could be accessed in OVER8, although contents N12 were garbage. Then, subsequent use of garbage N12 led to an error at S.N. 1458. But use of zero N1 or N2 itself was tolerated when first observed using the 12th subcase of DCNEW-26 on January 16th. This led to correction of OVER13 the following day. Investigation using F77 Salford had revealed that the right answer was being obtained using bad numbers (a zero subscript, which produced value zero for N12). By restoring List-2 vector LENGTH (for the Semlyen line in question, it had been modified in preparation for the dT loop), the zero subscript was avoided for any program version of any age. To conclude, a universal correction ended the conversion of 9 List 1 vectors from COMMON to ALLOCATE on January 17th.

List 9 limits nonlinear elements. The conversion of its 14 vectors from COMMON to ALLOCATE was completed without incident on January 19th.

List 10 stores the characteristics of the nonlinear elements of List 9. Although only 3 vectors were involved, changes were required to except special values that marked special kinds of data. These were associated with code of SUBR15 for the flux output of an inductor as described in the January, 1998, issue. Execution failed using Lahey because an illegal subscript was being used to check GSLOPE(K) where K was a large, special value. This was no problem using F77 and COMMON because too large indices are generally allowed, and generally will store zero values. Preparing for the future, one 4-digit flag was converted to 5 digits, and made negative, to prevent possible misidentification as an actual index of some huge data case. The new values -77777 and -44455 do require more than 2-byte integers, it should be noted. This is another sign of changing times and practices (16-bit indexing is assumed to be gone forever). Work was completed January 20th.

SPACE1, SPACE2, and DECK21 posed a substantial structural challenge. For one thing, the first and only use of EQUIVALENCE within VARDIM was involved, and considerable change to the translator was required. Another complication was the equivalence of REAL*8 PLOTEV with REAL*4 SINGAR --- acceptable to F77 but rejected by Lahey F95 (just as aliasing of integers and reals was rejected). About DECK21, this includes the exceptional List 13 for plotting --- exceptional because at one time this was handled differently (e.g., Lahey F77L for DOS used REAL*4 for PLOTEV, and overlaying for SPY). Finally, there was a problem with MS Windows NT itself. Program execution suddenly seemed to fail quickly. After nearly a day of experimentation, it was concluded that something like the LUNT10 problem of Mingw32 ATP (see the July, 1999, issue) was involved. ATP would die quickly in the middle of ALLOCATE use with a message such as: *"jwe0020i-u An error was detected during an abnormal termination process."* But what process? Why? Separate testing show that all ALLOCATE lines executed normally as a small program. After rebooting did not help, Dr. Liu and your Editor began looking around with Vernon Buerg's freeware LIST. The first sign of trouble was too many files in C:\TEMP (a limit of 1000 exists). Found were 355 files named TF*.$$$, 582 files named *.TMP, and 168 named LFT* with only the final set obviously attributable to the Lahey compiler or resulting ATP version. Anyway, after removing all such clearly-unused entries, which had accumulated over months of use, Lahey ATP execution returned to normal on January 24th. Another four days were required before all standard tests produced correct output for both computers (Lahey F95 and Salford F77), however.

The universal superposition of OVER13 was modified to prevent corruption from one or more preceding subcases. Curiously, F77 Salford ATP did not demonstrate the problem for DCNEW-26 whereas Lahey F95 did. This is the good news: a universal error was discovered. Included in changes were correction of the List size 13 printout of case-summary statistics. For example, the 15th subcase had value 24 increase to 28. Output of only one of the 16 subcases was changed --- apparently because of extensive use of plotting (remember, the printed output will change only if demands of plotting are less than the demands of superposition on List 13). About possible overflow of List 13, the modification ensures rigorous observance, although only after the fact. That is, storage now is used first, and is checked later. For ordered COMMON blocks, this should not be a problem. But for F95 ALLOCATE, any overflow probably will result in death of the execution before the error message is reached. Final curious detail: blanking of Dube's CSTO added 1 byte to the List 15 usage of one test case (the final subcase of DC-68). This seems to show that initialization of CSTO is not necessary, and certainly is not cost effective (2699 and 2700 are the numbers seen).

List 19 provides working space for TACS, basically. Dube's MODELS does use it, but only slightly, and not in any way that complicates conversion to F95. Although only the single vector SPTACS is involved, this is because of Bob Eifrig's minor miracle that involved offset subscripting (see mention in the April, 1999, issue). That work was right for its time (memory-short computers of the late '70s), but is wrong for F95 more than two decades later. Conversion without change should be easy enough, but is not being undertaken because it would preserve the penalty of offset subscripting: more code and slower execution. The better solution for F95 involves the destruction of SPTACS and the removal of all of Mr. Eifrig's offsets. In their place, Laurent Dube's original vectors and indexing are to be restored, and F95 ALLOCATE is to be used to size these

separate vectors appropriately. This is the ambitious plan as work begins January 29th.

News from Outside USA and Canada

Western Union (WU) worked well for China as well as Russia (about the latter, see explanation in the January, 1998, issue). Once again, there was a problem providing an appropriate bank check, so your Editor had mentioned the alternatives of bank wire (the July, 1997, issue) and WU (the January, 1998, issue). In E-mail dated January 7th, Zhou Pei Hong of the Wuhan High Voltage Research Institute seemed to express his preference for the latter. He also mentioned a name from EMTP history: *"I was Mr. Ma Renming's colleague for more than 14 years. I had already known your name from him when he worked in Wuhan. Mr. Ma will retire in two years in Shanghai. I still cooperate with him in our research projects since he left."* About the transaction, Dr. Tsu-huei Liu confirmed that the same nearby Lake Oswego drug store was used without difficulty. In E-mail dated January 26th, Mr. Zhou confirmed reception of his package from Dr. Kai-Hwa Ger. *"The fastest way to send money worldwide"* is the slogan that appears on the yellow WU advertising signs of its agents. If modern banks are part of the problem, WU is part of the solution --- at least for small amounts of money. This is the important difference: banks basically work on fixed fees --- bad for small amounts of money such as those collected by Dr. Ger. WU basically works on percentages --- better for small amounts, but much worse for larger amounts (e.g., thousands of dollars).

The Indian user group was mentioned in the January newsletter. Expansion continues, as documented by E-mail from Prof. Hariharan dated April 12th: *"We conducted an ATP tutorial (eighth in the series) in a university in the city of Hyderabad, in South India. There were 20 participants ... There was lot of interest in the capabilities of the Window version, which was demonstrated with interesting examples. There are now about 35 members in the Indian ATP User Group ... list being maintained by kind courtesy of Masahiro Kan and others of Japanese AUG. Am keeping Prof. Ned Mohan informed."*

JAUG, the Japanese ATP User Group, has moved to a more recognizable address on the Internet. This was explained by the JAUG Chairman, Dr. Hiroshi Arita of Hitachi Corporation, in E-mail of the Fargo list server dated May 21st. The Subject was: *"JAUG New HomePage ..."* It seems that JAUG has *"acquired an original domain name,"* and now is using **http://www.jaug.gr.jp/**

More about the Internet and E-mail

"French ban email" is the clever title of a story posted at *The Register* on March 6th. Obviously, the French are not banning use of the Internet. Rather, the English word *email* might be discouraged from use by the government. *"Politicians ... want to force the French civil service to stop using cyber-Anglicisms. Email will be replaced for bureaucrats by courrier electronique ..."*

Governmental elections that allow use of the Internet for voting have arrived in the USA. *"Arizona Dems Flood Online Voting Web Site"* is the title of an *ABC News* story dated March 10th. Here *Dems* is short for Democrats, who, along with Republicans, dominate American politics. An accompanying photo has caption: *"Traditional voting booths are vacant in Scottsdale, Arizona as the electorate goes online."* It must be explained that this March election is just a so-called *primary* election, which is designed to help each party select its most attractive candidate for each of various offices. But what about security? *"Some 60,000 Arizona Democrats applied for a special password in order to vote. They mailed their signature to the state party, then got an e-mail confirmation, a personal identification number and even a toll-free trouble number to call if they forget that PIN."* Use was made of *"the home page of Election.com, the independent company handling the system."* As usual whenever rules change, there were protests: *"The e-balloting survived a legal challenge earlier this year from a voter rights' group."* What was the complaint? *"Too many minorities and low-income citizens don't have access to computers for voting."* Do you suppose this same group complained when balloting was extended to snail mail some years back? Probably not. Voting by snail mail generally is believed to favor less-motivated Democrats at the expense of more-motivated Republicans. The latest electronic alternative might be expected to reverse this edge, should use be extended to a general election during November. Of course, Democrats and Republicans are continually at war with each it. This is the inimitably-American way.

Location of lost persons based on name is the business of **www.1800ussearch.com** as featured at Yahoo. Founded in 1994, US SEARCH.com uses the same telephone number (1-800-...). There are many data bases in the country, and this company seems willing to computer search as many as a customer is willing to finance. The opening pitch reads as follows: *"Search results in approximately one hour! Find anyone! Only $39.95 Internet Special!"* No question, this is inexpensive compared with the old days when human time and printed books (e.g., telephone directories) in libraries were required. But, effectiveness would seem to depend on a precise name and date of birth (not much use if a person is hiding under another name and another date). What are some specialized applications? *"Search ... for a female whose last name may have changed ... Search national death records to determine if someone is alive or deceased. ... Order a public record report to find out about anyone! ... Do you know who (sic) you are dating? Are they who they appear to be?" About a search of court records: "find out if anyone has any liens, judgments or bankruptcies! ...*

Are you about to accept collateral on a loan? Search UCC filings to see if someone else has the right to the collateral before you do!" Even curiosity seems to be a justification: *"Find out what other people can find out about you!"*

Counterfeit video games are being sold over the Internet. This according to a lawsuit against Yahoo that has been filed by dominant game manufacturers. A short story posted March 29th at *The Register* summarized the seriousness of this latest challenge to Internet retailing: *"Nintendo, Electronic Arts and Sega accuse the online retailer of selling counterfeit copies of computer games and devices to copy games through its auction and sales sites. The companies filed the suit in US District Court for the Northern District of California on Tuesday. They are seeking an injunction against the sales, damages of $100,000 per copyright violation, and $2,500 for each sale of the hardware devices."* One company representative is quoted as saying: *"Yahoo! has created a virtual flea market for thieves to sell stolen property."*

"Long fraud scam hits eBay" is the title of another story found at *The Register*. Recall your Editor's warning about eBay in the April, 1999, issue. Limitations of the Internet for retail sales are clearly illustrated. The story which was posted March 30th explains: *"Police in Los Angeles are investigating claims that dozens of people handed over money for computer equipment advertised on eBay but have never received the goods. The seller in question is understood to have sold via eBay prior to the alleged sting and had built up a reputation for being trustworthy."* As the story explains, *"there's nothing new about this, it's called the long firm fraud --- you conduct yourself as any law-abiding individual would. You win the trust of the people you do business with and then you hit them hard. ... The long firm fraud was an old favourite of the London criminal fraternity in the 50s. ... There wasn't much the law could do to prevent this sort of activity fifty years ago -- its nice to know that, even in the fastmoving world of IT, some things never change."*

Computer Shopper was seen during March for the first time in many months. BPA's Walter Powell, still a subscriber, wanted to know if your Editor recognized what he was holding in his hand. It looked like a thin copy of *PC Magazine*. Gone is the oversize format and low-quality, telephone book-like paper. Also gone is about half of the content (the April issue contains 322 pages). Why the change? Your Editor's guess is that the great old product was largely a victim of competition from the Internet.

Encrypted books are being sold and delivered via the Internet, with Stephen King's 16K-word novelette entitled *"Riding the Bullet"* probably being the most famous example. But it seems the legal publisher, Simon and Schuster, has encountered resistance to its $2.50 price. *"Stephen King e-book cracked and distributed free"* is the headline of a story posted at *The Register* on March 31st. If this is a model for the future, publishers had better rethink details. How did security fail? *"The original file came from Glassbook, an electronic publisher distributing PDF versions ... It is not known whether Glassbook's own public key was attacked or whether Adobe's crypto system for PDF was exploited."* What is the role of various Websites in the illegal distribution? It is unclear. S&S *"says most of the hosts have been cooperative in removing it when notified."* The key word here is *most* (not *all*).

Napster is the best known example of Undernet, a name that has been applied to various uses of the Internet for the sharing of computer files without permission. Boston.com is the Web site of *The Boston Globe*, and a story by Keith Dawson, dated April 5th, summarizes the beginning of the revolution as follows: *"Napster is the product of a privately held startup company, Napster.com. Its 2.0 beta release early last November engendered a monster buzz and, within weeks, a lawsuit from the recording industry. Anyone who downloads the free Napster client program has immediate access to a rapidly expanding universe of music in the form of MP3 files. ... What makes Napster so virally compelling is that every downloaded client is also, by default, a server. As you download the music you want, Napster encourages you to offer the music on your own disk for download. ... Napster.com maintains only the metadata that keeps track of who is offering what; the actual MP3 files are scattered across the client/servers of the Napsternet. Napster can truthfully say that it does not, as a company, encourage or condone the theft of intellectual property. The recording industry claims that the very nature of the technology that Napster has released encourages theft. The RIAA filed suit 2 weeks after Napster's beta release, aiming to shut the service down. The suit is now pending; by the time it's heard it will be far too late. It is already too late."* So, Napster was just the beginning. Already, there are extensions that circumvent present limitations, and attempts to control it. Author Dawson concludes: *"So, Napster is a proprietary program that facilitates sharing of MP3 files with central metadata and a distributed database. Wrapster lifts Napster's MP3-only limitation. Gnutella is an open-source program that allows sharing of any files with distributed metadata and a distributed database."* Thanks to Stu Cook of JUST Services for making your Editor aware of the Dawson article. In E-mail dated April 7th, he provided a specific link. More generally, begin at **www.boston.com** and select "digitalMASS" from the pull-down menu near the top. Then click on COLUMNS in the left margin; then scroll down to the Internet section (3rd of 5 choices), and click on this to access the author's columns (*"Keith Dawson writes ...The Internet column appears on Wednesdays"*).

Trademarks are inadequate for deciding disputes about Internet domain names. Recall the January issue mentioned trademarks, but some disputes are more complicated than one might imagine. This and other problems are summarized in a long story posted at *The Register* on April 10th. The headline is *"Net regulators close in on rogue domains."* Yes, many cases probably are obvious, but

some are not. *"Jonathan Cohen, a Canadian intellectual property lawyer ... drew attention to a number of problems that still need to be resolved. ... Cohen outlined some interesting problems in trademark law: identical trademarks can exist for different products or services, but this is not possible with domain names. A further problem concerns the territorial nature of trademarks -- they are limited to the country or countries of registration, whereas TLDs are not."* Of course, TLD indicates Top Level Domain. As an example, remember Apollo Computer. It seems unlikely that this pioneer workstation maker of the '80s would be given the name Apollo.com today because the name Apollo is used in other lines of business (e.g., as the name of an airline reservation system). Also, consider Germany, where the name Apollo already had been taken by some other computer company, so Apollo Computer instead used the name Domain (the name of Apollo networking) for the name of its product. Your Editor recalls being told this story by the Apollo salesman in Belgium during late August of 1984. This was at the first advanced EMTP short course, offered by Prof. Daniel Van Dommelen at K.U. Leuven). In closing, consider a second interesting conflict: *"A current problem is in the use of nicknames, or where the names of people have been legally changed -- for example in the case of a certain Mr Oxford University, in Australia."* Of course, Oxford University is the famous and historic English (not Australian) school.

"Death of Online Retailing?" is the headline of an April 13th story by Rachel Beck that was found at the *ABC News* Web site. The sub-headline of this exciting AP story is *"Forrester report predicts demise of many cybershops."* The story itself begins: *"Most retailers that operate entirely on the Internet will be out of business by next year, a respected consulting firm predicted in a harsh report that fired another blow to the battered online shopping industry. Intense competition combined with an ongoing selloff in dot-com stocks will result in a rapid rise in buyouts and bankruptcies in the coming months, according to Forrester Research."* Well, the negative economics of Webvan, Amazon, and Red Hat were summarized in the April issue. But for each such well-known name, there are many obscure ones. As tech stocks on the NASDAQ exchange continue to drop in price, many if not most companies are in financial trouble. So-called momentum investing no longer works. Momentum has been lost. The NASDAQ index already is down 27% from its March 10th high of 5049, as money flows out of tech stocks and into money market funds, bonds, and more-conventional stocks (you know, equity of old-fashioned companies that actually make money most of the time -- a requirement before Internet stocks somehow defied gravity during recent years). *"The fallout has already begun. Lawyers and consultants are getting swamped with calls for help from companies in distress."* Mark Doll, described as a consultant to startup companies, is quoted as predicting: *"There are 30,000 e-tailers out there, and probably 25,000 will have to go away."* About the response to continuing losses (typical of Internet companies of all sizes), the story states: *"There is no doubt that investors have tightened their purse strings. The flood of money from venture capitalists and initial public offerings of stock has dried up, and dot-com shares have been on a downward spiral."*

Outage of the Fargo list server was caused by *"7 inches of rain in 6 hours."* This according to June 21st E-mail from Prof. Bruce Mork of Michigan Tech in Houghton, who described troubles on the campus of North Dakota State University as *"a once-in-200 years rain/flood."* Included was a summary from NDSU list server guru Marty Hoag in Fargo, which explained: *"... we had to shut down power in our building when utility tunnels flooded the basement of the IACC building, the main location for Information Technology Services. LISTSERV.NODAK.EDU went down about 11:52 CDT (16:52 GMT) on Tuesday, June 20 and came back up around 2:42 p.m. CDT (20:42 GMT) today, Wednesday, June 21, 2000. The staff here is concentrating on getting our core network infrastructure rebuilt and will then work in the next day or two to get the campus network running so things are a bit primitive but improving minute by minute. Our voice phone switch was flooded so it may be some time until phone service is restored and the university is closed for today at least. This makes it more complicated to do things like check e-mail from home so please be patient if you are trying to reach us. There may be some unanticipated or announced outages as the power and environmental systems are brought back to normal. Thank you for your patience."*

European EMTP User Group (EEUG)

Wroclaw, Poland, is to be the site of the next EEUG meeting, which is to be held earlier than ever before: September 25-26, 2000. There also will be a course, according to the April 19th announcement by Chairman Kizilcay: *"The meeting will be hosted by Institute of Electrical Power Engineering of Wroclaw University of Technology. Dr. Marek Michalik is the organizer and contact person for questions related to registration and accommodation. ... A one-day course on 'Frequency dependent line and cable modeling' will be held immediately after the EEUG meeting on September 27, 2000. Prof. Akihiro Ametani, Doshisha University, Kyoto/ Japan is invited by the EEUG as guest teacher."*

The Proceedings of the 1999 EEUG meeting were received at BPA shortly before May 30th (date of Dr. Liu's "thank you" E-mail to Prof. Daniele Menniti). Without any comment about content, your Editor wants to write a few words about the professional appearance, which is quite extraordinary. The work is bound (soft cover, of course), with a large photograph of antique Italian statues on the cardboard cover, which involves 2-color printing (black and various shades of blue on white paper). Inside, each of the 165 pages carries identification in the top margin. The fixed part consists of the familiar graphical EEUG logo on the left, and the conference name, location, and date in the

middle. On the right is the page number, which also includes the session letter and the number of the paper within that session. For example, "C-2; Page 113" appears on the first page of a contribution by Prof. Kizilcay, which was paper number 2 within Session C. Finally, the papers of each session are preceded by a special title page that carries the session title. The quality is quite amazing.

A list server with clear rules of operation was the refreshing news from EEUG on April 3rd. The Internet address being used is **eeug-l@listserv.gmd.de** The previous day, Chairman Kizilcay invited participation by the Can/Am user's group: *"As honorary members of the EEUG I added your Email address ... to the list of editors and subscribers. As Editor, your messages will be posted directly to the list. You should receive an acknowledgment from listserv automatically that you have been subscribed to the list."*

Rules include: 1) censorship (*"The mailing list will be moderated by me and Laszlo, i.e. all postings will be approved first by the moderators using OK mechanism."*); 2) security (*"The subscription of members to the list is performed by Prof. M. Kizilcay manually after checking the ATP license of the members"*); 3) restriction to simple English (*"Messages written in any other language are not accepted. Since English is not the native language of most EEUG members, please use simple wording and avoid local idioms and slang."*); 4) civility (*"Rebuttals to another person's opinions or beliefs should always be made in a rational, logical and mature manner. Subscribers should refrain from abusive or derogatory language that might be considered questionable."*); and 5) prohibition on commerce (*"Unsolicited advertising and chain letters are not allowed."*).

Impressed, your Editor was the first to contribute. Sent at 5:16 in the morning, this initial message was acknowledged rapidly enough (maybe a minute), but was not received back again for nearly five hours (MS Outlook 98 shows 10:08 for the copy). Is there any other good reason to have more than two moderators? It should be explained that your Editor made precisely this point in his greetings: *"you might consider expanding to a few other trusted EEUG members in order better to ensure coverage of all days and times."* In his response, Prof. Kizilcay did not disagree: *"Probably. It depends on the Email traffic that will settle in our mailing list."* Well, if EEUG would expand to include foreign users groups, your Editor and a few friends would guarantee the volume.

About security, your Editor asked for clarification: *"How do you know the person making the request really is who he claims to be? Over here (the Can/Am user group), we intend to require a licensing form that includes the Internet address being used."* The EEUG Chairman clarified his procedures: *"As EEUG we receive from each member membership application form and ATP licensing form, both forms have a field to enter Email address. These Email addresses are entered into our data base. I used exactly those data from data base to create the subscription list. No request from members is needed to join the mailing list. There are a few members from which we do not have any Email address. We have contacted them by fax to provide us with their Email addresses."*

The limitation on subscriptions was explained as follows: *"As a first step only one contact person from each EEUG member has been added to the subscriber list. That contact person, who is identifiable by the EEUG, may (or may not) propose a 2nd person for the mailing list."* This is a little different from Can/Am plans, which envision no limit, but which will require a license form (a separate piece of paper) for each E-mail address and person (the two will be paired).

News About TACS and MODELS

Variable PI of MODELS was given full precision March 22nd. Later, other variables such as tolerances might follow. But initially, the replacement begins with only Pi, which MODELS author Laurent Dube had defined in double precision to 16 decimal digits. Several objections come to mind. First, ATP already had TWOPI defined elsewhere, using more precision (21 digits). Why not instead use what already had been defined? Secondly, for radian frequencies that are supposed to be the same, one does not want use in the electric network to differ from use in MODELS by more than roundoff error. When it comes to harmonics, very small errors are to be avoided like the plague. Recall Gabor Furst's great idea to allow the computation of time-step size DELTAT using an exact number of points/cycle (see the 4th subcase of DC-22 as mentioned in the October, 1998, newsletter). Finally, there is the possible need for much higher precision (e.g., as mentioned in the April issue, Lahey F95 offers quadruple precision as an alternative to the present, common, double precision).

Separate disk file COMTAC was convenient for COMPILED TACS USE as long as COMMON blocks remained current. But if the number or order of C0BXXX blocks changed, it was possible that there would be data misalignment, and erroneous results. This was prior to May 23rd, when consistency was programmed into OVER16 and COMTAC by means of LOCINT application to E(1). If inconsistency is detected, ATP execution should be halted, of course. It was on June 14th, when a final correction was made.

Line and Cable Constants

DEXP is the exponential library function, and size of its argument first was limited January 20th as BPA's Dr. Tsu-huei Liu prevented trouble during the phasor solution

of a cable with XLPE insulation. The data and first indication of trouble came from Prof. Mustafa Kizilcay of FH Osnabruck in Germany. Disk file C1SC.DAT was attached to E-mail dated December 19th, 1999. The professor explained: *"I represented a 400-kV single-core cable installed in a tunnel that is modelled as a pipe of 'infinite thickness'. What is special about this model is the representation of the semi-conducting tapes around the core ... The first insulator (in reality non-existing, between core and semi-conducting layer) is assumed to be very thin. The sheath of the cable is represented as armor. ... I could show today ... that this semi-conducting layer influences significantly the wave propagation speed in the single-core cable. The measurement and simulation agree well by means of this model improvement. ... In a 2nd measurement, the core was charged to 16 V first. Then by a switch the source and at the same time core to sheath were short-circuited. The other end of the cable was open. I have trouble to simulate that measurement. ... ATP stops with an error message (KILL=18) before starting the phasor solution as shown in the attached file C1SC.LIS. ... If I create a Pi-equivalent using the same cable data ... then the phasor solution will be performed without any error message."* What Dr. Liu found was trouble with the library function. Depending on the compiler, trouble occurred either immediately when the function was called or later as the function value was used. Data was peculiar, all right. There was no hope at all of handling an argument around 1.E5 (Intel hardware fails just past DEXP (709) = 8.2E+307, it was found). To prevent trouble, use of universal DEXP was converted to installation-dependent ENTRY DEXPZ at the critical location within OVER8. Inside DEXPZ, FLTINF is returned for any argument in excess of 709. The default value of 1.E+19 and special value 1.E+20 produced identical solutions as shown by \gnunt\c1sc.019 and *.020 For background, see the story entitled *"Limits on library functions"* in the October, 1998, issue. There is no dispute about the merits of such a change this time. For the semi-conducting insulator, the change is necessary to produce a solution using Intel hardware. About Open VMS, nothing is yet known.

A recent difference between CABLE CONSTANTS (CC) and CABLE PARAMETERS (CP) was removed December 17th by BPA's Dr. Tsu-huei Liu. Of course, this was following the recommendation of author Akihiro Ametani of Doshisha University in Kyoto, Japan. The story is long, but can be quickly summarized from the record of E-mail. This begins with a message dated December 9th. Dr. Liu reported the trouble to Prof. Ametani as follows: *"On December 7, 1999, Christophe Andrieu of Schneider Electric SA in Grenoble, France, reported a problem that he ran into using ATP on an overhead cable system: ... 'These differences seem to be big when conductors are close to the soil, and for SC cable type (it happens when the last dielectric layer is on the soil). Could it be the introduction of conductance in the model of cable?' ... The results from running with CP are wrong (modal velocities of 6276 m/microsec and 9885 m/microsec). Also warning messages appeared in the output list file: 'Real(Q) of mode 2 may include numerical error. Eigenvalue rotation is made.' I traced back the differences all the way to subroutine SIMP ... I noticed some recent changes that you made in ... SIMP seem to cause the problem of zero diagonals in ZY ..."* In his first reaction dated December 12th, Prof. Ametani summarized the apparent problem: *"Changes in SIMP ..., which relate the mutual impedance between overhead and underground conductors, seem to cause the error you observed."* Four days later, the professor provided more details, and a solution: *"My modification of CP on October 5, 1998, is valid when HI(I) > R. But it gives ZY(I,J) = 0 when HI(I) = R, and results in capacitance C = infinity and inductance L = 0. This certainly involves a numerical instability ... Although analytically the modified formula DIJ(I,J) = ... is more accurate ..., numerically it involves an instability for HI(I) nearly equals R. Therefore, I have decided to remove the above modification, and to go back to the original one ..."* So, solutions to standard test cases (DC-27, 28, ...) have returned to where they were in October of 1998. Dr. Liu knows, since she saved the old results.

Shunt conductance has been available in CABLE PARAMETERS (CP) since day one (see the July, 1994, issue), but might not have been used much in the past. See parameter IYG of Section 1.11 of Chapter XXIII of the Rule Book. Changes were made by Prof. Ametani following consideration of XLPE cable data from Prof. Mustafa Kizilcay of FH Osnabruck in Germany. The initial inquiry, contained in E-mail from Prof. Kizilcay dated December 19th, explained (in addition to a previous quotation) : *"I had trouble simulating that measurement. I used a Type-14 source with a low frequency ... But, ATP stops with an error message ... This comparison shows something is not correct with the Pi-circuit internally created in case of CPDL model."* Prof. Ametani responded as follows on February 1st: *"Occasionally a semi-conducting layer of an XLPE cable is dealt with as a conducting sheath as you did, and this approach gives a good result provided the parameters (resistivity, thickness, etc.) are appropriate. ... There are some miscodings in CP for the IYG option in the pipe type cable case. I have corrected these, and made further modifications. ... As soon as the final check is completed, I will send you calculated results of your 400kv XLPE cable by E-mail, and send a note of corrections and modifications to Tsu-huei ..."* In Portland, the UTPF update was performed March 29th, and a copy of resulting Mingw32 ATP was E-mailed to Prof. Kizilcay the following day. New standard test case DCNEW-29 was created to store Prof. Ametani's 11 new data subcases that verify operation. Finally, clarification about limitations on shunt conductance has been added to instructions of the Rule Book, although Dr. Liu has not yet made these available in PDF format for distribution via the Internet.

100 coupled conductors of CABLE PARAMETERS became possible February 23rd when BPA's Dr. Tsu-huei Liu increased program dimensions without incident for both Salford and GNU Mingw32 ATP. She used LISTSIZE.100 with 1750K words for List 31 rather than the usual 230K. The result *"can handle up to 103 cable conductors"* according to her E-mail later that same day to Ashok Parsotam of Vector Ltd. in Auckland, New Zealand. This was in response to an inquiry dated February 14th which mentioned a *tunnel model* with various cables inside a tunnel. *"It seems that the existing limit of conductors inside the pipe is 36. I need to model 68 conductors inside a pipe."* Dr. Liu provided this gentleman with both ATP versions. But your Editor wonders: are Prof. Ametani's cable mathematics capable of supporting such a burden? Remember Prof. James Van Ness's pioneering work with high-order eigenvalues nearly four decades ago. What works well for order 10 might be hopeless for order 100. Users are advised to increase order of their data cautiously.

The BRANCH request to name punched branch cards of supporting programs was limited to 12 phases prior to correction on March 18th. BPA's Dr. Tsu-huei Liu first complained to your Editor that his old storage in CHARACTER*144 ANS144 failed for more than 12 pairs of 6-character names. Interest was for cables, but LINE CONSTANTS and other supporting programs also are affected. Following a full day of work, 7 UTPF segments were swapped. The new code offers true variable dimensioning, with an error stop if overflow might ever occur (but never should, for realistic data). New code is modularized in new subroutine NEXNAM. Output of each standard test case was unchanged.

The BRANCH declaration to name branches of punched cards was variably-dimensioned using NEXNAM as described in the July issue. What was not then included was protection against lack of definition. The need first was appreciated while looking at 31-phase punched cards that were produced by BPA's Dr. Tsu-huei Liu. This was for a cable, as Dr. Liu worked on problems of high-order use with the CABLE PARAMETERS author, Prof. Akihiro Ametani of Doshisha University in Japan. Fewer than 31 pairs of names had been defined, so ending phases of the punched cards seemed to have blank names. In fact, the problem was more serious. Vernon Buerg's freeware LIST revealed zero characters rather than blank characters. So, protection finally was added April 28th. If the user fails to define a name for a phase, NonameNoname will be used for the 12-character name pair. Beginning April 28th, such output can be found in DC28.LIS and DCN6.LIS as well.

An error of subscripting was removed from CABLE PARAMETERS on May 5th. While investigating another problem, it was discovered that not all offsets JOFXX of the variable dimensioning code in MAIN27 were correct.

CPRINT is a routine that prints matrices, with 10F10.5 being the FORMAT of S.N. 940 until early April, when replacement 10F13.5 was used to prevent overflow. Dr. Liu's in-line comment documents the inspiration: *"Aki, 4/11/2000, for verifying large Zp."* But the change was only required in exceptional cases, and it made difficult the mechanical comparison (e.g., using freeware FC) of any new output file with an old output file. So, May 11th, the change was made conditional, based on need. For any given row, the wider alternative will be used if and only if one or more component number fails to lie in the closed interval [-99.99999, 999.99999], which will ensure one or more blank separator. But for the exceptional row that might require more, the visual effect will be poor. The user now is being forewarned.

The CP output line that begins with *"Shunt admittance: G(S/m) & C(F/m)"* was clipped on the right prior to correction on May 16th. In this case, it was program text (KILLCODE) rather than code (NEWCBL) that was at fault.

Final corrections from Prof. Ametani were applied May 22nd. Involved were changes to CYMTRX and PTZ2 of CP. These modifications ended weeks of experiments following Dr. Liu's E-mail dated March 16th, which considered complaints about higher order (more than 30 conductors) from Ashok Parsotam of Vector Ltd. in Auckland, New Zealand. Dr. Liu would report what looked like trouble, Prof. Ametani would propose solutions, etc. (round and around). Finally, Prof. Ametani was able to approve results, in E-mail dated June 9th. A corrected copy of Mingw32 ATP, dimensioned to 18 times default, then was sent to Mr. Parsotam by E-mail on June 16th. This TP103.ZIP was named because it allowed 103 conductors within CP. Typically it will **not** handle 103 phases of simulation using a Pi-circuit, however (another problem). About previously-mentioned DCNEW-29, four additional data subcases from Prof. Ametani were added to the 11 original ones on June 9th. Not surprisingly, data is related to verification of the recent program changes.

Brain - Damaged MS Windows

Caldera's suit in Salt Lake City (see the preceding issue) unfortunately has ended prematurely. *"MS pays up to settle on eve of Caldera antitrust trial"* is the title of a story of *The Register* dated January 11th. Unfortunately, money talks in business, and MS offered plenty. Yet, nobody knows how much. MS tried to create the impression that the cost was around $155 million (3 cents/share), but the real cost probably is far higher. After all, MS *"itself had estimated the potential damages it faced in the case at $1.6 billion (and they could well have been much more), so a total settlement in the $155 (sic) region is most unlikely. ... Microsoft's immediate purpose is to minimise the damage to its image."*

IBM finally is pushing Linux as an alternative to MS Windows NT, it would seem. A couple of stories found at *The Register* summarize the changing times. First, posted January 12th, is a story entitled *"IBM rolls out unified Linux strategy."* This begins: *"IBM is increasing its bet on Linux ... This turns a series of initiatives within IBM into a strategic, company-wide embrace."* Second, there was a story posted February 3rd with title *"IBM dubs Linux as realistic champion against NT."* The story begins: *"Big Blue is embracing the open source movement in general, and Linux in particular, with a vengeance, and no doubt with the painful lessons of their spectacularly unsuccessful OS/2 still in mind."* The story by Thomas C. Greene ends with this historical observation: *"We are persuaded by the wisdom of this approach already. By licensing an open source OS, Big Blue can make a very favourable impression on the thousands of small-to-medium sized business users for whom the cost of licensing NT is prohibitively high. IBM may indeed make inroads into Microsoft territory. And if so, they will finally redeem the colossal folly of OS/2, which was far too expensive to entice Windows users. It must be a painful thought to IBM strategists that if they had released the OS2 (sic) source code when they developed it, Micro$oft might not be half the Titan that it is today."*

"Microsoft Violated Law" was the headline of an *ABC News* story dated April 4th that documents MS legal troubles in federal court in Washington, D.C. *"Judge Jackson Rules Microsoft Violated Antitrust Laws"* is the sub-headline. The caption of a photo of Bill G at the top of the story concludes: *"U.S. District Court Judge Thomas Penfield Jackson found that the software company used its monopoly power to engage in illegal anti-competitive behavior."* The story begins: *"A federal judge has handed down a crushing verdict against Microsoft, ruling that the software giant violated antitrust laws. ... Judge Thomas Penfield Jackson agreed with nearly every aspect of the Justice Department's case in his 43-page opinion, finding that Microsoft exhibited illegal anti-competitive behavior in violation of the Sherman Antitrust Act."* That was the federal government. But what about the various states? *"The judge accepted 23 of 26 arguments brought forth by the 19 states that joined the federal government in the case, finding that Microsoft could be liable under state anti-competition laws."* Yet, the decision was not total: *"Jackson did hand Microsoft one victory, though, finding that Microsoft's marketing arrangements with other companies were lawful."* So how did both sides react to the decision? *"Not surprisingly, Microsoft immediately announced its intention to appeal the verdict, and Attorney General Janet Reno hailed the ruling as a victory for America's consumers."* Of course, the value of MS stock dropped: *"Jackson issued Monday's ruling at 5 p.m. ET after the markets closed so as to minimize the impact on the market. Even so, Microsoft's stock suffered one of the largest selloffs in the company's history, losing 14.5 percent, or $15.37 a share, and dropping to $90.87 on the Nasdaq market."* As for the future, story author Jonathan Dube predicts: *"The remedy phase will likely take several months, with Jackson expected to make a ruling late summer or early fall. But, unless there is a settlement, appeals will likely prolong the case for years."*

A breakup of Microsoft was recommended after the close of stock trading on Friday, April 28th. *"U.S. proposes MSFT split"* is the title of a CNN story by David Kleinbard, which was filed that same evening. It begins: *"The Justice Department and 17 of the 19 states that had filed a landmark antitrust lawsuit against Microsoft ... proposed the split in a joint proposal filed Friday with District Judge Thomas Penfield Jackson."* Although 3 or more pieces had been recommended by some, two pieces seemed to be simplest, and had the widest support: *"The joint proposal calls for Microsoft to be split into two competing entities - one to contain its Windows operating systems ... and another to contain the rest of its business lines ..."* But what about the promised MS appeal? This could delay implementation for years. So, *"the Justice Department and the states proposed a series of restrictions to Microsoft's business practices that would be implemented immediately -- if approved by Judge Jackson -- and left in place for three years."* About historical significance: *"The proposed remedy against Microsoft marks the first time that the government has tried to break up a major corporation since the Bell System telephone monopoly was divided into eight companies in 1984."* About sizes of the two pieces: *"In the nine months ended March 31, Microsoft derived $7 billion, or 41 percent, of its $17.15 billion in revenue from its Windows operating systems."* Finally, there are measures of the MS monopoly: *"Microsoft is estimated to have an 82 percent share of the market for personal computer operating systems and a 94 percent share of the market for office applications ..."* Needless to say, Bill G was not happy about the proposed remedy, and has about a week and a half to make it official (*"Microsoft response due May 10"*). About stock price, MS already has lost about 1/3 of its value since it peaked earlier this year. No longer is MS the most valuable company in the world, having fallen to third place behind Cisco Systems and G.E.

"Judge Orders Microsoft Split in Two" is the title of an *ABC News* story by Jonathan Dube. Dated June 7th, this began: *"A federal judge ordered software behemoth Microsoft to be split into two independent companies today in one of the most severe punishments ever handed down for antitrust law violations. ... U. S. District Court Judge Thomas Penfield Jackson accepted the Justice Department's proposal to break Microsoft into one company for its dominant Windows operating system and another for software applications such as Word and Internet Explorer."* Under the section heading entitled *"Microsoft Plans Appeal,"* one finds a prediction: *"The breakup will not occur anytime soon, as Microsoft has vowed to appeal the ruling immediately. Shortly after the ruling, the Justice Department said it would ask the U.S. Supreme Court to directly review the ruling, bypassing the appeals court ..."*

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. This is a continuation of the story that began in the April issue.

As stated, newer **hard**ware including existing Compaq (formerly DEC) Alpha should provide such service. But what about the alternative of better **soft**ware**,** running on old, 32-bit hardware? This exciting possibility first was suggested by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. His E-mail dated April 5th began with the unexpected revelation: *"I found that gnu FORTRAN allows INTEGER*8 .... The following is the result of a test: ... 2**62 = 4611686018427387904 Stop here!"* Yes, this should be more than adequate within the lifetime of anyone using ATP today. Using round numbers, 32 bits are adequate through 2.E9 and 64 bits should be adequate through 4.E18

The old Salford F77 compiler FTN77/486 Ver. 3.50 dating to 1996 did not tolerate Mr. Hevia's little test program . The attempt to compile TESTI8.FOR was rejected as follows:

```
0001)       INTEGER*8  J8, K8
*** Unidentified type
    1 ERRORS  [<MAIN@>FTN77/486  ..
```

No surprise here. This is exactly what was expected. On the other hand, rejection by the new F95 Salford compiler **was** a surprise. Yet, this is what was reported by Masahiro Kan of Toshiba Corporation in Japan on April 14th: *"Invalid size for type"* was the F95 Salford error message. No trouble using F95 Lahey, however, as reported by your Editor in E-mail dated April 12th. Are there any other good reasons not to pay more (in this case, for a Salford compiler, which is much more expensive than a Lahey compiler)?

Type - 98 Hysteresis from Hevia

HYSTERESIS HEVIA (HH) is the request word that connects with yet another supporting program from Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. For an illustration of use, see the new 7th subcase of DC-13. Previous subcases numbered 5 and 6 illustrate Mr. Hevia's SMOOTH SATURATION USING TANH (SSUT) which provides a smooth but lossless representation. The present HH provides another alternative: non-smooth but lossy representation. Input consists of the Type-98 characteristic plus steady-state losses, the frequency, and residual flux. From this data, author Hevia will construct an equivalent Type-96 pseudo-nonlinear element (program output).

Recall the Type-96 pseudo-nonlinear reactor came from Prof. Ned Mohan and graduate student Jim Frame at the University of Minnesota. For background, refer to Section V-D of the Rule Book and Ref. 31 (the 1982 IEEE PES paper by Frame, Mohan, and Liu). For one particular type of steel, supporting program HYSTERESIS will create the corresponding Type-96 element as illustrated by the 4th subcase of DC-13. But what if the user's transformer or reactor involved another type or thickness of steel? Or what if the user did not know the type of steel, or anything about the associated hysteresis loop? To satisfy the need in such cases, Mr. Hevia wrote his supporting program. It produces comparable output (Type-96 branch cards) using more readily available input data.

HEVIA HYSTER is the request word that will perform the computation of HYSTERESIS HEVIA during branch data input. For an illustration, see the new 8th subcase of DC-13. In effect, HEVIA HYSTER is like a special, fixed version of more general TO SUPPORTING PROGRAM (see the April, 1999, newsletter). Advantages include compactness of data (roughly a factor of two is saved for the characteristic), avoidance of the need for comment cards to document raw data, and avoidance of intermediate roundoff error (the need to punch flux and current in columns of width 16). Disadvantages include the effort to perform the conversion each time the data case is simulated. Name HYSTER can be traced to SUBROUTINE HYSTER in which author Hevia's supporting program has been placed. This is next to SFTANH of SSUT fame.

A CALCOMP PLOT (batch-mode plotting) graph of the hysteresis loop is possible as part of a HYSTERESIS HEVIA data case. Operation is comparable to what was done for SSUT. I.e., no plot card is required, with plotting being automatic if NOCALC is not unity. If instead in-line HEVIA HYSTER is used, no such plotting is performed, however.

To document dates of progress, the first successful output of HYSTERESIS HEVIA was sent to Santa Fe attached to E-mail dated March 8th. The first successful output of HEVIA HYSTER was sent 4 days later, and a PostScript copy of the screen plot of the top half of the hysteresis loop one day after that. NOZOOM, FSCALE, and DXL2 are 3 new parameters that control the screen plot as documented on comment cards that precede the illustration. By means of the REPLOT request (added March 14th), more than one plot is possible for each set of input data, and each plot is allowed to have different parameters.

The reference branch names BUS3 and BUS4 of columns 15-26 are used in unusual ways. For cards punched by HYSTERESIS HEVIA the text HEVIA HYSTER represents not a request for a copy, but rather a request for wide format that is equivalent to preceding use of $VINTAGE, 1. This is for a Type-96 branch. For a copy of a preceding Type-98 HEVIA HYSTER branch, names BUS3 and BUS4 are used in the usual way but the type code is to be changed from 98 to 96.

The Jiles-Atherton model is another way to represent hysteresis. Although unrelated to the preceding work, it is worth mentioning. In an ATP context, this alternative first was seen in semi-public E-mail of the Fargo list server dated March 14th. Hitoshi Mori of the Kusatsu Factory of Nichicon Corporation in Japan explained: *"I'm now investigating ... the possibility of introducing Jiles Atherton Method into ATP by means of TACS or MODELS in order to represent magnetic hysteresis as smooth curves. ... So, please tell me if anyone already has done, started or planned the work ..."* There was a lot of discussion (to be continued in the next issue).

Trapezoidal Rule Oscillations

This is a continuation of the story that last was seen in the July, 1996, issue. It began in the October, 1995, issue. What great story, and now we have a continuation thanks to initiative from Japan.

Modern reconsideration began in Portland following reception of E-mail dated April 9th. Masahiro Kan of Toshiba Corporation used this message to inform persons at 9 addresses of recent interest and progress in Japan. The message began: *"I send the illustrative data case which Prof. Kimura used to point out the effectiveness of GIFU switching logic, and at the same time, the oscillation caused by the trapeziodal rule under a fixed time step."* Later, Mr. Kan quoted from BPA's EMTP Theory Book, in which Prof. Dommel had written that *"The critically damped trapezoidal rule with Rp = 2L / deltaT is identical with backward Euler method. ... In general, the undamped trapezoidal rule is better than the backward Euler method, because the latter method produces too much damping. It is a good method, however, if it is only used for a few steps to get over instants of discontinuities (see Appendix II). ... B. Kulicke [15] recognized that such a backward difference quotient can be used to restart the solution process smoothly after a discontinuity, with the correct jumps in vL across L, or in iC through C."* Interpolation is an inherent and necessary first of 3 steps of Kulicke's procedure, and Mr. Kan concluded: *"B. Kulicke seems to be an author of Siemens Netomac program, and the above method seems to be used in Netomac. And maybe, the interpolation method which EMTDC uses is derived from this?"*

About EMTDC, recall the Manitoba authors wrote a paper for the 1995 IPST conference. The January, 1996, newsletter documents this. At first, your Editor was skeptical of a connection between Manitoba and Kulicke. But the more your Editor thought, the more he had to agree. In E-mail 2 days later, he wrote: *"Yesterday, based on your summary, I was encouraged. Today, having looked at the Theory Book, I am not. In fact, I now understand well why you mentioned EMTDC and interpolation. Although a small part of what Dommel wrote, this seems to be the key detail to me ... Yesterday, I thought maybe Dommel was able to restrict interpolation to the inductor of interest. But after a few minutes of thinking, I conclude that* ***every*** *variable of the program must be interpolated. How is this any easier than what was done in Winnipeg for EMTDC? This is a key point. Who can imagine not interpolating each variable of the simulation? Why?"*

Actual, separate damping resistors were used for initial experimentation of the preceding idea. While interesting, the procedure was rapidly discarded as explained to Prof. Mustafa Kizilcay of FH Osnabruck in Germany. Quoting from E-mail dated May 2nd: *"Let me explain that real parallel damping resistors were rapidly rejected for two reasons. First, something I did not see beforehand: they suffer from the same flaw that Laurent Dube's scheme did. In the January, 1996, newsletter, read the paragraph that begins: 'Laurent Dube began experimentation after the Lisbon conference, using his own ideas for a CDA-like scheme.' The spikes would cause havoc with diodes. Second, there was the problem of damping inductive voltage oscillations when associated currents are* ***not*** *zero. The damping worked well for single phase, where the current* ***was*** *zero. But what about coupled phases of 3-phase use, or other configurations? The problem is this: the damping resistor may damp the voltage oscillation just fine, but it ends up carrying a non-zero current. Then, when it is removed (e.g., 5 or 7 dT later), one has another transient to deal with. To conclude, if the inherent spike (1st objection) was not enough to doom the idea, the non-zero current was more than enough. My sudden inspiration was not practical, I concluded."*

Extension to linear, lumped elements that include coupling is progress beyond the 1995 testing. Believable operation is demonstrated by later subcases of all-new DCNEW-30. The first two subcases are limited to series R-L-C branches, but the 3rd involves a Type-51,52,53 branch as copied from DC-53. Finally, the 4th subcase restores the three saturable TRANSFORMER components, which internally use [A] and [R] (instead of [R] and [L] as used by Type-51,52,53). Although Type-59 S.M. dynamics are missing (an infinite bus replaces the rotating machinery), the rest of the network is present and complete, and it demonstrates the trouble SCE had with oscillation when the 3-phase fault to ground was cleared. More precisely, DC-53 has demonstrated the trouble for nearly a quarter of a century, and the 4th subcase of DCNEW-30 finally documents a solution. Attached to E-mail dated May 20th, results were summarized for Prof. Kizilcay. Your Editor explained: *"Attached are the .DAT, .LIS, and FORMATTED .PL4 files for DC53d simulation ... As for the numerous screen plots, they all look smooth except for discontinuities at the instant of switching. Note time step is* ***not*** *uniform as I interpolate for the current zero. Opening is faster (in fact, exactly twice as fast, due to the averaging). To see really substantial oscillations, remove the request card near the top of data ..."*

MODELS and a Type-94 Norton element might be used for testing of alternative integration schemes. Prof. Kizilcay summarized his initial experiment in E-mail dated May 16th: *"I worked last weekend on different methods to damp trapezoidal rule oscillations ... I experimented with type-94 Norton element and have good results. I switch to backward Euler in case of any state change of a switch and integrate 2 steps using backward Euler and then switch back to trapezoidal rule. I do not need to half the time step for backward Euler as originally proposed by Marti."*

MATLAB Enhances ATP Simulation

Harald Wehrend of SEG in Kempen, Germany has successfully integrated MATLAB and ATP in order to enhance modeling and display capabilities during ATP simulation. I.e., this is **not** the common use of MATLAB to postprocess ATP-generated signals. Rather, MATLAB is an active, contributing part of the simulation in the same way MODELS or TACS could be, as requested by Gayle Collins six years ago (see the July, 1994, issue). In fact, Mr. Wehrend connected MATLAB through Laurent Dube's MODELS interface for user-supplied source code. Of course, MATLAB is the popular and relatively-expensive visualization software offered by The Math Works of **www.mathworks.com**

"Calling MATLAB out of an ATP / MODELS simulation" is the title of the paper in which Harald Wehrend first disclosed to the general licensed public his breakthrough using MATLAB to extend ATP simulation. This can be found in the Proceedings of the 1997 EEUG Users Group Meeting, which was held in Barcelona, Spain on November 9-11, 1997. Subscribers of the Fargo list server are indebted to Laszlo Prikler of T.U. Budapest for this information, which was contributed March 27th. Your Editor had expressed skepticism about the possibility, arguing that the MODELS interface required *"ordinary object files as produced by the same compiler (e.g., Salford for us in 1994). Do you think MATLAB makes ordinary object files available for use by the general public?"* Prof. Prikler explained that MATLAB *"dynamic link libraries (DLL), which are loaded during run-time (i.e. not linked together with ATP),"* provide the connection.

Innovator Wehrend eventually joined the semi-public discussion of the Fargo list server. Later that same day, he provided the following final word: *"The coupling of ATP and MATLAB is done via the MODELS interface for FORTRAN / C routines. Using foreign models written in Fortran / C / C++ should become clear to the user from the standard MODELS literature and courses. Once you have passed your data to the C routines, you can go on and pass these data to MATLAB, or to the hard disk, or to the screen, or any function that resides in your PC memory, further on. To make the connection to MATLAB, another three libraries (containing some object files, generated from MATLAB resources) have to be linked with the ATP objects. Then the ATP / MODELS foreign models code is able to use the MATLAB engine with all the features that this MATLAB engine offers. Our usage was to create difficult control algorithms in SIMULINK, the famous graphical user interface, and let the SIMULINK model be executed by ATP / MODELS (e.g., using SIMULINK models instead of the built-in transfer functions of MODELS). This is of great utility if the control algorithms in Simulink involve detailed power network simulation, because ATP is much faster for that."*

Harald Wehrend used Watcom C for the interface between ATP and MATLAB. But this is not the only practical alternative, according to Masahiro Kan of Toshiba Corporation in Japan. In E-mail two days later, he explained: *"2. GNU Compiler is supported under Linux."* Of course, GNU compilers have the dominant attraction of zero cost. Also, the GNU compilers continue to be available and supported whereas Watcom FORTRAN already has been withdrawn from the market (see the October, 1999, issue). As mentioned by both Messrs. Wehrend and Kan, MS provides another alternative. But who wants to use brain-damaged software? Even 4 years later (see that early exposure to MS PS FORTRAN under Windows 95 as reported in the April and July, 1996, newsletters), it is hard to take MS seriously. Your Editor has been burned by Bill G once too often. He has become wary of any MS flame.

Nicola Sorrentino of the University of Calabria in Italy deserves credit for beginning the discussion that led to the preceding revelation. But it was Raul Morillo of Universidad Simon Bolivar in Caracas, Venezuela, who made the critical contribution by suggesting that MODELS could be used. At first your Editor was skeptical, but the idea turned out to be true. What a surprise. How the MATLAB aspect of Harald Wehrend's work with Watcom C could have been overlooked so long remains a mystery. In any case, we finally have closure to that 1994 story. Gayle Collins was ahead of her time.

Non - Graphic GNU ATP Details

GNU F95 was mentioned on the GCC home page **http://gcc.gnu.org** in news dated March 18th: "Andy Vaught has started work on GNU Fortran 95, the Fortran Frontend destined to implement the latest standard." Notification of this promising development came from Masahiro Kan in E-mail dated March 19th.

Compatibility between MS Windows 95 and Mingw32 ATP was a serious concern for 5 or 6 weeks --- until May 20th when the BPA-created problem was solved by Masahiro Kan of Toshiba Corporation in Japan. What problem? April 4th, Prof. Mustafa Kizilcay of FH Osnabruck in Germany had written about a recent copy of

Mingw32 ATP: *"It runs well on my desktop PC under Windows 98, but it does not start on my notebook PC under Windows 95. The line 'ATP Started at ....' appears on the screen. This is followed by intensive but short hard disk access, and a Windows error message appears saying that the application will be terminated due to an invalid operation (in German). ... A version created on 13 August 1999 executes normally."* Of course, other PCs running Win95 were tested, and they, too, refused execution --- both over there in Germany and here in Portland. The problem was not with too many temporary files (that great observation by Dr. Ali Moshref as explained in the October, 1999, issue), either. Three days later, your Editor recalled an earlier complaint: *"There was a person in Florida who had trouble during mid- to late-November, as I recall. I even issued an inquiry via the Fargo list server. I am not sure that problem was resolved (the guy may just have given up). If so, yours may be a second report of different trouble that has yet to be explained. We did some detective work at the time, but need to do more."* Unfortunately, that November trouble of John Mulhausen of Florida Power and Light involved Win98 rather than Win95, so was thought to be unrelated. In fact, it was not. As Mr. Kan explained the mistake on May 20th: *"At first, I guessed the cause was Win95. But I could not understand why ... This morning, I suddenly noticed the compiler switch '-march=pentiumpro' ... I thought it might generate a code which cannot be operated by Pentium."* Yes, this was the reason: improper compilation for ordinary Pentium. Win95 was involved only indirectly --- because Win95 is older, and ordinary Pentium is older, so they typically are paired (the one exception was that PC in Florida). About location of the -march switch, your Editor observed: *"Had it not been hidden inside a separate file (ATP.MAK), we might have suspected it earlier. This is what I do not like about MAKE: complexity and obscurity. I prefer to have details readily visible in a .BAT file."* As for why -march was added, both Dr. Liu and your Editor recall experimentation as recommended by one of the compiler writers, Dr. Mumit Kahn (see the October, 1999, issue). Our mistake was failure to remove the Pentium Pro switch, which was not found to speed ATP execution significantly, anyway, for the 200-MHz Pentium Pro-based PC that is used at BPA.

Computer Viruses and E-mail

"E-Mail Virus Spreads Worldwide" was the title of the first *ABC News* story about trouble with E-mail in this country that began May 4th. The following day, "Virus Takes New Form" was the title of the continuing story, which lasted for days. The summary explanation follows: *"The vbs.loveletter.a virus spreads through Microsoft Windows Internet extensions and replaces all JPG and MP3 files it finds with copies of itself. It then sends itself to everyone in an infected user's Microsoft Outlook address book."* Large organizations typically were affected the worst: *"The virus penetrated computer networks at major corporations, such as AT&T, which was forced to shut down an e-mail system serving 145,700 employees. It also struck the Pentagon, the Central Intelligence Agency and Britain's Parliament ..."*

BPA was disrupted more than any organization described in news stories that your Editor has read. In summary, E-mail was largely unavailable during 4 days, and thereafter about one working hour is to be lost each day due to special new virus checking. This was the way the situation began on Monday, May 10th: the computer was unavailable for any use during 60 full minutes of special checking by Dr. Liu's 200-MHz Pentium Pro PC that runs NT. But two days later, login occurred normally (after perhaps 2 minutes), after which the Norton virus checking began as a background process. The computer was usable, but very, very sluggish. Also, the virus checking was slowed substantially by the human competition. After about an hour, only 65% completion was reported. What a pain.

Immunity from viruses is an increasingly good reason to avoid MS software. About the famous ILOVEYOU computer virus (see mention elsewhere), the *ABC News* story dated May 5th explained *"The virus needs Microsoft Outlook to spread. Macintosh and Linux users are safe."* It seems even Macintosh users who were running MS Windows by emulation were safe. According to a *Wired News* story dated May 9th, *"Even though many Mac users run Microsoft software on their machines, Macs lack support for Visual Basic at the system level, a component that the Love Bug needs to do any damage."* This opinion comes from *"Gene Steinberg, author of ... the MacNightOwl site."* The title of the *Wired News* story was *"Windows-Haters Crow Over Worm,"* by Leander Kahney. This began: *"While most of the world convalesces from the Love Bug worm, people running alternatives to Windows are smugly congratulating themselves for knowing better than to use Microsoft software."* One Sun Solaris (Unix) user, Lynne Ragazzini, blames Microsoft *"for configuring Outlook Express to run background scripts. ... The idea of allowing people to perform active processes using mail is a bad idea. You think they would have gotten it by now after Melissa. I avoid the whole Microsoft nightmare ..."* How? By using Sun at work and an iMac at home.

ATP Licensing Problems

The Fargo list server, controlled by Prof. Bruce Mork of Michigan Tech in Houghton, is about to undergo change related to ATP licensing. *"Stay tuned for some additional announcements regarding upcoming security measures and the future of ATP-EMTP."* This was the way Prof. Mork ended his June 21st message about flooding (see mention elsewhere). It provided the average subscriber with the first hint of imminent change. Although final details can not yet be announced as this issue is being frozen for publication on June 23rd, some background can be provided. The latest round of debate about list server security began January 28th, when your Editor wrote to Prof. Mork: *"Speaking of*

Fargo, be advised that future ATP work of consequence (e.g., adaptation to F95) is not going to be available to persons who actively participate in the distribution of ATP information to others whose licensing has not been verified. Question about operation of the Fargo list server: How can any HotMail subscriber be identified as licensed or not licensed? How can he be located on any one of the seven continents of the world? For the record, the user group denies responsibility for pointing out ATP-unlicensed subscribers to you. No such procedure or service is mentioned in our form letter. In the past, we have sometimes done this, and written a story for the newsletter. But we do not accept the responsibility for doing so. Even if we had the time and energy, could we verify every subscriber? I doubt it. Consider the problem of .COM or .NET addresses that are scattered around the world. In REVIEW BY COUNTRY, they show up as U.S., but many are not. We know. What about those recent … ("Dears,"). Do you think this is a licensed user? If so, who did the licensing, when, and where? About users in Australia, we do not have access to records, so could not make a judgment one way or the other. The only valid lists of E-mail addresses that I know of are the lists being kept by user groups for distribution of login and password information. But who has verified such lists? I am not sure. This is why it recently was proposed that every subscriber to a list such as ATP-EMTP might need to send one piece of paper with a signature to some location. This idea was floated, but rejected privately, so nothing was done. I am not sure this is impractical, however. I would be inclined to require a signature, and name and address … These are enough ideas here for JAUG and EEUG to consider. I will add a 'cc' for each."

Signatures require real paper and a real pen as mentioned in the July issues of both 1997 and 1999. In the latter, your Editor concluded: *"To summarize, monochrome bit maps such as you propose have no legal significance. ... If and when you or anyone else provides any documentation to the contrary, I will publish it, and we will rethink our policy. Until then, use snail mail."* Since then, nothing to the contrary has been received, and experience of the mutual fund industry can be offered as an illustration of the problem. Consider a Morningstar article entitled *"Mutual Funds Slow to Go Paperless."* Written by Dan Culloton, and dated May 31st, this explains: *"Investment companies have tread warily because they fear some investors won't honor electronic contracts or will manipulate them for fraud."* In the USA, there are problems at both the state and the national level: *"State laws governing electronic documents vary, and the Securities and Exchange Commission has been silent on the issue. This has bred confusion as to whether electronic records satisfy legal requirements that documents be in writing or signed, and impeded fund families' e-commerce efforts, the Investment Company Institute, a fund trade group, has told various government and legislative panels."*

Comings and Goings

"PKZip Creator Dies; Katz Wrote Popular Free Compression Software" is the title and subtitle of a short story dated April 22nd. An AP story found at the *ABC News* Web site, this began: *"The creator of PKZip, Phillip W. Katz, died of complications from chronic alcoholism"* at the age of 37. *"Katz was found dead April 14 in a motel room holding a bottle of liquor, the Milwaukee County medical examiner's report said. Five other empty liquor bottles were also found in the room, according to the report. In a 1993 Milwaukee Journal interview, Katz said the concept behind PKZip was launched at his mother's kitchen table in 1986."* Katz was quoted as saying: *"It was just a hobby. I didn't expect it to turn into a business."*

The name T. U. Budapest can be found in numerous preceding issues of the newsletter. Of course, this was the famous university that Laszlo Prikler called home. But the name would seem to have been changed. Seen at the bottom of E-mail dated July 20th is *"Budapest University of Technology & Economics."* So, BUTE? Who is going to recognize this?! Maybe your Editor had better continue to write *"T.U. Budapest"* for a while!

Power Company Politics and Religion

Yu Wang was mentioned in the July, 1999, issue. Well, since then, the change in work has been bigger than just dropping use of ATP at Pacific Power in Portland. In E-mail dated March 8th, Mr. Wang explained: *"I am taking an offer from LightPoint, a Beaverton-based Web hosting and colocation company. ... This is a hot industry area in telecom and Internet. I will be their Engineering and Operation Manager and probably have some international exposure. It seems like a great opportunity."* Another sign of industry times.

Wacko environmentalism was mentioned in the April issue. For details relevant to the West Coast of the United States, **www.pushback.com** is a more opinionated and specific reference. Purpose of a part of this site is explained as follows: *"There are a large number of frauds that have been put on the back of California citizens, infringing on their rights and harassing them without respect for the law, the Constitution, or common sense. This site will be used to fight these injustices. Click on the link above to learn about the first three campaigns."* The site began in California, but recently has been expanded to fish in the Pacific Northwest. At the top of the page can be found: *"The last days of the salmon. Stop Oregon from killing thousands of fish!"* Not surprisingly, persons paid to protect the fish are the killers. Prominently featured at the site are recent crusades of San Francisco radio (KGO, 810 kHz AM) talk show host Dr. Bill Wattenburg. There is a link to *"The*

Bill Wattenburg page. The billion dollar environmental frauds and MTBE ..." For readers who may not be aware, MTBE is a substance that is added to gasoline supposedly to improve combustion and clean the air. But so-called *California reformulated gas* instead has increased fuel consumption and price (the latter about 20 cents/gallon), probably has dirtied the air, and certainly has poisoned ground water. The stuff now is known to be toxic (more great work by the wacko environmentalists), and might even be carcinogenic! Anyone who does not believe that environmentalism is religion, and subject to comparable excesses and irrationality, should read the details about salmon in Oregon and MTBE in California. Had these stories not actually happened, they would be assumed to be fiction. That responsible politicians are not yet being held accountable by the voting masses is yet another sign of the dangerous political climate that dominates schools and the news media. Is this what happens when real problems (e.g., poverty, war, disease, famine, etc.) are in short supply? Meanwhile, the U.S. economy continues its record expansion (since February, the longest ever).

Stu Cook Uses Apple Macintosh

Much more accurate timing is an advantage of the new Macintosh ATP. While Salford DBOS resolution has dropped to whole seconds (see the MODELS story in the April newsletter), Mac ATP now has microseconds if we want them. In E-mail dated March 27th, Stu Cook of JUST Services explained: *"These are true microsecond values rounded by the format statement to 3 decimal places so they only show milliseconds. The system routine effectively returns a 64-bit integer value giving seconds of operation since the Mac was last started. This value is stored in a record of two integers and I have manipulated them into a single double precision real with proper allowance for the sign bit of the low integer value."* It also should be noted that Mr. Cook corrected the two decimal digits of the year, which appeared as two stars instead of 00. The DEC VAX-compatible library routine that was being used seemed to be a victim of Y2K, so Mr. Cook switched to another of the alternatives made available by Absoft (no problem).

ENTRY points of complex functions seemed to cause trouble for the Absoft compiler being used in Rideau Ferry. Of course, once the trouble was understood, avoidance was simple enough. According to E-mail dated March 28th, the initial revelation occurred when Stu Cook, working on DC-27 and 28, *"substituted CDSQRT for CSQRTZ as used for the XE calculation in ZEGEN, and found that the results looked better. ... I can only surmise that the Absoft compiler isn't returning a COMPLEX*16 value for the two ENTRY sections because, when these are put into standalone functions, it seems to work properly."* Three days later, Mr. Cook summarized a rapid response from the factory: *"I reported this problem to Absoft who confirmed it for the MacOS version of their compiler. Trouble is due to the compiler optimizing the use of registers in the PPC CPU. It can be blocked by compiling with a debug switch turned on. But since this routine is part of a larger file, all of that file would be affected, and execution of this part of the code would be slower. So I think the solution of splitting the routine is better. BTW it doesn't happen with their Windows or Linux (Intel) versions of the compiler."*

I/O unit LUNIT9 is used to communicate data from LINE CONSTANTS to JMARTI SETUP in preparation for the rational function fitting. Until understood, there was trouble with JMARTI data cases such DCNEW-3. The Absoft compiler offers many choices, with the default choice about UNFORMATTED file storage not corresponding to that of all other compilers tested over the years (probably 40 or more during the past decade and a half). Specifically, record length is not, by default, part of the data. As a result, one can neither BACKSPACE nor space forward one record (the latter by means of a dummy READ). On the other hand, such default behavior can be overridden --- either by a compiler directive (-N3) or by adding a special qualifier (BLOCK = -1) to the OPEN statement for the I/O unit. This was Stu Cook's amazing discovery of April 14th. The Absoft compiler is not worse, but it certainly is different --- in unexpected ways.

Recognition of ENDMOD within MACMODS.RUM (the main file of installation-dependent input) began May 10th. Previously, this software end-of-file was recognized only in the second file of installation-dependent input (the .DAT file). But it seemed desirable to be able to retain comments at the bottom --- most recently because of the need to separate certain modules in order that they be compiled differently by the Absoft compiler. So, if detected, ENDMOD will terminate the reading of installation-dependent SUBROUTINE and FUNCTION code by the VAX translator (used for Mac).

Verification of Mac ATP, using standard test cases, was concluded successfully toward the end of May. Never before has there been such successful Macintosh ATP testing. Everything that could reasonably be expected to work finally does work, it is believed. May 29th, Stu Cook wrote about his final changes to Mac LU4CLS for DCNEW-25: *"I have confirmed that this version of the routine runs the full DCN25 as well as the isolated cases with either $STARTUP included or CALCOMP changed to PRINTER for plotting, and all 3 run as expected. ... Now what is next, screen plotting?"* Your Editor responded with kind words the following day: *"This is a first. In the July newsletter, Mac ATP should be given a clean bill of health. In the past, retranslation always seemed to upset past progress, and never was completed. This time, you are both current and complete. Congratulations."* About DCNEW-25, your Editor wrote: *"My guess is that your Mac ATP is better than Salford ATP. I recall some strange aspects, when I*

looked at this a week or more ago. But I remain satisfied with what Salford ATP has (good enough for now)."

Parameter Variation Studies by PCVP

Combined use of PCVP and STATISTICS first was requested by Prof. Juan Martinez Velasco of the Polytechnic University of Catalunya in Barcelona, Spain. He first inquired about the possibility in E-mail dated February 17th, reporting trouble during his attempted use. Upon researching the matter, your Editor found a paragraph in the January, 1999, newsletter. This began: *"Any STATISTICS or SYSTEMATIC data case is incompatible with the PCVP declaration."* This was because of conflicting use of variables such as KNT (the loop counter). The paragraph ended with a question: What reader disagrees, and why? Well, Prof. Martinez believes he has a practical use, so conflicts between the two loops were removed between March 3rd and March 5th. The effort was considerable, with 13 UTPF segments requiring change before all standard test cases were made to agree. Neither data nor .LIS file has changed for any test case. About precedence, STATISTICS is to be the inner loop and PCVP the outer loop --- comparable to Dr. Tsu-huei Liu's 2-dimensional variation using a frequency scan within LINE CONSTANTS as illustrated by the 11th subcase of DC-59.

The 5th subcase of DCNEW-25 uses PCVP for time simulation, and it should produce a separate .PL4 file for each pass. It will if copied into a separate disk file. But not so in its present location as the second or later subcase. This was prior to Stu Cook's successful modification on May 23rd. He had discovered reason for the trouble using Macintosh ATP (see separate story), and your Editor then proposed evasion of the problem using data. Addition of one $STARTUP line was the result.

Publishing Programs and Viewers

A new table of contents for each newsletter file --- one that is both click-able and continuously visible --- has been proposed by Prof. Mustafa Kizilcay of FH Osnabruck in Germany. His E-mail dated February 28th included an illustration: *"I am sending you attached JAN00OPT.PDF ... When you open the file in Acrobat Reader you will see on the left side the contents as 'Bookmarks'. Clicking on an item with the mouse will display that part of the file."* About creation, Prof. Kizilcay claimed the work was easy: *"It takes only 5 minutes for one issue."* But can we afford the luxury? The concern is about possible loss of limited and valuable screen space. For a single full-page display, nothing typically is lost because a page is higher than it is wide whereas the average monitor is wider than it is high, leaving plenty of wasted space on the sides. But that is too small to be read confortably, anyway. What about the more practical use of *Fit Width* within the *View* menu of Acrobat? BPA's Dr. Tsu-huei Liu and your Editor compared both the regular and the Kizilcay-modified January issues using this mode of display. No question, the added bookmarks decrease readability --- even using this huge (21-inch) monitor. The bookmarks require perhaps 15 to 20% of the page width, resulting in comparably lower magnification.

The need to lock PDF files first was pointed out by Prof. Mustafa Kizilcay of FH Osnabruck in Germany. Although he probably mentioned the need earlier, it was his E-mail dated March 21st that prompted Dr. Liu and your Editor to serious, active consideration. Prof. Kizilcay wrote: *"The Theory Book PDF files available on the servers are not protected against copying, i.e. you can mark the text and copy to any word processor. I checked this some minutes ago. ... I think it is important to activate the PDF security options especially for licensing forms. Recently, we received a filled-in licensing form from a person who just cut out one paragraph."* To conclude, future ATP-related files of PDF format that are produced by the user group should be locked, and this will include newsletters. The Can/Am user group recognizes the error of its former ways.

Hoidalen Improves ATPDRAW

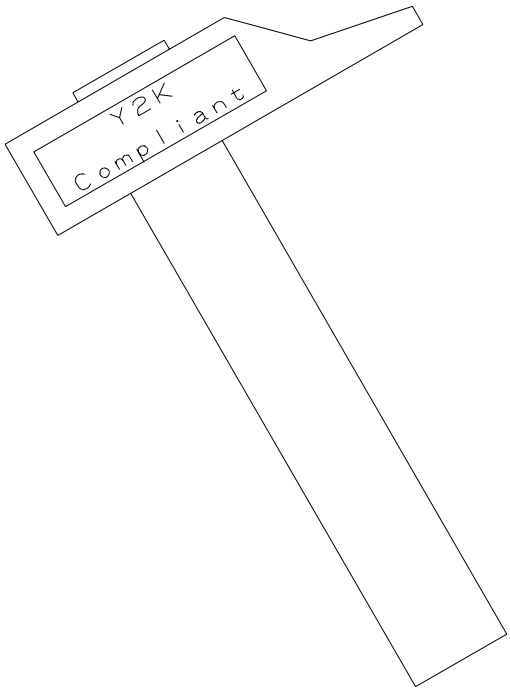
Large dimensioning of current ATPDraw was documented April 9th by ATPDraw author Dr. Hans Kr. Hoidalen. Using E-mail of the Fargo list server, he wrote: *"The maximum number of nodes in ATPDraw is 2000. However, only 1000 nodes with user specified names are allowed. The maximum number of components is 1000 as well as the maximum number of connections."* Not yet as big as ATP itself (e.g., for a decade or more, BPA users have required 3000 nodes), but very large nonetheless.

Year 2000 Compliance of ATP ?

About legal liability, the latest question is more interesting than the original. Should persons who exploited and encouraged Y2K hysteria be made to pay? If so, how? Dated January 21st, *ABC News* offered a *Reuters* story from London that explained: *"Lawsuits for hundreds of millions of dollars are in the pipeline, seeking damages for a range of problems. Some firms allege overcharging by information technology consultants or accuse consultants of recommending work that was unnecessary. Others may seek to recover huge sums spent on new computers because they were persuaded that unless they were installed, the business might disappear into a cyberspace black hole. Firms also expect lawsuits from shareholder groups who wonder why U.S. and British companies spent vast amounts to insure their equipment against the bug while state-owned enterprises in countries such as South Korea and Italy, with*

similar equipment, spent nothing and had no problems." A lot of money is involved according to *"Gartner, which reckoned that the global cost of repairing the bug would be between $300 billion and $600 billion ..."* One principle is obvious: *"Graham Ross … said companies that were persuaded to repair software or buy new computers to avoid being hit by the bug might sue, alleging that the original equipment should have withstood the changeover to 2000."* Less obvious is the aspect of insurance: *"Others might seek to invoke the 'Sue and Labor' principle, which originated in marine insurance and covered a shipping company that was forced to take emergency action against an imminent threat, which, if not taken, would sink the vessel. The expense of purchasing new computers or expensive advice to avoid the millennium bug could in theory be charged to insurance on these grounds, Ross said. Smooth-talking salesmen might have persuaded companies to make unnecessary purchases."* Yes, and smooth-talking governments such as the all-caring ones in Washington and London, too! There was no shortage of fraud in the colloquial sense. But is there a judicial remedy? What will judges and juries think? Nobody yet knows, and many months or several years more may be required to find out.

As a special treat, readers are being provided with a copy of Orlando Hevia's inspirational sketch, which was received sometime around the first of the year:



Branch Data Input Restructured

Symmetrical component data for a Type 51,52,53 branch was restricted to narrow format prior to extension on February 19th. The first report of difficulty using $VINTAGE,1 arrived two days earlier in E-mail from Prof. Juan Martinez Velasco of the Polytechnic University of Catalunya in Barcelona, Spain. Prof. Martinez explained about his work: *"a $PARAMETER loop will take care of internal (previous) calculations. In general, when something like this is developed we prefer to use high-precision card format."* Yes, although an extension to the code of SUBR3 was required. To verify that operation now is correct, data of the 10th subcase of DCNEW-23 was changed from narrow format to wide without affecting the results beyond data input. Interested readers are referred to interpretation of the final input line, which provides the only indication that symmetrical component data has been recognized. In fact, this final line of interpretation is the same as the 3rd and final line of the original, narrow-format alternative.

Interactive Plotting Programs

ATP and other large programs (e.g., Orlando Hevia's GTPPLOT) generally will not be enhanced to provide an alternative-format output file if that file can equally well be produced by a command file that executes the program. This is the general principle, which was stated by your Editor in semi-public E-mail of the Fargo list server dated February 29th. Another subscriber had asked Mr. Hevia to provide an alternative format for his PL42MCAD command, and the author responded by showing how a command file would do the job. Your Editor concurred, ending his message with KISS. Robert Schultz of the New York City area then seemed to approve while illustrating more advanced alternatives: *"Keeping it simple is always a good idea. Here's another simple alternative for command line pro's: ... or .... when used inside a script (.cmd) file. This directly addresses Li-Ming Zhou's request in the original context. It's another good reason to know how to operate more than a mouse! This technique is generically applicable to a multitude of problems."*

About Java, in the April issue your Editor asked: *"what is the practical use in the ATP world?"* March 7th, GTPPLOT author Orlando Hevia clarified: *"Mr. Magnago explained to me the possible use of Java from ATP to illustrate an ATP related web page."*

Miscellaneous Intel PC Information

1000 MHz is a milestone having considerable value for advertising, and it would appear that Intel has lost the race to it. *"How AMD beat Intel to 1 GHz chip"* is the headline of a story posted at *The Register* on March 3rd. The story begins: *"Intel has clearly lost the PR war it has engaged in with AMD to bring a 1 GHz x86 microprocessor to the market first."* As for end users, *"one OEM will ship GHz PCs in March. ... Compaq and Gateway showed near-*

mass-production-units at CeBIT at AMDs (sic) booth with 1 GHz. ... This is highly embarrassing for Intel." But why? If Intel was not embarrassed about its infamous Erratum 21 (see the January, 1991, issue onward), why be embarrassed now by a little time (weeks)? More important should be impact on AMD profits. No longer must AMD processors sell for less: *"The company feels that it need no longer play by the same rules that in the past forced down the average selling prices (ASPs) of its chips and had a disastrous effect on its financial results."*

The Cray supercomputer market continues to contract, with a story posted at *The Register* on March 2nd providing relevant statistics. *"SGI finally sells off Cray"* is the title. Of course, the SG of SGI stands for Silicon Graphics, the high-end workstation maker, which sold Cray *"to rival (and rather smaller) supercomputer manufacturer Tera Computer. ... Tera, it seems, hasn't been doing too well of late."* About price, *"Wall Street Journal deep throats claim its in the order of $100 million. That's rather less than the $740 SGI paid for it back in 1996, but since SGI wants rid of the operation, it's really a buyer's market."* About terminology, a *deep throat* is a secret source. This term dates to former Pres. Richard Nixon's removal from office following his reelection in 1972 (the so-called Watergate scandal).

Miscellaneous Small Items

NOCALC can be used to suppress batch-mode vector graphics as mentioned imprecisely several times before (e.g., the October, 1994, issue). Not mentioned was the necessity of a CALCOMP PLOT declaration, in order for value unity to be effective. This is not always the case, as illustrated by the 2nd subcase of DC-9. Stu Cook of JUST Services had set NOCALC to unity in order to avoid non-existent plotting, yet Macintosh ATP sometimes would die in the middle of plotting. Lack of CALCOMP PLOT was the reason. Not good. It is amazing no one previously complained about lack of full effectiveness of the control, for which suppression should be universal. This became the case following a 2-line addition to SUBR28 on March 31st. Any PRINTER PLOT that precedes the first vector plot of a subcase should be seen in output, but any that follows should be lost when NOCALC has value unity.

"How far to model a network?" was the popular question posed David Alvira of Red Electrica de Espana in Spain. His semi-public E-mail of the Fargo list server began as follows on June 5th: *"I am trying to determine how much network do I have to model to do a transients study, in this case capacitor bank switching."* Many knowledgeable readers contributed interesting perspective from various points of view. Not surprisingly, the most uncertainty surrounds network equivalents and interfaces to the data of other programs. Dr. Ali Moshref of Powertech Labs, Inc. (PLI), in suburban Vancouver, B.C., Canada, made a surprising contribution. List server mail dated June 8th summarizes one way to create ATP data from that already being used for conventional, positive-sequence, steady-state analyses named load flow, transient stability, and short circuit (fault). Recall PSS/E is the trade name used by Power Technologies, Inc. (PTI) of Schenectady, New York. Well, Dr. Moshref explained: *"Since my last response ... many of you sent me email inquiring about our translator program. ... To systematically set up the ATP data file, we developed a computer program to translate the power flow and sequence data files (in PSSE format) into ATP data file format. Since the program can utilize the sequence data, either single phase or three-phase models can be built. A list of power system components that are translated from power flow format to ATP data file format is as follows ... PLI will provide this data conversion program free of charge to any authorized ATP user for their internal usage only. Please note that there will be no support provided, unless $500. support fee is paid."*

IDEBUG is the JMARTI SETUP diagnostic variable that is defined on the JMARTI miscellaneous data card. Until April 17th, this was independent of the program's DIAGNOSTIC control (variable IPRSUP). But on this date, the JMARTI control was subordinated to the ATP control. While operation for positive IDEBUG should be unchanged, operation for value zero will be the same as if IDEBUG had been defined equal to IPRSUP. This is another convenience developed during Macintosh ATP testing by Stu Cook (see separate story).

Parameter NOSM59 was added to STARTUP on March 27th in response to a request from Japan. In E-mail the preceding day, JAUG Vice Chairman Masahiro Kan had reported on discussion of Type-59 S.M. troubles at an important and recent meeting (an *"ATP-EMTP related session"* of JIEE *"was held March 23"*). To satisfy requests for protection, your Editor proposed the addition of a new control as follows: *"Value 1 would have the effect of treating any Type-59 model as if it were Type 58."* In fact, NOSM59 is more general, as documented on comments in the first subcase of DC-26, which illustrates use of one of five possible values of the parameter. About location, the new NOSM59 replaces old IZGR1 which has been moved to GRAPHICS along with companion parameter IZGR2 as part of continuing reorganization. New non-graphic parameters slowly are replacing old graphic parameters, which more logically belong in disk file GRAPHICS than in STARTUP.

"Source code date" was mentioned in the April, 1999, issue. Then, it was explained that age would be clearly documented when KOMPAR has value zero or one. But this was just for 132-column output. March 29th, BPA's Dr. Tsu-huei Liu noticed the need for 80-column output, which mentioned *"Last Rule Book printing: July, 1987."* Not good, so this useless information was replaced by the source code date the following day. One or two lines of several test cases (e.g., DC-10) were affected.