Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Vol. 02 – 1 ; January, 2002

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Salford FORTRAN Compilers

Intel assembler for several vector utilities including MOVER was written by Robert Schultz of the New York City area. This was explained in the January, 1994, issue. Of course, this was for Salford EMTP that uses DBOS since the F77 Salford compiler has the added advantage that it allows Intel assembly language within a FORTRAN subroutine. All of this is old. But what was not considered at the time was the application of routines such as faster MOVER to relatively short U.M. matrices that are dimensioned 3 x 3. The reader might be surprised to learn of substantial benefit for vectors as short as 9 cells. Yet, the relative improvement is significant using Dr. Liu's 486 DX2-based PC. Rounded to the nearest second, the numbers are as follows for 800K repetitions of a transfer of 9 REAL*8 words:

```
Nested DO loops:  37 seconds
CALL MOVER     :  20 seconds
```

Encouraged, your Editor progressed to his 133-MHz Pentium at home. The same test, performed for 8 million repetitions, was a little less encouraging :

```
Nested DO loops:  23 seconds
CALL MOVER     :  15 seconds
```

This is not earthshaking improvement, but it is substantial improvement. In order that such possible progress not be forgotten, LINEQS and MATMUL were modified to use MOVER on May 28th. Comment cards document reasoning of the change.

COMTRADE output of ATP was requested by Jules Esztergalyos during a visit to Dr. Liu's office on June 20th. It is worth reviewing why this alternative has **not** been provided. A technical objection was stated in the January, 1993, issue : *"manual scaling ... means that creation generally is possible only after the simulation is complete."* Remember, COMTRADE signals are stored as 2-byte integers, not as floating-point numbers. So, ATP signals require scaling, and an appropriate factor will depend on signal range. But many users do not have a good idea of

extrema ahead of time, so it is necessary to delay the conversion until the simulation is complete. Yes, relay engineers who might generate a family of .PL4 files might have a good idea, but this would be an exception, not the rule. The same engineer who would take the time to learn an optimal scaling factor ahead of time also could take the time to automate the conversion after ATP execution has ended. One extra, constant line in the batch file of ATP execution (e.g., RUNTP) is all that should be required to perform a conversion to COMTRADE. This concept was explained in the January, 1994, issue, and RELAY.BAT within the Salford TPPLOT archive demonstrates use that was designed to satisfy the needs of Scott Williams at Westinghouse in Pittsburgh, Pennsylvania. Of course, Mr. Williams wanted uniform columns of numbers rather than COMTRADE output, so a change to TPPLOT would be required to support the COMTRADE alternative. But this should not be difficult, and your Editor would be happy to perform the connection for anyone having serious interest. About other good reasons not to make COMTRADE an ATP output option, do not forget selectivity. As part of postprocessing by TPPLOT, *"the user has added flexibility to omit some variables, consider less than the full time interval, add logical signals for simple switching, etc."* Particularly note the final detail: ATP lacks logical (i.e., true/false or binary) signals. All signal values presently are numeric. To conclude, there are plenty of good reasons to use Salford TPPLOT. Perhaps the best counter argument is incompatibility with MS Windows NT, 2000, etc. But remember that Orlando Hevia's GTPPLOT began as an approximation to TPPLOT that avoids DBOS, and it, too, will produce COMTRADE output. Presumably it, too, could be modified to be used as a DOS utility (the original Westinghouse request).

News from Outside USA and Canada

ICEE 2001 was held in Xian, China, late in July. Like the year before (see the October, 2000, issue), this seemed to be a good opportunity to highlight both ATP capability and availability --- this year at a panel discussion about multinational technology transfer. One of the panel members was Prof. Akihiro Ametani of Doshisha University in Kyoto, Japan. A supporting paper was required, and in this Prof. Ametani chose to emphasize the various ATP user groups of the world. So, five of them (Japanese, European, Latin American, Argentine, and Canadian/American) were busy writing and revising text during preceding weeks. EEUG Chairman Mustafa Kizilcay first suggested that the resulting document might be reprinted by *EEUG News*, if there is no problem obtaining permission (i.e., the ICEE copyright). For readers who want the history of user groups unified in one location, this is highly recommended. But text is too long for a newsletter, and much of the story already has been told here, scattered over the years. For example, the Argentine story was told in more detail in the April, 1998, issue. But the Latin American story is largely unknown to the average reader, so reproduction of this portion seems appropriate. The following 6 paragraphs are from *"3.4 Latin American EMTP User Group"* --- writing attributed to Marco Polo Pereira of Furnas in Rio de Janeiro, Brazil :

"BPA's Transients Program (T.P.) first was used in Brazil during the early seventies. Then, in 1976, an effort was made to coordinate use: a one-year plan to test and install EMTP in Brazil. This was conducted by Furnas (located in Rio de Janeiro), and it resulted in the creation of the Brazilian Committee, which operated from Furnas.

The first fully-operational EMTP version used in Brazil was the 'M21.' IBM mainframe version dating to early 1978. The 'M28.' version dating to 1980 followed, and was the most widely used of all because it coincided with the important studies of the Itaipu Transmission Systems (765 kV AC and +/- 600 kV HVDC) .

The Latin American EMTP Users Group (CLAUE) was created in 1983 as an outgrowth of the Brazilian Committee in response to a request from BPA. Drs. Meyer and Liu had suggested that Furnas might also distribute EMTP to other Latin American countries, considering the similarity of languages (Portuguese and Spanish) and geographical proximity. CLAUE is an informal organization. It has no legal obligation to its members, and no dues are paid to CLAUE by members.

With the advent of the ATP, a significant group of potential EMTP users started to join CLAUE. These new users were mostly universities, small consulting companies, and the individuals --- persons who could not access a mainframe computer, but so had IBM-standard micro-computers (IBM PC). Today, most Brazilian companies make extensive use of one of the several ATP versions for personal computers.

Presently there are more than 180 ATP-registered members in CLAUE, just counting the Brazilian members and one local coordinator in each of the other Latin American countries. Besides the distribution of the ATP materials, the main effort of CLAUE's coordination is directed at the organization of regional EMTP users groups within Latin America. Within each country there is one local coordination, and within each company there is one main contact. The regional coordinator in each Latin American country must organize its own group of users. However, although a great effort has been expended on administrative matters, just a few committees have reached an adequate level of organization. The Argentinean and Mexican committees were noteworthy successes that since have become independent user groups.

Courses and seminars involving ATP have improved CLAUE's contact with program users. Many such offerings have occurred --- in Argentina, Ecuador, Colombia, Paraguay, Uruguay, Mexico, and Brazil."

"Internet address zjklj@sina.com.cn in China seems unreachable from BPA." Thus began a paragraph in the July, 2001, issue. Recall your Editor had asked: *"Is it possible that some Internet services in China do not accept messages from outside the country?"* Apparently so. After more bounced messages (the person involved can send messages to BPA, but apparently he can not receive them from BPA), an explanation was provided on July 3rd: *"I've inquired of sina.com about problems with their e-mail services, and they said it might be a problem of telecommunication office. Because sina.com undergoes a little disorder in its upper management echelon, it seems that problems you have met will not be solved soon."* Two days later, there was recommendation of an alternate address, and added explanation that free service might be responsible for some of the trouble: *"163.net is a mailbox without problems ... For providing services of higher quality, they have stopped application for free email-box, and have begun charging for email services. This recently was big news of China's IT industry."*

More about the Internet and E-mail

Roman Catholic confessions must **not** involve the Internet. This according to a story posted June 5th at *The Register* with title *"Net confessions fail to get Vatican blessing."* Pontifical dissatisfaction with the Internet is summarized as follows: *"believers can only confess in person and to priests --- not to servers."* This sounds reasonable to your Editor. After all, during the past century, who was confessing by telegraph, telephone, tape recorder, or closed-circuit TV? Why would the Internet be any different? The story later refers to the Vatican's historical hostility toward the new medium: *"After earlier decrying the Internet as a pernicious influence the Catholic Church has come to (at least partially) embrace the online world and there's even talk of creating a patron saint of the Internet."*

"The Taliban has banned the use of the Internet in Afghanistan ..." Thus began a story posted at *The Register* on July 13th. Pornography seems to be one of the stated reasons (*"... things that are wrong, obscene, immoral and against Islam."*). Conclusion: the Catholic church is not the only religious organization to raise objections.

Digital cameras were described in the July, 1997, and October, 2000, issues. Recall brand names Kodak and Sony were mentioned, with the latter of these recommended in E-mail from Prof. Mustafa Kizilcay of FH Osnabrueck in Germany. Dated June 10th, this concerned biographies of ATP-related authors for the EEUG Web page. Today, writing really should be accompanied by perfect color pictures as already is the case for Drs. Hoidalen, Kizilcay, and Celikag. Gone should be the distortion involved in digital scanning of conventional photographs, as was done by your Editor for EEUG around 1995. The advantages of digital photography are well explained by Prof. Kizilcay: *"Do you or does Tsu-huei have a digital camera (maybe BPA has one)? Someone from BPA could take a photo of you together? ... I purchased at the end of last year a Sony camera. I must say that I am very satisfied with this new technique. Since then, I reduced my photo costs (no film, no development cost, and no photo album); and I save time because I do not need to go to a photo shop, and sort all photos later, to put them into an album. The quality (especially colors) of photos is much better. I view them on the screen and store them on CD-ROM . "*

"Online currencies go for broke" is the title of an *ABC News* story dated August 27th. Payment always has been a problem of Internet commerce, and alternatives named Flooz and Beenz recently have failed. The story is told by M. Corey Goldman as follows: *"It seemed like a brilliant idea at the time. With no foolproof secure way for consumers to pay for purchases online, why not create a brand new Internet currency? It would be safer and more secure than a credit card number and merchants would receive their payment instantly --- without having to worry if the buyer on the other end is a crook. And for consumers, they would be able to use it on virtually any e-tailer they stumbled onto on the World Wide Web. That idea seems a little less brilliant now with the closure in the past week of two widely known Internet currency companies: Flooz.com, a 2-year-old firm that made its name with Whoopi Goldberg as its spokeswoman, and the lesser-known Beenz.com ..."* Credit cards suffered from *"obvious pitfalls. For one, no one could figure out how to verify identity. Since you can't check someone's signature over the Internet, companies accepting credit cards as payment for their wares could only hope that the person inputting the credit card number was who they claimed to be. For another, the major credit card companies --- Visa, MasterCard, American Express --- were, and still are, requiring higher percentage fees based on the risk of the transaction"* as mentioned in the October, 2000, issue. So, there was a need for something different and better --- a new currency. *"For a while it worked; Flooz sold more than $3 million of flooz currency in 1999 and $25 million in 2000. The company also managed to persuade dozens of merchants to accept its currency ..."* But the problem was with *"getting money into a Flooz account in the first place. To fill up their accounts, customers would have to provide a credit card ..."* I.e., the new currency relied upon the old! This was a serious flaw in the business model. Ironically, it led to disaster for the already-troubled company: *"A New York Times report Monday … said Flooz had unknowingly sold $300,000 of its currency to a ring of credit card thieves in Russia and the Philippines. Stolen credit card numbers were used online to buy the flooz currency, the newspaper said."*

The name *@Home* first was mentioned in the April, 2000, issue, where it was associated with AT&T. But just as quickly as the name @Home arrived in Portland, it already has disappeared. The same sort of junk mail that

advertises cable modem connection to the Internet continues to be received regularly (e.g., once per month), but the name has changed --- from AT&T@home to AT&T Broadband. Why? Suddenly, your Editor suspects that AT&T is trying to disassociate itself from yet another huge Internet failure (see the July, 2001, issue for a summary of the NBC Internet failure). Substantial bad financial news about Excite@Home has been seen recently. *"More woes for Excite@Home : Investors want $50 million back"* is the title of an AP story by Brian Bergstein that was found at the Web site of the *Seattle Times*. Dated August 28th, this story began: *"The spiraling state of affairs at Excite@Home worsened yesterday, after an investment firm that arranged emergency funding for the cable-modem company last spring demanded a $50 million payment by the end of the week. ... Promethean now says Excite@Home breached terms of the deal ..."* So why the crisis? A spokesman explained that the company *"needed more cash because the online advertising market has deteriorated even faster than expected."* I.e., those AT&T tulip bulbs no longer are worth even 10% of what gamblers once thought they were worth. Using investment lingo of the day, *the Internet bubble has burst.* About the AT&T operation: *"Excite@Home provides a range of Internet services, including high-speed access to customers of AT&T Broadband. ... Even before yesterday, At Home Corp., which does business as Excite@Home, was in crisis mode. After losing $7.4 billion in fiscal 2000, the company said in April it needed to raise $75 million to $80 million to make it through this year. ... Excite@Home's auditors recently expressed doubt that the company will continue ..."* About tricky ownership: *"Excite@Home is controlled by AT&T, which owns 23 percent of the stock but has a 74 percent voting stake."* Finally, September 29th there was an announcement of a funeral : A *New York Times* story by Matt Richtel began: *"The At Home Corporation ..., a once-mighty Internet portal turned high-speed access provider, said today that it planned to file for bankruptcy protection ... The company, which does business as Excite@Home, said that it intended to sell its broadband business to AT&T ... for $307 million, pending court approval. The broadband business serves about 3.7 million customers nationwide ... It represents a downfall of a company that was one of the marquee brand names of the highflying dot-com era ... At least one industry analyst has said that Excite@Home suffered not merely because of the advertising market but because officials bet that the cable access business would grow much more quickly than it had."*

Electronic books were mentioned with some skepticism in the January, 2000, issue. Two years later, business is disappointing. *"Forecasts of an E-Book era were, it seems, premature"* is the title of a *New York Times* story dated August 28th. Author David Kirkpatrick begins with optimistic forecasts from industry leaders a year or so ago. None has come to pass. Today, *"almost no one is buying. Publishers and online bookstores say only the very few best-selling electronic editions have sold more than a thousand copies ... Only a handful have generated enough revenue to cover the few hundred dollars it costs to convert their texts to digital formats."* In retrospect, e-books were a solution looking for a problem that did not exist. Ordinary old paper books continue to serve most readers well. Stephen King's novella entitled *"Riding the Bullet"* (see the July and October, 2000, issues) seems to be the one great exception: *"It ignited last summer's wave of enthusiasm for electronic books ... But nothing since then has even come close."* One problem has been a lack of cheap portable readers: *"After watching the music industry's piracy problems, book publishers insisted that Microsoft add to its software for reading electronic books much stronger safeguards against unauthorized copying than today's hand-held personal computers can accommodate. As a result, hand-held computers using this software cannot display most publishers' books. ... Sales of specialized hand-held appliances purely for reading books on a screen have also disappointed ... Publishers estimate fewer than 40,000 of the RCA appliances are in circulation. Consumers appear confused ... the devices are neither computers nor hand-held organizers, nor do they connect to the Internet. The appliances download electronic books over phone lines directly from a central server. ... The least expensive has a suggested retail price of about $300."*

"Ebay continues to flourish despite faltering economy" is the title of an October 19th story by Saul Hansell that was found at the Web site of *The New York Times*. Recall that on-line auctioneer Ebay first was mentioned in the April, 1999, issue. Whereas many Internet companies have failed since then, Ebay has prospered --- in part by adapting to changing conditions. One analyst offered this opinion: *"They are still living inside the Internet bubble ... Internet commerce turns out to be extremely difficult, and they have the model that allows them to be flexible and to have a natural monopoly."* About new directions for the company: *"EBay continues to diversify from its origins as the world's largest flea market ... Much of its growth has been from big companies, like I.B.M. ... that are selling their overstocks. It is also expanding to offer goods at fixed prices, rather than through auctions. Its fixed-price services ... now account for 16 percent of its sales ... Similarly, it is growing internationally, with 16 percent of its revenue now generated outside of the United States ..."*

"The longest economic expansion in American history has ended." This is the opening sentence of a *New York Times* story dated November 1st. Recall the July, 2000, issue referred to *"record expansion (since February, the longest ever)."* Well, contraction has begun. About the cause, author David Leonhardt wrote : *"The terrorist attacks of Sept. 11 played a key role, pushing an already-weak economy over the brink, analysts said, as travel temporarily stopped and spending briefly froze."* The federal government estimates growth quarterly, and *"in the three months that ended Sept. 30, the economy contracted at an annual rate of 0.4 percent, after adjusting for inflation. That is the only significant quarterly decline since early 1991, when the last recession ended."* Of course, two

such consecutive quarterly contractions constitute a recession (the classical definition of economists). Note use of the adjective *significant*, however. It seems there **was** a negative quarter since 1991, but it was statistically insignificant (less than the margin of error of the data). This was *"a one-quarter downward blip of 0.1 percent in the spring of 1993."* This is why the story was entitled: *"After 8 years, U.S. economy finally falters."* Unfortunately, the rest of the world, too, now is having problems: *"The value of exports and imports each fell more than 15 percent in the third quarter, for the first time since 1975, when all of the world's largest economies were struggling at once and companies were failing to find any healthy markets eager to buy their goods."*

News About TACS and MODELS

"TACS initial condition problem" was the *"Subject:"* of E-mail from Dr. Michael Steurer of CAPS at Florida State University in Tallahassee. Dated June 14th, this prompted a couple of days of study of data TACSINIT (renamed from SCRATCH for easier preservation). The problem mentioned by Dr. Steurer is this : TACS variable RAMP1_ is the output of an integrator (a 1/s block), and it began with a value that was the sum of the steady state value (Dube's solution of S-blocks) and the value of the Type-77 initial condition. See the table that is labeled *"Zero-frequency (dc) steady-state solution for TACS follows."* But why superposition (addition of the two values) rather than one or the other (but not both) of the two components? Attempts to duplicate the strange behavior using trivial data thus far have failed, although a new 10th subcase was added to DCNEW-16 to illustrate differences in the treatment of initial conditions. As your Editor wrote to Dr. Steurer on June 17th: *"I tried to demonstrate this using a modification of the 1st subcase of DCN-16. See attached … I do not want to forget this strange treatment of initial conditions. Note the 4 independent illustrations. Two give one answer and the other two give another. … Note the difference between 1/s and 1/(1+s). At least I understand the latter, since use of the phasor solution seems reasonable to me. But what is the phasor solution for 1/s at zero frequency? Why is this even allowed? Why did Dube allow this to continue? One can not integrate dc forever!"* The superposition *"is in the code. Your RAMP1 goes through the superposition line. What I do not yet know is why yours does, but my simple illustrations do not. Conclusion: I do not believe an obvious error is involved. I believe you will obtain the right answer if you either have no phasor solution (in which case initial conditions should be honored) or no initial conditions (in which case the phasor solution should be honored). What is unpredictable is the result when you have both a phasor solution and also initial conditions."* As an unexpected benefit of the study, your Editor realized that substantial code could be (and was) removed from OVER12 and SSTACS because TACS STAND ALONE no longer exists internally (see explanation in the July, 1995, issue) .

CONCATENATE INCLUDE FILES and DCNEW-28 were mentioned in the October issue. Recall the timing for *"Dr. Liu's 550-MHz Pentium III ... Watcom ATP running under WinNT on this PC completes the job in 8.8 seconds. This is as timed by DOS (using TIME), taking the average of the best 5 of the final 6 of 7 consecutive executions."* Repeating the experiment using Mingw32 ATP on September 30th resulted in 4.5 seconds for the same experiment. However, instead of DOS TIME, *"Total Execution Time"* as written to the screen was used. Once again, Mingw32 ATP demonstrates its superiority starting and stopping (recall there are 75 stacked MODELS subcases within DCNEW-28) .

European EMTP User Group (EEUG)

emtp.org E-mail addresses seemed to be unusable for at least five days beginning July 14th. After three failed attempts to send small messages to mailinglist@emtp.org and one to eeug@emtp.org, your Editor wrote EEUG management on July 19th. Fortunately, Prof. Kizilcay responded promptly with a good explanation : *"I have forgotten to warn people ... Because the provider 1&1 Internet.Profi in Germany now allows … **.org** domain names, I moved emtp.org to EEUG's account at that provider and canceled our membership at another provider, 1&1 Puretec (in fact the same company!). The consequence is that all Web files (emtp.org and eeug.de) are now on the same server and we (EEUG) have only one Internet account. Things have been simplified. We can even change eeug.de to eeug.org !"*

The year-2001 EEUG meeting in Bristol seems to have been a big success. The first report came from honorary member Gabor Furst of suburban Vancouver, B.C., Canada. His E-mail dated September 14th summarized: *"The Bristol EEUG meeting was very successful ... They were about 50 attending, most of them stayed for the course."* Chairman Mustafa Kizilcay then wrote on September 21st that the meeting *"and the short course on FACTS were successful. I assume that all participants were satisfied. The quality of the papers was good."* The course seems to have been exceptional. Prof. Kizilcay wrote: *"The course on FACTS devices was very well prepared by Mrs. Anna Pinnarelli of the University of Calabria in Italy and Mr. Ricardo Tenorio of ABB in Vasteras, Sweden. A total of 260 slides were shown, in addition to simulation examples."* Of course, Prof. Kizilcay mentioned New York City. About timing, your Editor observed later that same day: *"You already may have heard that Gabor was on the last flight by Air Canada from Heathrow. He was very lucky. So was the meeting. Can you imagine what would have happened if you had scheduled your EEUG meeting for one week later?"*

Watcom ATP for MS Windows

List 29 was changed from blank to 300 and the RAM TABLES declaration was removed from LISTSIZE.BPA on September 26th. This had the effect of removing huge JARRAY. It is curious that this change was not made sooner --- most recently, at the time of the GNU modification as reported in the October issue (see mention of 200 and 300 cells being used). After all, the gain was important for Watcom. Presumably it now will be a while before there again is trouble with Watcom linking due to lack of paging space (see the January, 2001, issue). The October newsletter mentioned that the first try using Win 2K was successful, but this was misleading because few processes then were in use. Later, with more windows open, the old familiar overflow was experienced once again. Windows 2000 did **not** solve the problem, but the limitation of JARRAY provides considerable relief.

"Watcom no longer is an orphan." Such a headline would negate the bad news of the October, 1999, issue. This possible new good news first was learned from Prof. Juan Martinez of UPC in Barcelona, Spain. His E-mail dated 30 March 2001 stated: *"Today we have learned that Watcom compilers are still alive. They are supported again, and apparently they are **free**. If you are not aware of this you can visit … **www.openwatcom.org**"* Of course, your Editor and Dr. Liu followed this recommendation, and found promises. Six months later, as this paragraph is being written on October 4th, the aforementioned Web page contains the following news: *"The Open Watcom core team has already created a binary patch update release (11.0c) targeted at existing Watcom C/C++ and Fortran customers."* In the right margin is a note entitled *"Current Status. 09/27/01 -- Watcom 11.0c beta is now available! Check the status report for more information or download the update today!"* So, what knowledgeable reader can recommend a compiler upgrade for ATP developers? How might the average ATP user benefit from version 11.0c?

Line and Cable Constants

Routine CDATOU of CABLE PARAMETERS, stored within segment NEWCBL of the UTPF, was modified by BPA's Dr. Tsu-huei Liu on August 14th in order that any distributed line section that was punched would be lumped-resistance rather than distortionless. This is the way LINE CONSTANTS always has been, so the change improves uniformity. Modification followed the recommendation of Prof. Mustafa Kizilcay --- most recently in E-mail dated August 13th, which indicated that distortionless modeling was not Prof. Akihiro Ametani's intention. Test cases are affected only in that 4 lines of DC28.LIS change by one byte each, as "1" is replaced by blank in column 76 of branch card images. Correction to correction on August 29th: Prof. Kizilcay noted that ILINE in columns 75-76 had been changed by mistake, rather than IPUNCH. So, the correction was made a second time, on the eve of CD creation and distribution for EEUG members. Later that same day, Prof. Kizilcay confirmed correct operation for all 3 executable versions of TPBIG that were supplied.

CABLE PARAMETERS within JMARTI SETUP is the summary characterization of a new 4th subcase of DCNEW-6 that was added October 13th. The previous day, using E-mail of the EEUG list server, BPA's Dr. Tsu-huei Liu explained how data from ONS (Operador Nacional do Sistema Eletrico) in Rio de Janeiro, Brazil, had inspired improvement of the JMARTI fitter: *"While performing the curve fitting of either the characteristic impedance or the propagation function ..., ATP now will skip the splitting of a segment to allocate poles and zeros if the frequency range of the segment is too small (F1 / F2 < 1.0023) . With this remedy, Dr. Siqueira de Lima's modified data ran through JMARTI SETUP and produced punched branch cards. In addition to the 9th subcase of DC-27 mentioned above, we also tested JMARTI SETUP using three other pipe-type cable cases and one underground cable case without pipe from DC-27. All terminate normally."* So, success. Or is it really? Dr. Liu reiterated the habitual warning about cables and JMARTI: *"Remember, the JMARTI code was designed for overhead lines --- in fact, continuously-transposed overhead lines (all that were covered in Dr. Marti's doctoral dissertation). There is the assumption of a constant transformation matrix [T], whereas in reality [T] depends on frequency. For some overhead lines and most cables, constant [T] is not a good engineering approximation."* I.e., beware of GIGO. About range of the frequency scan, *"Dr. Siqueira de Lima used ... [1, 100K] Hz --- 5 decades with 10 points per decade. Here at BPA, this writer used ... which corresponds to an extension below 1 Hz to .001 Hz. Whether this makes any significant difference has not yet been investigated. There also is the matter of the high end. Mr. Hevia had suggested trying 15 decades ... This writer is skeptical that such a change could have physical significance because F-max = 1.E12 Hz is far beyond the limits of circuit theory upon which the model is based. In any case, experimentation with higher frequencies has not yet been performed."* If any reader has evidence to the contrary, notification would be appreciated.

Brain - Damaged MS Windows

"Dead people rise in support of Microsoft" was the title of a story posted at *The Register* on August 23rd. This seemed to be a summary of an article by Joseph Menn and Edmund Sanders of the *Los Angeles Times*, which was published under the less clever but more descriptive headline: *"Microsoft lobbying campaign backfires; even dead people write in support of firm."* This latter story, also dated August 23rd, was found at the *Seattle Times* Web site. It begins: *"Letters purportedly written by at least two dead people landed on the desk of Utah Attorney General Mark*

Shurtleff earlier this year, imploring him to go easy on Microsoft for its conduct as a monopoly. The pleas, along with more than 100 others from Utah residents, are part of a carefully orchestrated nationwide campaign by the software giant that may be backfiring. ... The Microsoft campaign goes to great lengths to create an impression that the letters are spontaneous expressions from ordinary people. Letters sent in the last month are on personalized stationery using different wording, color and typefaces ... State law-enforcement officials became suspicious after noticing that the same sentences appear in the letters and that some return addresses appeared invalid." Also mentioned is the matter of payments to political parties. Obviously cheaper and more cost effective than the payment of lawyers to defend its cause, MS *"has stepped up campaign donations, becoming the fifth-largest 'soft-money' donor to the national Republican and Democratic parties in 1999-2000."*

Software libre, a movement that seems to have begun in Brazil, poses an altogether different threat to MS. This is the good news. Although the U.S. government might no longer be working actively to break up Bill G and company, others are attacking MS at the legislative (rather than the judicial) level. Paul Festa is a Staff Writer of CNET News.com who wrote an excellent and long summary dated August 29th. The title is *"Governments push open-source software."* Well, governments other than those within the USA. Obviously, MS *"is working overtime to quell it. ... A recent global wave of legislation is compelling government agencies, and in some cases government-owned companies, to use open-source or free software unless proprietary software is the only feasible option."* Cost and flexibility are advantages, but nationalism may be a more important aspect. There is *"a desire to break free of the United States' lock on the global software market."* So what is software libre? *Libre* is the French word for *free*. Software libre is *"software that is not only free of licensing fees but whose development is not controlled by a single company. Theoretically, that single company could be any one of a number of software providers. In reality, most of the legislation in Europe, Asia and Latin America is specifically targeted at gaining freedom from Microsoft ..."*

Be or BeOS (the Be Operating System) represents yet another complaint about MS as explained in an August 27th article by Scot Hacker. The document reference is *"BYTE Magazine > The Be View > 2001 > August,"* and the title is *"He who controls the bootloader."* It seems *"that Palm, Inc. will be purchasing Be's technology, intellectual property, and assets. ... Be will receive $11 million in Palm stock, which they intend to liquidate to pay off debts. Considering that Apple allegedly once considered paying $125 million for Be, Palm got Be for a song ..."* It is Mr. Hacker's contention that anti-trust complaints about Web browsers (Explorer vs. Netscape) are weak in comparison with those having to do with the way an Intel PC boots: *"So why aren't there any dual-boot computers for sale? The answer lies in the nature of the relationship Microsoft maintains with hardware vendors. ... This is a confidential license, seen only by Microsoft and computer vendors. ... Microsoft classifies it as a 'trade secret.' The license specifies that any machine which includes a Microsoft operating system must not also offer a non-Microsoft operating system as a boot option."* The long story concludes: *"Be may yet opt to sue Microsoft, which could be a very interesting case to watch. Let's just hope the media figures out where the real antitrust issues are this time."*

"Supreme Court declines to stall possible penalties against Microsoft" is the title of a brief AP news story dated October 9th that was found at the *ABC News* Web site. It begins : *"The Supreme Court said Tuesday it will not grant Microsoft Corp. another chance to avoid punishment for antitrust violations ... The court, without comment, declined to accept an appeal from the computer giant ... The case is now in the hands of a lower court judge."*

"Windows XP officially launches in New York with marketing extravaganza" is the headline of a *Seattle Times* story dated October 25th. Year 2001 seems a lot like 1995, which saw the launch of Windows 95. The commercial hype (see the October, 1995, issue) seems comparable. The location is the same; even the amount of money being spent ($200 million) seems to be exactly the same. Bill G is playing the oldest game in town, and everyone knows it. So the question is, who will buy, when, and why? TST author Brier Dudley failed to see quick results: *"it appeared that consumers were in no hurry to buy the operating system ... Nor did there seem to be a rush for the 5 million XP-based computers now sitting on store shelves."* As already noted (see the October issue), the industry is in the middle of a sales slump. XP is *"unlikely to revitalize the PC industry this year. Even before the Sept. 11 terrorist attacks it was seeing PC sales fall for the first time in the industry's roughly 25-year history."* The following day, Dudley teamed with Eric Sorensen to expand upon the XP sales problem. *"XP debuts loud, now awaits crowd"* was the clever title. They explained : *"New Yorkers did not seem overly impressed by jugglers roaming Times Square, XP banners in Manhattan, a free concert by Sting and hot-dog vendors using napkins and umbrellas with the XP logo. ... At the nearby Gateway computer store, a stream of customers were trying XP, but there was little activity at the cash register."* The best thing to say about XP is this: it is not expensive: *"Upgrading from an earlier version of Windows costs $99 for the home version and $199 for the professional."* So, not much money per copy, although the market is huge: *"This year, an estimated 100 million copies of all versions of Windows will be sold, up slightly from 98 million last year, according to IDC, a Framingham, Mass., research company."* Of course, XP will propagate with time, if only by attrition: *"... earlier consumer versions of Windows will no longer be available on new PCs ... Microsoft is pressuring businesses to renew their Windows user licenses."* Conclusion: most of us will end up with XP

(renamed from NT, then 2000) whether we like it or not, if enough time passes. The pitch about improved reliability (compared with 95, 98, etc.) did not convince Al Gillen of IDC, who *"compared it with Ford trying to sell new Explorers by saying they are less likely to roll over than earlier models."* Yes, and this recalls Shi-yi's great joke about *MS Gas (tm)* in the April, 1996, issue !

New EEUG List Server

Bilinguality is the latest problem with legal disclaimers that some companies automatically append to all outgoing E-mail. If the trouble was not bad enough in English (see the October, 2000, issue), suddenly it has been multiplied by a factor of two as company lawyers try to be more thorough. On August 20th, moderators received a proposed contribution from Arcadis in Amersfoort, The Netherlands, and this ended with two copies of a disclaimer. One was in English. EEUG Deputy Chairman Laszlo Prikler handled the message, explaining : *"To make it compatible with our rules, the legal disclaimer ... has been eliminated --- either because it included non-English text, or because of the lawyer's statement that '... distribution ... to third parties ... is strictly prohibited.' This is nonsense for a public (for licensed ATP users only) list such as ours."* The worst part of these messages is lack of control by the sender. It is not his (in this case, Peter Sloots') fault. It is company lawyers who have created the problem, and ATP-interested engineers have lost control. Well, thanks to moderation, at least the average list subscriber is not burdened by the appendage. Prof. Prikler quoted from the English. The following would seem to be the Dutch alternative, from near the middle : *"Openbaarmaking, vermenigvuldiging, verspreiding en/of verstrekking aan derden is niet toegestaan. Gebruik van deze informatie door anderen dan de geadresseerde is verboden."*

An ATP pardon represents yet another unanticipated complication of tightened security for ATP information that is communicated via the Internet. Recall insecure operation of the EEUG list server ended 30 November 2000 as summarized in the January, 2001, issue. Everyone licensed by the Can/Am user group was asked to affirm his use online via Prof. Kizilcay's new Web form. At the time, no one remembered exceptions who were unable to do so: persons who had received an ATP pardon. By definition, these are persons or organizations that had participated in EMTP commerce. But the standard agreement for free ATP use states that there has been no such involvement. Obviously, it does not apply in this case. Anyone who had accepted an ATP pardon required a special agreement as first pointed out to the Can / Am user group within E-mail dated September 14th. This was from Murray Eitzmann, Manager of Product Application Consulting within Power Systems Energy Consulting of General Electric International, Inc. Mr. Eitzmann wrote on behalf of Dr. Dan Baker, a long-time EMTP (and for the past decade, ATP) user who last was mentioned in the January, 1995, issue (see G.E. TCSC modeling). For background of the licensing peculiarity of G.E. in Schenectady, see a story in the July, 1991, newsletter. Note this refers to *"a special agreement dated June 4th."* In his rapid response to Messrs. Eitzmann and Baker later in the morning of September 14th, your Editor explained: *"I agree, something must be done. Times have changed. A decade ago, no one was using the Internet as we do today. The present need could not have been foreseen in 1991. On this end, let me use the weekend to think about what needs to be changed, if anything. Rest assured that it was not our intention to exclude G.E. Schenectady as part of the recent tightening of security. Rather, we simply failed to remember that you were a special case requiring special treatment. My apologies."* Resolution can be found in your Editor's second reply, dated September 17th. A new disk file named PARDON.LIS has been established to handle persons involved with ATP pardons. E-mail containing relevant licensing information continues to be requested of each subscriber, although in this case it will be sent manually rather than by Prof. Kizilcay's Web form. After completing the form using a text editor such as DOS EDIT, the user is expected to print a copy, sign the paper, and convey it to Oregon --- a conclusion that is the same as for normal users. Only the language of the form is different.

Monte Carlo (STATISTICS)

A STATISTICS or SYSTEMATIC data case with non-positive TMAX (the ending time of a simulation) will be prevented by a new KILL = 240 error termination. This change to SUBR1 was made October 31st following study of a huge data case from Wuhan, China. Data came from Zhou Pei-hong of Wuhan High Voltage Research Institute --- the same place where Ma Ren-ming, the great TACS reformer, once worked. About the data, Mr. Zhou wrote: *"We are doing over voltage research on the 750-kV transmission system in the west of China … to be built next year."* Included was explanation that the Can/Am limit of 3000 branches -- List 2 as defined in LISTSIZE.BPA -- was inadequate. So, either EEUG or FGH dimensioning avoided overflow easily enough (6000 nodes and 10K branches are allowed). But data as received led to a more interesting observation. STATISTICS was involved, yet TMAX was zero. Your Editor and BPA's Dr. Tsu-huei Liu each independently noted with amazement that the loop over energizations was being traversed even though there was no simulation within the dT loop! The effort of table dumping and restoring was being totally wasted. But such behavior henceforth will be prohibited.

GNU ATP Installation Dependence

Installation dependence of TABLES and TAPSAV was a GNU convenience that increased the complexity of

future maintenance. Removal was an idea that was worked on beginning September 2nd. Key to a universal TABLES is a 3rd value (-1) for the originally-binary LINUSE --- a value that now is set within GNU RFUNL1. But theory was troubled by practice using DC-40 prior to a resolution on September 5th that was less than fully satisfying. Masahiro Kan's C code is believed to be involved, although your Editor can not see precisely how or why from his vantage point on the FORTRAN side of the divide. Redefinition of LL92 at the top of TABLES solved the problem with death in DC-40b (the only standard test case that was troubled) as documented on comment cards. It is not known why LL80 (used prior to September 2nd) worked properly whereas LL92 of current Salford code failed. Some sort of semi-stable equilibrium seems to be involved. Yet, this is the good news: careful control of a problem that probably has been present for years, and just now has been observed for the first time.

Universality of much larger TAPSAV became reality during the morning of September 13th as your Editor and Dr. Liu verified the Mingw32 solutions to standard test cases. In addition to TAPSAV, the 6 Schultz compression modules TAPSAV_xWRITE and TAPSAV_xREAD for x = D, I, and C now are universal. The GNU translation finally has been simplified considerably, with surprising ease. Later debugging will be limited to DC-22a and DCNEW-19a --- cases involving the pocket calculator. Amazingly, every other data subset was handled correctly the very first time it was tested. This was an unexpected advantage of universality. Yet, before g77 was considered, the same GNU code was developed and tested extensively using Salford. Such wrong-compiler testing involved all standard data cases except DC-40 and 49, which were fundamentally incompatible because of the sequential nature of Salford LUNIT2 I/O. START AGAIN for GNU requires the random access I/O of Masahiro Kan's C-language LU2WRT in order to write JARRAY cells 1 through NUMC0B + 2 at the top of the file when TAPSAV dumping is complete. But all other uses could be, and were, tested first using Salford. This was the key to success: use of the F77 Salford symbolic debugger (unfortunately, the GNU g77 debugger was not of much use the last time your Editor and Dr. Liu reviewed details) .

ATP Licensing Problems

Hydro-Quebec is a DCG member. Yet, on June 13th, BPA's Dr. Tsu-huei Liu received the following message from a **hydro.qc.ca** address: *"Hi, I'm engineer working for Hydro-quebec. I would like to get access to the secure area EMTP user group. How can I have it?"* Your Editor responded later that same morning with a short explanation about the difference between commercial and non-commercial EMTP versions. Since nothing more was received, it would seem that the person simply was confused. How he had learned of Dr. Liu's E-mail address at BPA, and why he believed it to be a source of commercial EMTP information, is not known. But the inquiry confirms the need for security to protect ATP-related information.

Erich Gunther, Vice President of Technology at Electrotek Concepts, Inc. in Knoxville, Tennessee, wrote E-mail that was printed in its entirety in the preceding issue. The story now continues with your Editor's response.

Electrotek is **not** being denied ATP materials that are available to the average ATP user, it should be emphasized. Today, even commercial competitors are allowed access. About Electrotek, a paragraph in the October, 1996, issue began as follows: *"Electrotek was welcomed to join the ATP user community, of course."* No response to this offer ever was received from Electrotek, it should be mentioned. Your Editor can only conclude that Electrotek did not like the concept of reciprocity. I.e., it chose **not** to pay its own price (the price it had charged others for DCG / EPRI EMTP) .

"TOP 2000 is a free program" for everyone, according to Mr. Gunther. But how long will TOP remain free, and will the free version always be the best version that Electrotek has? Your Editor is somewhat skeptical. For one thing, TOP seems not always to have been free to everyone. Certainly Mr. Grebe never mentioned such an important detail during his negotiation with the user group a decade ago (see the summary in the July, 1992, newsletter). To your Editor, TOP appears to be a former commercial product for which the price suddenly and inexplicably was lowered to zero. If any reader knows otherwise, he is invited to summarize supporting evidence. Anyway, for purposes of discussion, this is your Editor's assumption. He is somewhat suspicious whenever a commercial product is withdrawn from the market place. The most likely explanation is that the product was not a good money maker. TV shows are not canceled because ratings are good. Hence the questions: just how serious is Electrotek about TOP? Is the free copy of TOP 2000 the latest and best version of TOP (or a TOP-like display tool) that Electrotek has available? Will the latest and best TOP or TOP-like program always remain available free of charge? Electrotek would not be the first company to begin charging for what once was a free product --- either that or terminate its support entirely (think of the F77 Watcom compiler as explained in the October, 1999, issue), or sell a better version (in effect, using the inferior, free version as advertising) .

Mr. Gunther claims that *"ATP file support was enabled from reverse engineering the file format from files posted on the Internet by ATP users."* If any reader knows where any ATP .PL4 file might be *posted on the Internet* so as to be accessible to an ATP-unlicensed party such as Electrotek, it is requested that details be sent to the user group for consideration of possible legal action.

Mr. Gunther alleges a *"vindictive attitude"* that *"is beyond our comprehension."* Well, your Editor is unable to comprehend Electrotek's lack of comprehension. The company must realize that ATP materials are denied to any person who is not ATP-licensed, and Electrotek certainly is not ATP-licensed. Any reader who does not understand the need for licensing is referred to the licensing agreement used by any ATP user group. The nondisclosure requirement alone is adequate to deny what Electrotek now seems to want. But beyond this (which covers normal ATP materials), details of ATP .PL4 file structure constitute an ATP trade secret, and are denied to most licensed ATP users. Without the special approval of program developers who created the secrets, and who own the work, disclosure would be unthinkable.

Electrotek was refused details of ATP .PL4 files about a decade ago. The average reader may not be aware of this detail, which was mentioned in the July, 1992, newsletter in conjunction with the COMTRADE .PL4 alternative. Note that TOP **was** mentioned. While it might be true that Electrotek no longer is EPRI's agent in EMTP matters, this does not affect the denial of access. The licensing agreement does not distinguish between former and ongoing EMTP commerce. Today, Electrotek Concepts **has** (past tense) participated in EMTP commerce, so can not be ATP-licensed free of charge, using the standard ATP licensing agreement. The user group's form letter (today split in two and accessible from Web page **www.emtp.org**) makes this crystal clear. Why is Electrotek unable to comprehend such a basic concept of property rights? Why is it *vindictive* if Can/Am property is not available for Electrotek to use free of charge ? To be continued (again) .

Comings and Goings

The Fargo list server, operated since 1991 by Prof. Bruce Mork of Michigan Tech in Houghton, seems to have ended operation. This was the conclusion of Prof. Mustafa Kizilcay of FH Osnabrueck in Germany, who wrote as follows on August 13th: *"It seems that Prof. Mork has closed his mailing list atp-emtp@listserv.nodak.edu It does not appear in L-Soft's archive. I visited the related Web page of L-Soft to perform some routine maintenance, and used this occasion to see all mailing lists beginning with ATP. Only EEUG's was listed."*

Power Company Politics and Religion

BPA management finally seems to have accepted that E-mail is used for non-business purposes. For years, it has warned that such use violates federal law. That always was management's theory, and the basis for hidden monitoring. But then a message dated September 17th from *"Internal Communications - KC [intecomm @ bpa . gov]"* to all employees seemed surprisingly tolerant. Or maybe this is belated acceptance of reality? *"In the aftermath of last week's tragic events, there has been a significant increase in BPA e-mail traffic. The need to talk about these events and express opinions is understandable, but business e-mail is not the appropriate vehicle. Overuse of e-mail saturates the system and produces a heavy load on the network. This has the potential to slow or even stop normal e-mail traffic for a time. ... All BPA employees are reminded and requested to keep use of BPA's computers and e-mail system focused on transactions and communications that carry out the business of the agency."* The real irony is this: telephones never are mentioned in these periodic reminders not to use government equipment for personal use. Whereas telephones are just as much government property, and are just as easily (if not more easily) used for personal use, management never complains about them. The distinction is curious. Why does an employee not enjoy the same privacy of E-mail as he does for telephone conversations? Maybe Richard Nixon's secret recording of his own telephone conversations during the early '70s made the monitoring of telephone calls politically insupportable?

Impending privatization in Bulgaria was the subject of Laszlo Prikler's E-mail dated September 19th. It contains a lot of good advice about ATP licensing during restructuring. In this case, Dr. Kiril Tagarov of Energoproekt in Sofia, Bulgaria, had inquired using the EEUG list server. Prof. Prikler rightly responded privately, with copies to all moderators, *"because it is a business issue and not a technical one."* Dr. Tagarov had written: *"a process for the privatisation of the state owned company 'Energoproekt' PLC (where I am working) will begin on November 2nd 2001. ... This may affect my status as an employee, my E-mail, etc. Please advise me how to proceed if some changes arise, so that I don't lose my license and the permission to use ATP ..."* Prof. Prikler responded, beginning with EEUG membership fees for which money might not be available: *"The collected money is used to provide certain services to our members in Europe. Our policy makes available the 'EEUG products' to non-members with some time delay (1-2 years). Thus non-members will have access to most of EEUG supported developments after a while. Of course, for many of us, waiting this long for something useful would be unacceptable. But if one has financial constraints, the time might have less importance."* Next, there was the matter of altered legal structure: *"If the owner of the company will change, but the name, seat of the entity (the office address where you are sitting) and the person who signed the license agreement on behalf of the company will* ***not****, the ATP License will be valid following the privatization. But there is one exception: if the new owner is not licensable. E.g., if your new owner would be EDF in France, free access to ATP would be lost."* Dr. Tagarov had wondered about possibly transferring his license. Prof. Prikler observed that this is not possible: *"The ATP License is a non-transferable one. If the person who has signed the*

paper does not belong to the company ... he/she or the company must apply for a new license. Additionally, if new circumstances prevent compliance with conditions of the ATP License Agreement, the license terminates itself automatically." Dr. Tagarov had concluded with the hope that finances of Energoproekt might improve following privatization. Prof. Prikler concluded: *"I do not want to be destructive, but our experiences in Hungary show something different. After privatization, everything became more complicated ..."* Yes, there exists the theory of privatization or deregulation or restructuring; and then there exists reality. This distinction seems true anywhere in the world. Politicians propose change in the name of reform, but reality never seems to fulfill the promise. The best example of all is electricity re-regulation in California (see all 4 issues of last year). The politicians had no idea what they were doing. Perhaps Bulgaria has a better chance. After all, privatization implies natural market forces, which clearly were overlooked in California.

Pocket Calculator Used by PCVP

Demands on $PARAMETER continue to increase without obvious limit at UPC in Barcelona. In E-mail dated March 27th, Prof. Martinez explained: *"we need at least 1000 variables or parameters and no fewer than 200 $PARAMETER blocks."* These were provided the following day (actually, the maximum number of blocks was expanded to 300). About the trend, your Editor was somewhat philosophical: *"Well, we use LISTSIZE.FGH for high-order Pi-circuits, and that requires much, much more storage. In comparison, your request is modest."* The biggest burden is associated with those parameters, which require 30 bytes each. The 30 Kbytes is nothing, but storage in the form of two CHARACTER*15000 scalars provides growing cause for concern. The limit for old compilers such as F77 Salford is believed to be 65 Kbytes (addressable using 16 bits). Expansion beyond this is possible, but it would require reprogramming. Another hidden limit is 2000 for the maximum total number of symbol references. Should this be increased? Correction July 6th : The just-mentioned storage was provided March 28th as stated. However, the associated error traps were not updated correspondingly. As a result, Prof. Martinez needed to repeat his request on July 5th. This time, your Editor changed the IF statement and text of the error message in MATDAT to limiting values 1000 and 15000. Corrected Watcom TPBIG was supplied the following day.

Superposition of two Type-10 analytically-defined sources was illustrated by the 1st subcase of DC-22. This operated correctly. What did not, prior to a modification of POCKET on May 12th, was the superposition of 3 or more. The trouble first was reported in E-mail dated April 12th from Orlando Hevia. To verify the generalization to more than two, DC-22 data was slightly modified. The second source at node PULSE, which had constant value -.25, was split into two parts : -.10 and -.15 (since the total is unchanged, the resulting solution also is unchanged) . Warning : present logic for Type-10 analytically-defined sources would seem to require contiguous data. I.e., all sources that are to be superimposed at any particular node must be grouped together in data. The use of NAMLHS (LHSTOT - JSAME) within POCKET seems to require this.

PCVP loop index KNT was in conflict with the energization number of STATISTICS prior to separation of the two as summarized in the July, 2000, issue. At the time, your Editor wrote: *"Neither data nor .LIS file has changed for any test case."* True for standard test cases DC*.DAT, but less than the full story as first reported by Marta Val Escudero of ESB International in Dublin, Ireland. From the EEUG list server, her semi-public report of trouble had *"Subject: MODELS and parametric studies."* This was September 18th, when she described *"a family of simulations (MAXKNT)"* that she wanted to halt upon the detection of *"a certain condition. The way I am trying to do it is to change the ATP variable MAXKNT to the current simulation counter (KNT) when a condition is matched in an IF sentence. What I have experienced is that this procedure only works for the ATP versions distributed in 1999 (Watcom and GNU) by the EEUG, but not for the 2000 distribution (I haven't tried the 2001 version yet). Is there any significant difference in the versions? Is there any parameter that I should change?"* The answer to both questions is *yes*, as your Editor explained later that same day. For MODELS access to the internal PCVP counter, ATP(KNT) must be changed as just now documented on comment cards in the 11th subcase of DCNEW-25.

Hoidalen Improves ATPDRAW

Does ATPDraw fail to pass the user-supplied decimal point of a floating-point number along to ATP for a simple, uncoupled capacitance? This was the suggestion from Dr. Michael Steurer of CAPS at Florida State University in Tallahassee. His E-mail dated August 2nd explained: *"I entered the number 1.32629119E4 for the value of a capacitor in ATPDraw. ... However, the value was placed as 13264 in columns 40 through 44 in the branch section by ATPDraw, exactly where the number should be according to the Rule Book page A4-2."* But because EMTP read the number using E6.2 format, there is an implied scaling factor of 100, as Dr. Steurer observed. In his response the following day, your Editor denied responsibility: *"ATP is older. Dommel established the original series R-L-C data rule more than 30 years ago. It has not been changed since then. As a general rule, we try to maintain compatibility with old data. ... I am not happy with implied decimal points, but they are a sign of the times. Dommel had only narrow formats, and the implied*

decimal point saved one byte in many cases. If only 6 columns are available, this could be important. Of course, today, no one cares. Today, we have the wide alternatives, and extra bytes no longer imply more trees (to make punched cards)."

ATPDraw version 3.0 comes from Prof. Hans Kristian Hoidalen of the Norwegian University of Science and Technology in Trondheim, Norway. Availability was announced using the EEUG list server by Deputy EEUG Chairman Laszlo Prikler, who wrote as follows on October 12th : *"Dr. Hans Kristian Hoidalen has just issued a new version of the program that is available for licensed ATP users through the EEUG secure web site ... Below you can find a short installation guide and read Dr. Hoidalen's original message."* Skipping the 6-step section entitled *"Installation"* and the 6 entries of *"Bug fixes"* leads to a section entitled *"New features in the program."* This seems to be a summary of a more elaborate-presentation at the EEUG meeting in Bristol, England, during September : *"The news are reported in proceedings ... /secret/atpdraw/version3/eeug01_hkh.pdf*

1) Grouping: The user can select a group of components and select Edit | Compress. This result in a single icon replacement of the group with user selectable external data and nodes. Multiple levels of grouping is allowed. A new example file Exa_4b.adp included in the ATPDraw 3.0 distribution.

2) Variables. The user can specify a text variable instead of a data value. The $Parameter cards are specified under ATP | Setting / Variables. The user does not have to think about resolution and the number of digits used in the ATP cards. This is a powerful method if the same data value is used several times in a circuit (the user does not have to click up all involved input windows).

3) Cable Constants is supported along with Cable Parameters for cable systems. This gives a more flexible grounding scheme and adds support for Semlyen cable models. Multiple PI-segments are supported.

4) Printed output for line modelling is supported for PI-equivalents. The PI-equivalent is still written as inductances in ohms, while the unit of capacitances is user selectable. Proper handling with $UNITS will be introduced in version 3.1.

5) Rubberband connections. The user can select Rubberbands under Edit. A connection with one endpoint inside a selected region and one outside is treated as a rubberband (does not work for short cut single component selection).

6) The support files for all standard components (including TACS) are stored in a single file ATPDraw.scl (standard component library). 4 files (ATPDraw.exe, ATPDraw.scl, ATPDraw.hlp and ATPDraw.cnt) are required for the distribution of ATPDraw 3.0.

A version 3.1 is under development with an improved Verify module for lines and cables. The file formats are unchanged."

Creative ATP Modeling

VERIFY U.M. COMPENSATION (VUMC) is a request that became effective in its long form on May 23rd. This addresses the problem of Gabor Furst's missing KILL = 9 termination as explained in the April issue. Special code has been added to OVER16 (this is within the dT loop) to detect possible overlap of U.M. compensation with List-9 (non-U.M.) compensation each time [Z-thev] is calculated. This is for the dynamic logic, not the static logic of STEP ZERO COUPLE (the static logic never was troubled, recall). With the VUMC addition, the dynamic logic of OVER16 no longer is defective for the 6th subcase of DCNEW-16. Separate code was used because, as stated, *code is complicated, and your Editor does not want to make any change unless and/or until he is sure it has no adverse effect for other data.* VUMC should be completely safe for any data, whereas modification of the old logic probably would not have been. Later, VUMC could be made mandatory and automatic for U.M. data cases. But until confidence has been built, your Editor wants the user to be able either to use, or to ignore, the new logic. Of course, the new logic is not free. The experimental verification each time [Y] is retriangularized **does** slow execution. By making the addition voluntary, the user is able to avoid this added burden, if he wants. Safer and slower U.M. simulation is not mandatory.

TACS seems to be the alternative that was used at Florida State University in Tallahassee to model the 6-phase machine. In E-mail dated June 14th, Dr. Steurer reported: *"But let me first tell you the good news: We managed to develop a model (in TACS) for a 6 phase synchronous machine. And it is stable!"*

An Application Program Interface (API) to ATP would seem to be the more general and learned way to refer to the connection of another program to ATP in order to enhance ATP simulation. The idea is not new, with Gayle Collins first making the most famous request, which was for the assistance of MATLAB (see the summary of Harald Wehrend's success in the July, 2000, issue). In semi-public E-mail of the EEUG list server dated August 2nd, another request was made --- this one by Dr. Michael Steurer in Tallahassee. He explained : *"An API allows different programs to interchange variables during runtime and therefore allows ... linking simulations performed in different programs together dynamically. ... We are simulating the power system of the US Coast Guard icebreaker Healy, which has an electric propulsion drive. The entire drive system was manufactured by ALSTOM, and so was the motor controller. Eventually, we would have access to a compiled version of the ACSL model (Advanced Continuous Simulation Language, distributor http://www.AEgisTG.com/ACSLCUT/ACSLCUT.html) of this controller. Therefore we would not interfere with any proprietary issues ... ACSL does provide an API interface*

to communicate with models in other simulation environments, so the idea would be to incorporate this model into our ATP simulation to control the drive motor. Has something similar ever been done before? Could it be done with ATP?" It does seem to your Editor that MATLAB might have provided one API and ALSTOM another. For such successful hybrid simulation, an existing interface must be exploited by ATP, of course. But beyond this mechanical detail (not necessarily trivial), there is the general algorithmic challenge: can the computation be split into two halves that are performed alternatively? Is this segmentation of the burden both feasible and practical? As far as your Editor can imagine, *the devil is in the details.* I.e., some are feasible and others are not. As a second example of successful hybrid computation, do not forget Ms. Concetta Pragliola of Ansaldo Transporti in Naples, Italy, as mentioned on the final page of the October, 1990, newsletter. This was real hybrid, using real (not simulated) controls. Ansaldo hardware was connected to VAX/VMS ATP using that alternative copy of ANALYT named ANALYS (see bottom 2/3rds of the .SPL file). Your Editor recalls that success later was reported in some issue of LEC's *EMTP News.*

Nonlinear capacitance C(v) was of interest to Dr. Ivan Dudurych of University College in Dublin, Ireland, who first established contact via a submission to EEUG list server moderators on October 15th. That message did not mention capacitance, but a following private clarification did: *"What I need is to change a voltage of some node at the point of the integration in order to simulate switching of pre-charged nonlinear capacitor (I represent one as a current source 17 controlled from MODELS). How can I find out the names of these variables in order to use them in DEPOSIT procedure in this case?"* Your Editor responded: *"Nonlinear capacitance is discussed from time to time. I have thought about adding it as a nonlinear element, but have never found a general use that seemed common enough. So, anyone who wants it devises his own, as you seem to be doing."* What do readers think (do others also have interest)? About the DEPOSIT function of MODELS, your Editor had written: *"Using DEPOSIT requires the names of program variables. Depending on how much you know, this may or may not be usable."* Privately, Gabor Furst had added: *"I too struggled with this when developing the ... Backflash.dat lightning model. The average user has no idea what the program name of a, say node voltage, is ... Moreover, he doesn't even now how to define a program variable which he can change at will in MODELS, to do certain things, independent of the network. An example I had for this in Backflash was to create three independent and different random functions. This goes back to some of our discussions way back in 1996. I thought that one way to partially solve this problem and even allow the DEPOSIT function work in a statistical analysis would be to create a special list that is retained between two simulation steps. We now do have of course another way of doing this with the pocket calculator, but that does not solve Dr. Dudurych's problem."* Concluding question: is there general interest in nonlinear capacitance? If so, need obviously could be satisfied. But in the absence of practical demand, your Editor is hesitant to begin work.

Frequency Scans and Harmonics

The .GNU output for GNUPLOT was corrected May 4th for cases involving HARMONIC FREQUENCY SCAN (HFS). This follows the observation of Bernd Stein of FGH in Mannheim, Germany. In E-mail dated April 3rd, Mr. Stein explained that the 4th subcase of DCNEW-26 produced a correct plot (a bar chart) on the screen, but erroneous corresponding .GNU output. One month later, a change to SERIES produced the following improvement to the first 4 harmonics (5 through 11 were unchanged):

```
     Old results          New results
  1  2.6812389E+00    1  1.3983103E+03
  2  4.3200000E+02    2  0.0000000E+00
  3  1.3983103E+03    3  2.6307739E+01
  4  1.0000000E+00    4  0.0000000E+00
```

Of course, the fundamental (harmonic 1) should dominate, and it now does. About other standard test cases, a total of 26 *.GNU files are produced by RUN.BAT, and only two were affected. DCNEW-21 also was affected, with just the first harmonic changing, but in all 3 locations (3 bar charts are produced by the 19 subcases).

Mingw32 Overloads Windows 2K

"Mingw32 ATP problem: Win 2000 overload" was the title of an inquiry by your Editor using the EEUG list server on October 1st. The trouble was described as follows: *"Mingw32 ATP no longer executes properly on this PC at BPA. Execution of many data cases (e.g., DC-19) will abort quickly. MS Windows opens a small window, and this mentions that an error log is being generated. After days of experimentation, it has been concluded that resources of MS Win 2000 are inadequate. Specifically, execution dies while trying to connect a scratch file to I/O unit 52 within CRDSAV. There is some similarity to the problem of the July and October, 1999, newsletter paragraphs that began: 'Crippled and unusable LUNT10 = 10 ...' This time, the problem is more serious because the I/O unit number is buried in code. ... Dr. Ali Moshref of Powertech Labs ... first mentioned 'temporary files created by TPBIG in the \Windows\temp directory or any other temporary directory ...' This worked for Win NT, but does not seem to solve the problem for Win 2K as now being used."*

Dr. Sven Demmig of Bewag in Berlin, Germany, was the one reader who confirmed the previous report of trouble. Others reported no trouble, but Dr. Demmig reported comparable trouble in list server mail dated October 2nd: *"I have experienced the same trouble with Mingw32 ATP using Windows NT 4.0 and Windows 2000. A year ago,*

when I was running Mingw32 ATP using Windows NT 4.0 deleting all the files in the temp directory (and I think even in the recycle bin) solved the problem (i.e. I was able to run Mingw32 ATP again). Now, however, using Windows 2000, that doesn't help anymore. The strange thing is that I had been able to run the same data cases before without any problem."

Avoidance of STATUS = 'SCRATCH' for the unit 52 file (see opening paragraph) was adequate to avoid trouble on Dr. Liu's computer at BPA. One day later, your Editor explained that the following 4-line program dies exactly the same way as GNU Mingw32 TPBIG does :

```
PAUSE  ' PAUSE b4 open of 52.'
OPEN ( UNIT=52, STATUS='SCRATCH' )
PAUSE  ' After open.  It worked.'
END
```

Furthermore, if 52 is changed to 57, execution is normal! Unit 52 as a scratch file uses some resource that is unavailable on this PC running Win 2000. Are there any other good reasons not to buy a newer copy of MS Windows from Bill G? Maybe this story, too, should be moved under the title of brain-damaged MS software!

Robert Wheat of Los Alamos National Laboratory (LANL) in New Mexico correctly diagnosed the trouble using nothing more than the preceding description. He wrote: *"TPBIG is **not** at fault! The error is occurring because of some faulty communication between the operating system and code that the MingW32 compiler inserts into the executable at link time (I believe). ... I believe I have reproduced the problem here ... Apparently, when an OPEN is executed, there is some background housekeeping that occurs. The program, as compiled by g77, creates a temporary file of its own in the directory pointed to by the TMP system variable. ... Type SET at a DOS prompt to view the system variable settings. ... The problem was with UNIT = 52. ... The first attempt at creating a temporary file ... is to use the name 'fort.522'. If this file exists, then the next name tried is 'fort.523', etc. until the name 'fort.529' has been tried. If files with all of these names exist, then the very last attempt at creating this temporary file is to try the name 'fort.52'. If this fails, then the result is a program crash at the system level. ... Another example of Windows Garbage Collection ! "* Yes, and this suggests a more appropriate name for the next MS release: Windows GC .

Win 2K scratch files can be moved as explained by Robert Wheat in a later, final tutorial message. In response to your Editor's message number III, this was number III.5 : *"To change Windoze 2000's default 'TMP' path to something a little more reasonable, for example 'C:\Temp', follow these simple instructions ... 1.) Right Click on 'My Computer' (located on the desktop). ... Single click on 'TMP' in the list and then click the 'Edit' button. Change the 'Variable Value' field to the path you would like it to be and click OK. You can also edit the value of the 'TEMP' variable, which some programs use in a similar way as TPBIG (actually, the g77 compiler) uses 'TMP'. At this point, you may want to consider modifying the values for the 'TMP' and 'TEMP' 'System Variables' (bottom half of the dialog box) as well. This should limit the number of places that Windoze uses for it's garbage collection."*

Of course, *Windoze* is a pun that was used without explanation in the July, 1995, issue. The term first was seen in E-mail from Robert Meredith of the New York City dated 25 December 1994. Nearly 7 years later, an expert user of MS Windows changes *dows* to *doze* (as in *sleep*) to make the point that Bill G has done some less-than-inspiring things with windows during recent years. The time is right for a more general discussion of technology-challenged MS. *"Breaking Windows: how Bill Gates fumbled the future of Microsoft"* is the title of a new book by David Bank, a reporter for the *Wall Street Journal* (America's dominant business newspaper). Your Editor was alerted to this book by listening to a long interview (perhaps a full hour) of the author on the Ralph Steadman radio talk show (KPAM, AM 860) during the evening of October 2nd. This referred to a summary of the book at **www.breakingwindows.com** Barnes and Noble then revealed: hardcover, The Free Press, $20.00, 287 pages. An excerpt from the author's advertising follows. The book *"tells the story of the battle for the soul of Microsoft that raged inside the company from 1997 to 2000 and continues to reverberate today. Drawing on hundreds of e-mails among Microsoft executives, trial testimony, and exclusive interviews with Gates and his chief lieutenants, Wall Street Journal reporter David Bank reveals the bitter maneuvering between what he calls Microsoft's 'Windows hawks' and its 'Internet doves.' On one side were the fierce defenders of the hegemony of Windows, on the other those who championed a new way of doing business based on the Internet's 'open standards.' The reformers wanted to break free from the legacy of Windows and dare to compete on the merits of their software. Bank argues persuasively that the rifts within Microsoft underlie many of its recent troubles -- from the antitrust courtroom debacle to the exodus of many of the company's most talented employees to Gates's own fall from grace as a corporate leader and technology visionary."*

Orlando Hevia in Santa Fe, Argentina, proposed the solution that Dr. Tsu-huei Liu and your Editor like the best: `DEL %TMP%\fort.*` I.e., touch neither Mingw32 ATP nor MS Windows. Instead, erase all the associated scratch files using MS-DOS. This is out in the open, visible to all, and modifiable by anyone. Program developers have added such cleanup to RUNTP.BAT along with comments explaining the need. Robert Wheat, too, seemed to like this alternative : *"Great! And actually, users should consider deleting everything in this garbage collection directory. According to what I know, programs can freely use the TMP or TEMP directories, but are trusted to clean up behind themselves. (Actually, it's the programmers who are supposed to do this.) When I first found the default, deeply nested temp directory, it was occupying **several hundred megabytes** of disk space!"*

TEPCO Improves S.M. Model

SOLVSM and KILLCODE were updated September 7th in response to E-mail from TEPCO (Tokyo Electric Power Company) in Japan. SOLVSM is the solution module of the Type-58 and Type-59 S.M. within the dT loop, of course. Changes were explained by Atsushi Kurita as follows: *"(2) Small modification of type-58 synchronous machine model. We received e-mail from Dr. Antonio Carlos Siqueira de Lima <acsl@ons.org.br> who works for National System Operator in Brazil. He pointed out that the type-58 SM model showed some wrong result in the absence of a disturbance. Mr. Xiang-lin Cao of Toden Software Inc. (TSI) examined the data case, which involved four generators, with one of them saturated. He found that numerical instability occurred from prediction of the linkage flux, which was used for the equivalent conductance calculation. Mr. Cao changed the prediction formula, and checked it using several data cases including his data case. He explained that it is the best among the several prediction formulas at present, but no theoretical background."* About theory of the Type-58 S.M. model, there is hope for English-language publication : *"We wrote and submitted a paper to Japanese Electrical Engineering Society, of course in Japanese. We expect to translate to English -- hopefully by the end of this year."*

NIOMIN is a parameter of the Type-58 and 59 S.M. that has not been mentioned before, and which was not found within standard test cases DC*.DAT prior to October 14th. Definition of NIOMIN = 8 was added to the first subcase of DC-26 in order to produce agreement among the 3 program versions (Salford, Mingw32, and Watcom) that continually are being verified. Comment cards near the start explain recent small changes : *"Answers change slightly on 10 February 1999 following the massive changes from TEPCO (Tokyo Electric Power Company) in Japan. See April newsletter. Most extrema agree to 5 or 6 decimal digits."* Finally, after noting that Watcom ATP disagreed a little with Salford and Mingw32 ATP (each of which agreed with each other), your Editor spent a day investigating. What he found was this: answers differ because the number of Type-59 S.M. iterations differs. I.e., this is where differences larger than roundoff error suddenly begin. Recall a paragraph of the October, 2000, newsletter that began: *"Switching within JMARTI SETUP is yet another computation that is susceptible to roundoff error ..."* Well, the speed iteration of the S.M., too, is susceptible to roundoff error. This is what your Editor found. There is no trouble with the compiler or the code (good news). Rather, slightly different arithmetic produces slightly different solutions. Eventually a time step and an iteration and a machine are reached where the change of speed is just about exactly equal to the convergence tolerance (the default value EPDGEL = 1.E-16 is being used). One program version will have a value slightly less (so the iteration will terminate) whereas the other will not (and hence will perform an additional iteration). Of course, changing EPDGEL will change the number of iterations, but your Editor found it more convenient to use the minimum number of iterations NIOMIN (the default value was zero, meaning it was not being used). Yes, answers to DC-26 changed once again, but at least now all three .LIS files compare easily enough using Mike Albert's freeware FC. Not much science went into selection of value 8. It was noted that 10 was adequate whereas 5 was not. So, 8 was tried; it worked, and was adopted.

78 MODELS Test Cases of Dube

SUBTS3 and REQUES required modification of ISPRIN (the index that counts down to zero for printout). Dube's COMB1I had 2 extraneous outputs as explained on comments in SUBTS3. Without really understanding why no one ever complained about such differences before, logic was modified to prevent the extra output. But then output of a standard test case (DC-40, as your Editor recalls) was found to be different, so a compensating change was made to REQUES to prevent this. In the end, all new output agrees with all old output. Even though not completely logical and consistent, this decision seemed to be the most practical. Changes to code were made with this goal in mind.

S.N. 2937 of INNONL dates to December of 1999, and it was wrong. In the April, 2000, issue, Dube's use of `(6HMODELS)` was mentioned. The trouble in INNONL involves the different character string `(6HN )`, but was similar in type. Your Editor clearly did not understand what Dube was trying to do. Your Editor had attempted to replace the fixed name N by a name that was serialized using the numerical value of index N. But TYP94-T4 then failed to enter the dT loop, so your Editor restored the fixed name (albeit in modern form to avoid the Salford compiler warning that was a response to Dube's coding).

CURRTEST involved an illegal request for node voltage output. Dube's data card had columns 1 and 2 blank, and the following in column 3 onward: *"{No node voltage printout"*. But ATP erased the inline comment as it was supposed to, leaving nothing. The result was a blank card ending node voltage outputs. I.e., there was an extra blank card. As a separate data case having no batch-mode plotting, this made only a cosmetic difference. But for use with following subcases, execution was being terminated unexpectedly. So, the output request was removed by commenting.

ERRSTP is one of Dube's subroutines that is not appreciated. It exemplifies one aspect of MODELS structure that obviously is inferior: too many subroutines. Subroutines are not free. Although Dube did avoid the gross inefficiency of arguments, he was left with the burden of repeated CALL statements within the dT loop. Recall

that famous observation by Meredith and Schultz about *"extremely poor programming technique"* (see the January, 1997, issue). Your Editor believes the CALLs are sufficient to explain much of the unacceptably slow (e.g., tenth-speed) simulation of MODELS. Yet, this involved just the loss of speed. No functionality was lost. But inability of MODELS to recover from errors represents precisely such a loss of ATP functionality, and ERRSTP is involved. TACS can recover from an arbitrary number of fatal errors without difficulty, and resume the handling of following stacked data subcases. But MODELS can not, in general. Why? Dube's excessive modularization is believed to be the culprit. MODELS was supposed to be new and improved TACS, but it turned out to be inferior in several ways; and inability to recover from an error is one of these. Dube has so many subroutines, and he calls ERRSTP from so many different locations (e.g., XPRI has 25 CALL ERRSTP statements, COMB has 9, PTACS and INIT each have 6, etc.), there was no easy way for him to pass control back to dT-loop interface module TACS3 using a normal RETURN. This would be for a normal KILL termination to ATP execution. Since Dube could not do this without expensive change, he instead added a CALL MAIN10 statement to the bottom of ERRSTP. This seems to work acceptably for Salford EMTP. Following appropriate modification, your Editor demonstrated without difficulty ten consecutive uses of ERRSTP followed by the 74 remaining non-uses), so perhaps we all should be grateful for small blessings. It could have been worse. A recursive subroutine CALL is involved, and some computers or compilers probably would trap such non-standard F77 use immediately. Believing Randy Suhrbier's advice in the July, 1993, issue, the VAX compiler seems to have been troubled this way. At the time of that explanation, your Editor was not thinking in terms of error recovery, but he certainly is now. Since Dube's ERRSTP does not comply with F77, the associated data named ERRSTP has been handled exceptionally. First, it was forced last to ensure that none of the other 74 test cases might be omitted, for some other program version. But following success using Mingw32 ATP, it was decided that ten consecutive copies of ERRSTP at the beginning should be the standard form of DCNEW-28 beginning April 23rd.

C language of user-supplied source code is not yet being used, so 3 of the 78 test cases are ignored (see comment cards near the end of DCNEW-28) . Eventually, the C should be added, since user-supplied source code is an important attribute of MODELS. Recall that creative use by SEG's Harald Wehrend, was summarized in the July, 2000, issue. Years ago, copies of Dube's original C-language code for Salford was given to various persons for conversion to other compilers, so it certainly exists somewhere. If no reader offers to supply a copy soon, your Editor and/or Dr. Liu probably will begin looking harder. Although your Editor does not have the Salford C compiler at home, BPA has it at work, so operation can be verified there. This then would be comparable to what already is being done for Noda frequency dependence.

That order of N**2 / 2 operation (see an earlier paragraph) eventually bothered your Editor enough to extend the logic of SYSDEP to avoid it. First, the entire day April 13th was wasted in an attempt to rewrite .PL4 logic. Although results seemed nearly right for Salford, your Editor quickly began to worry about corresponding changes for other compilers (SYSDEP is installation-dependent, unfortunately). Following overnight thought, your Editor realized that a simpler, isolated patch would be more practical, so this is what was used. Changes are limited to additions involving ANSI14 (also see UTPF idents WSM01APR) .

COUNTDC was mentioned in the October, 2001, issue, where 435 was stated to be the total number of DC*.DAT subcases. But that was prior to the addition of DCNEW-28. Adding the 75 of the present story, and updating the count for the remainder, raises the total to 529 on November 7th.

California Electric Power Crisis

Disaster did not strike California last summer and fall. Your Editor's conclusion is simple: It is easy to reduce peak demand by 10% or 20% when so much is being wasted. This was California's hidden resource: typical American waste. As Benjamin Franklin observed more than two centuries ago, *"a penny saved is a penny earned."*

"California's electricity crisis rooted in many failings" was the title of an *IEEE Spectrum* story that began on page 24 of the February, 2001, issue. About the role of self-described environmentalists, a paragraph heading was entitled *"Strict environmental rules."* Under this, one reads: *"... one reason no major new power stations have been built was because it was impossible to get necessary permits. Second, some of California's fossil fuel plants had run so many extra hours during the summer that they used up their emissions credits."* About good intentions as opposed to understanding of engineering and economics, the opening paragraph begins: *"The year 2000 finally delivered calamity. California's electricity market has collapsed, sunk under a tidal wave of unforeseen consequences."* Conclusion: beware of politicians.

Juan Martinez Stresses PCVP loop

Negative IPRSUP in STARTUP first was mentioned in the April, 1996, issue. Recall this was worked out with Prof. Corwin Alexander of Oregon State University in Corvallis. His idea was to suppress all non-essential diagnostic printout. Well, on July 26th, the last of diagnostic output was removed for Prof. Martinez's PCVP loop over simulation. This followed changes to MAIN20, SUBTS3, OVER13, OVER12, OVER1, and SUBR1 . Size of the diagnostic file DEBUG.LIS

(created if IPRSUP = -2) now is independent of MAXKNT (the number of passes of the PCVP loop). In 1996, disk files were small and this new control seemed to be a little impractical to your Editor. But times and data have changed. Today, IPRSUP < 0 appears highly practical for the 5K passes of Prof. Martinez's PCVP loop. Since 1996, your Editor had been sloppy. He had not been careful to control new diagnostic output (e.g., for the pocket calculator). Well, the logistics of CASE03 were truly overpowering. When first executed, a 48-Mbyte .DBG file was produced! Today, using IPRSUP = -2, a 1-Kbyte disk file is produced.

The final bug of CASE03 was traced to the pocket calculator beginning July 27th. This was the important discovery: counter KONST was not being appropriately reset prior to the start of each new pass of the PCVP loop. After more than a day of trial and error, changes to MAIN00, MAIN10 and POCKET finally seemed to solve the problem. Limit LSIZ26 is applicable, and COMMON block VOLTI was not being protected against overflow. Each program version behaved differently because each involved different ordering of COMMON blocks, presumably. Salford EMTP seemed not to be bothered at all because VOLTI was followed by a lot of unused storage including huge JARRAY. This is a strength of the manual location of COMMON blocks (innovation attributable to Dr. Mustafa Kizilcay; see the January, 1991, issue). Unfortunately, program developers do not know how to exercise such control for Watcom or GNU ATP, so these versions behaved differently. Each died on a different pass, presumably due to different COMMON block ordering. Diagnosis was slow because your Editor did not know how to *set a watch* (DEC VAX symbolic debugger lingo from years past) for variables that were being overwritten. This is easy using the Salford debugger, but Salford EMTP did not exhibit the trouble, unfortunately. So, debugging was slow.

Overflow of List 23 within MCBANK is a potential danger of long PCVP loops just as for the more-familiar, long STATISTICS or SYSTEMATIC loops, the user is warned. This would be primarily for ATP versions other than Salford EMTP (which enjoys greatly-expanded space L23TOT for statistical storage thanks to ordered COMMON blocks). Precisely the same storage is involved. More seriously, prior to the correction of MAIN20 on July 28th, the error flag KILL = 1 was not being correctly recognized. Execution was not being halted, although the need was being appropriately signaled. The following day, binary flag NOSTAT was added to the PCVP declaration to allow the user to avoid statistical storage and tabulation if the value is unity. Another improvement was avoidance of the .PL4 file closure if plotting has been disabled by miscellaneous data parameter IPLOT = -1 .

"Voltage dip analysis using the ATP package" is the title of an IEEE paper that is being written by Prof. Juan Martinez and student Jacinto Martin Arnedo. A draft was received at BPA on July 5th, and the associated E-mail explained: *"we have finished the first document on the work ... Just look at the ATPDraw icons we are producing and the type of results we are interested in."* Yes, for readers who have been waiting to read in English about the industrial-strength use of $PARAMETER in Barcelona, this would seem to satisfy the need. Expect presentation soon (the 2002 PES meeting in New York).

$SPY provides the batch-mode connection to SPY as illustrated by DC-56 and DC-57. Prior to expansion on July 11th, such use was limited to 10 within any one data case. But larger numbers were needed by Prof. Juan Martinez. So, OVER1 was modified to allow a maximum of 99; and an error message was added (previously, execution halted without explanation).

Pocket Calc. Does TACS Supplemental

Variable names must begin with a letter of the alphabet. This is the initial assumption, and it follows logically from the POCKET calculator itself, which assumes FORTRAN rules, not Dommel's or Dube's rules. The restriction also is consistent with compiled TACS, note, because compiled TACS relies on real FORTRAN (which has such a rule). Later, the restriction might be relaxed, should there be need due to existing, incompatible data (e.g., Bob Hasibar's creation of DC-1, 2, and 63). Is there significant need? How many users have begun TACS names with numbers or other symbols rather than one of the 26 letters?

Standard test cases were modified February 11th to verify operation of TPC (actually, TAL was still being used at the time). A new 3rd subcase of DC-18 has the same solution as the 1st, and a new 5th subcase of DC-30 is the same as the 1st except for shortened simulation (600 steps rather than 3000) and less output. The new data subcases use TPC, of course. The only difference in the .LIS output is due to roundoff error, and this should be of no practical consequence for the 64-bit computation that today is used by all common ATP versions. Finally, a TPC declaration was added to the existing 1st subcase of DC-20 to demonstrate that there is no effect if there is no supplemental variable or device.

Watcom and GNU Mingw32 translations were verified February 12th, and this included use of the modified DC-18, 20, and 30. For F77, the new code seems adequately universal. But F95 Lahey has not yet been attempted because it is known that special work will be required. At the time, the added burden of F95 simply was too much for your Editor's mind, so he ignored the need. At some later time, this detail must be considered.

A possible error involving ABS(was removed on February 12th. This has nothing particular to do with TACS, although it first was observed using TACS data: that

RESID definition of DC-18 that involves 3 ABS(uses on the same data line. It is a little surprising that no one reported such trouble long ago (for $PARAMETER use). In any case, a correction was made at S.N. 8000 of POCKE4, and 3 following comment cards represent a note to your Editor that other functions (not yet modified) might be similarly defective. This is more unfinished business.

Speed of TACS simulation using assembly language was documented in the January, 1998, issue for 10 sets of the six variables TEST1, ... TWO? --- data as preserved in disk file MATHCOMP. Using your Editor's 133-MHz Pentium at home, and Salford EMTP, seconds spent in the dT loop were reported as follows :

```
Dube's original TACS, 60 variables :  106.21
TACS ASSEMBLY LANGUAGE             :   18.33
Original TACS, one dummy variable  :    8.46
```

The initial test of TPC execution within TACSUP (no CALL POCKET) was a little disappointing. February 19th, a single execution using real DOS (not Win95) gave :

```
TACS POCKET CALCULATOR, in-line code:  24.23
```

Immediately, your Editor realized that the old (former) TAL code involved fewer questions (IF statements) for each supplemental variable. The failure to account for supplemental devices was one, as already noted, although nothing could be done about this. However, three other questions looked promising: 1) possible diagnostic printout; 2) possible COMPILED TACS MAKE use; and 3) possible use of TPC. Also, some scalars (e.g., variables N1, N1SAVE, and N2) were being defined even though not needed for TPC use. Finally, the debugger was turned on. All of these represent small effects for Dube's code, but they had become important as speed increased (the new TPC alternative). Removing the non-essential code, and turning off the debugger, did reduce the time substantially. Taking the average of the best 5 of 6 consecutive executions using real MS-DOS :

```
TACS POCKET CALCULATOR, in-line code:  19.21
```

Subtracting the single-variable time from each of the others provides an estimate of the time required by the math itself :

```
Dube's original TACS,  60 variables :  97.75
Old TACS ASSEMBLY LANGUAGE (TAL)    :   9.87
TACS POCKET CALCULATOR, in-line code:  10.75
```

The TAL ratio of 9.9 has dropped to 9.1, representing a realization of about 92% of the 1998 promise. This should be close enough for celebration. Keep the progress in perspective. This is all TACS, which is relatively fast compared with Dube's newer MODELS (recall MODELS was where concern about speed began). Speed of the new TPC alternative is more than 69 times the speed of MODELS (from the previously-mentioned 750.11 sec).

The preceding MATHCOMP data was made available to everyone as a new 4th subcase of DC-18 beginning February 23rd. The original miscellaneous data cards have been preserved on comment cards, should any reader want to verify the preceding timing. But for use as a standard test case, faster execution was desired, so dT was multiplied by 100, and output frequency was modified accordingly.

Partial Table Dumping (PTD)

Salford DBOS-supported programs running on older hardware are not as favorable to Schultz's LU2RED technique as was Mingw32 ATP running on Pentium III (see the preceding issue). This is the bad news: no one technique is best for all compilers, all PCs, and all sizes of ATP data. Consider your Editor's 133-MHz Pentium at home. Prior to testing Dr. Liu's P3, separate small program TIMERAS was timed at home within a DOS window of Win95. Only 800 (not 8K) passes were made, and timing was by DBOS CLOCK@ which produced (in seconds) :

```
LENGTH :    2   32   128   512  1024  2048  4096
LU2RED : 2.31 2.20  2.20  2.31  2.47  2.75  3.24
In-line: 2.20 2.20  2.31  2.69  3.19  4.23  6.26
```

As expected, there was no extra flashing of the disk light (beyond the usual strong pulse every second or so). So why the much longer times for short vectors (the left side), even though the task is only 1/10th as burdensome? Had this test been performed in 1993 when Schultz provided his turbo code, your Editor might have had second thoughts about modularization using LU2RED and LU2WRT. Although modularization is never slower, it becomes significantly faster only for long vectors (512 words or more). For 4096 words, the difference is significant, but not great. One can read 4096 words in about twice the time it takes to read a single word! Using Salford DBOS at home, the initiation of READ itself is the bottleneck, and it requires 165 times (2.31 * 10 / 0.14) as long as using Mingw32 on Dr. Liu's Pentium III. Whether inside separate LU2RED or not, about 2.9 msec is required for each READ from disk. This is not good, for the reading of supposedly-cached data from disk. For small chunks of data, the cache seems ineffective.

Why use Win95 (the preceding paragraph) whereas normally your Editor uses ordinary DOS to support DBOS execution? Because ordinary DOS was substantially slower. SmartDrive, declared within AUTOEXEC.BAT as c:\dos\smartdrv 2048 2048 seemed to be ignored. Times using real DOS began at 4.50 seconds (for 2 words). The lack of SmartDrive seemed clear from an attempt to use Salford disk caching as an alternative. After removing the SmartDrive line from AUTOEXEC, the PC was rebooted. Then, following the switch to real DOS (an alternative of "Shut Down" within the "Start" menu), your Editor started DBOS using the command DBOS /DISK_CACHE But the first line of DBOS output is a rejection message: *"DBOS disk cache cannot be run with the VCPI."* Continuing, comparable times (beginning at 4.50 seconds for two words) were observed. Later manual execution of the SmartDrive command provided about 20 lines of clarification. First, there is confirmation that the full 2 Mbytes would be used under Windows (*"Cache size while running Windows: ..."*). Then a table showed the caching status of the various drives. Drives C and F included this qualification as a footnote: *"* Compressed drive cached via host drive."* It would appear that SmartDrive is not being used under real DOS because of the compression.

The disk itself is cached, and this seems to be less than fully effective (as measured by MS-DOS SmartDrive) .

The 486 DX2-based PC used for F77 Salford compilation at BPA is not handicapped this way. It offers no disk compression, it is SmartDrive-compatible, and it proved to be nearly as fast as your Editor's Pentium. One simplification is a lack of MS Windows (real DOS is the only alternative). Without changing anything, the following times in seconds were observed :

```
LENGTH :    2   32   128   512  1024  2048  4096
LU2RED : 2.31 2.25  2.31  2.42  2.58  2.80  3.63
in-line: 2.25 2.42  2.64  3.74  5.16  8.02 13.79
```

In addition to the same declaration of SmartDrive having 2048 Kbytes, it should be mentioned that newer DBOS is being used. At home, your Editor uses FTN77 version 2.66 dating to 1991 whereas BPA later purchased version 3.53, which dates to 1996. To demonstrate that disk is being cached, the SmartDrive line was removed from AUTOEXEC.BAT). Then times begin at 32.09 seconds (for 2 words and either method)! Note this implies 40 msec for each READ --- perhaps the random-access time of the disk.

Conclusion about differences between Salford DBOS and Mingw32 : Using DBOS, Schultz's modularization becomes significantly better only for much longer vectors. To speed Salford EMTP table restoration, typically it would be more important to minimize the number of READ invocations. But this is not possible using Schultz's modularization. As an alternative, might Mingw32 ATP better tolerate higher-level, in-line FORTRAN involving LUNIT2 (optimal Salford code)? Might this be the better compromise that could be used relatively happily by all?

Interactive Plotting Programs

Ten different alternatives for plotting ATP .PL4 files were mentioned in the preceding issue. While impressive, Prof. Prikler's table was incomplete. There clearly are other alternatives, and one of them even was distributed on the EEUG CD around the end of August. Quoting from EEUG Chairman Kizilcay's E-mail dated August 29th: *"New on the CD-ROM you will receive is 'ATP Analyzer', post-processor for ATP. Bonneville Power Administration gave us permission to include that program on the CD-ROM for members by the efforts of Mr. Prikler, Deputy Chairman."*

Double precision for MATLAB was lacking until September 8th when the need was satisfied by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. In E-mail of the EEUG list server, Mr. Hevia explained: *"I completed two programs: 1) pl482m.exe to convert double precision .pl4 files of C-like format to ASCII MATLAB format (20 digits). 2) pl482mat.exe to convert double precision .pl4 files of C-like format to binary double precision (8 bytes)"* of MATLAB .

The news about HFSPLOT continues (see preceding issue). In EEUG list server mail dated September 18th, author Gabor Furst explained: *"WHFSPLOT is the Windows/C++ version of HFSPLOT which has been available on the FTP sites. Whfsplot is a stand alone program not requiring any .DLL support in the Windows directory. The program is essentially the same as HFSPLOT, but has a number of refinements in terms of user friendliness. It enables the user to look at more than one .PL4 file at the same time, and analyze combined .PL4 files. The .PL4 file types that Whfsplot can handle are C-like and wide10, which were generated by the HARMONIC FREQUENCY SCAN request. Whfsplot is not yet on the FTP sites, but I will make it available to any licensed ATP users following an email request to me. I will appreciate comments and/or flagging of errors in the program."*

Miscellaneous Intel PC Information

Hewlett-Packard (HP) might absorb Compaq? This was the surprising announcement by the two companies late on September 3rd. Two days later, *"Analysts see problems ahead for HP-Compaq union"* was the title of a story by Staff Writers Ariana Eunjung Cha and Mike Musgrove of *The Washington Post*. Their summary began as follows: *"Wall Street reacted skeptically to Hewlett-Packard Co.'s $25 billion takeover of rival Compaq Computer Corp. yesterday, as investors wondered whether two companies with overlapping products and services can make their marriage work in a depressed technology market. Hewlett-Packard shares plummeted nearly 19 percent, sending its price to its lowest point since 1992, and Compaq shares slid 10 percent. At least one investment firm warned that Hewlett-Packard's credit rating could suffer ... and antitrust experts predicted the deal could face extended scrutiny by government regulators -- particularly in Europe. Some analysts questioned whether the companies could save themselves ... But others said the deal, although risky, may mark the start of a new round of consolidation in the industry ..."* Detractors *"regard the deal as further evidence that the market for computer gear continues to erode. Instead of talking about the possible power of the combined companies, these critics characterized the deal as a desperate measure for desperate times."* About the poor business environment: *"Sales of computer systems are expected to be 21 percent less in the United States this year than last, and HP has reported that its profits are down 144 percent from a year ago. Compaq also has had a year of dramatically lowered earnings forecasts and has announced that it is laying off 8,500 employees this year."* So HP and Compaq are trying to look more like IBM? *"IBM no longer sells home PCs in retail stores and has thrived by providing high-tech 'services' such as troubleshooting technical problems and creating customized purchasing, accounting, inventory systems and the like."* Daniel Kunstler, an analyst with J.P.

Morgan, is quoted as follows: *"The IBM model has taken 10 years to mature and a lot of investment. It's unrealistic for Hewlett-Packard and Compaq to believe that just because they are one they can match that."*

AMD K7 processors seem good for ATP use as an alternative to Intel. This was the conclusion of Laszlo Prikler of Budapest Univ. of T&E in Hungary. In October 16th E-mail of the EEUG list server, he wrote: *"Many of you shared his/her positive experiences either privately or via the list. Conclusion of the messages I received: no one has experienced any trouble with K7 when using ATP on either Windows or Linux. No bad news is good news, I think."* Yes, because AMD K7 should be cheaper than Intel for the same level of performance.

Miscellaneous Small Items

Arbitrary scaling of static (i.e., non-machine) source amplitudes began April 3rd with the introduction of the MULTIPLY AMPLITUDE BY (MAB) request. This really is a much-delayed continuation of the work on scaling that was described in the October, 1997, newsletter (see story entitled *"More about kilo-scaled voltages"*). Recall the 1997 story was the outgrowth of a suggestion by the late Robert Hasibar that lead to the INPUT KV AND KA request (see DC-39). There also was VOLTAGE SOURCES IN KV as illustrated by DC-37. The latest modification is related, but even simpler. It is being added as an illustration following an exchange of E-mail with Devin Van Zandt of General Electric in Schenectady, New York (inquiry dated March 29th). Recall your Editor had written: *"More will follow, no doubt, if the concept is well received by users."* Well, the MAB request illustrates a general procedure that might be applied to other data (e.g., switch cards) or other variables of the same data (e.g., times T-start and T-stop of source data). Note the advantage of modification within ATP: it is universal, and usable by anyone. If arbitrary data scaling were built into a data assembly program such as ATPDraw (another approach), it would be limited to users of that program. On the other hand, the down side of scaling as part of ATP input is increased complexity of input code, and slower input execution every time ATP is executed. This may not yet be a big issue, but it is a potential concern.

Portability of ATP among companies was mentioned in the April issue. An even more convincing explanation of this sort was received May 1st from an engineer in Ontario, Canada. On his license application, this person had failed to supply a company or department name (two lines of Prof. Kizilcay's Web form). Instead, he had written: *"I'm a power electrical engineer, and I need to use the program."* But your Editor clearly recalled the request from EDF in France (see the January and later issues), so was mildly suspicious of a possible connection to nearby Ontario Hydro (another DCG member involved in EMTP commerce). There seems to be no problem, however. Unemployment was explained to be the reason that no company name had been provided: *"I have dealt with load flow, and many places where I've applied for a job require the knowledge of ATP-EMTP Program ..."* Interesting. As North American economies continue to stagnate, more such interest in portable ATP might be expected.

LOSSY SATURATION is a new request to connect to a SATURATION-like supporting program that takes into account losses. This is another supporting program from Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. It became available in ATP May 11th when a new 10th subcase was added DC-13 to illustrate usage. The next issue should either summarize theory or refer to some other publication that does..

"Seconds after DELTAT-loop" is labeling of the 5th component of elapsed time in case-summary statistics, and this was erroneously and impossibly reported as a negative number for a PCVP loop over time simulations. The problem first was reported by Orlando Hevia in E-mail dated May 14th: *"Isolate the 8th data subcase of DCN25 ... The same error (negative time) is shown by the MAGVOLT data case."* Later that same day, your editor moved cancellation of the PCVP loop counter MAXKNT from MAIN20 to SUBR29, and this seemed to solve the problem.

Instability of the saturable TRANSFORMER component (STC) was mentioned at the end of the October, 2000, issue. It now is known that the paper by Prof. Xusheng Chen of Seattle University was published in IEEE *Trans. on Power Delivery*, Vol. 15, no. 4, October 2000, pages 1199 through 1204. Orlando Hevia is to be thanked for this information, which arrived by E-mail dated May 15th. Mr. Hevia had a copy in PDF format, and your Editor wondered how he had acquired it. Four days later, Mr. Hevia explained: *"I downloaded it from the password protected IEEE site. This site is for IEEE members. The files can be downloaded without extra money. Of course, I have a paper copy of IEEE Transactions, and I can scan it, but it is cheaper and quicker to download."*

EEUG chapters of the ATP Rule Book would be reviewed by your Editor if submitted no later than June 15th. This was the deadline imposed in E-mail dated June 12th, when your Editor wrote Chairman Mustafa Kizilcay as follows: *"I am willing to review what you now have. This is as a continuation of collaboration of the past, which I did not complete. Before Tsu-huei and I forge ahead with new material, I am willing to suggest corrections to your old material. But this is a time-limited offer, and it does not apply to the creation of more files in the future. I am willing to review what you now have. When that is done, Tsu-huei and I will reassess where the Rule Book effort stands, and what we should do next."*