Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Salford Compiler and DOS Extender

ATP compilation using FTN77/x86 version 2.67 failed after DBOS was replaced by the version 3.50 files described previously. This is a good illustration of how an old program usually will execute properly under newer DBOS --- usually but not always.   The new DBOS had been laid on top of the old in order to run a new copy of Taku Noda's fitter (see preceding issue). Without the new DBOS, this fitter had failed (not surprising since it was created using a newer compiler). Anyway, since ordinary ATP compilation is the more important at BPA, version 2.67 DBOS was reinstalled on Dr. Liu's 486 DX/2.

The /OPTIMISE switch to optimize compilation was thrown once again (see original mention in the April, 1994, issue) in the hope that operation had improved since it last was tried. Perhaps, but not enough to be adopted for regular use.   Unlike the version 2.66 test, today execution using version 3.5 does not die while running any of the standard test cases. On the other hand, 4 of the solutions (31, 41, 61, and 62) are obviously different based on a comparison using Mike Albert's FC.   For the record, DC*.OPT and DC*.NOP are the families of optimized and non-optimized solutions as stored in C:\ATP of BPA's 90- MHz Pentium. So, the conclusion is that Salford compiler optimization still is not reliable enough to be used by the general public. Yet, the lost potential is not believed to be great (recall the 10% gain in simulation speed for DC-1 using Meredith and Schultz's Watcom ATP). The issue is much smaller for Intel-based PCs than it would be for RISC workstations, where a factor of two typically is involved (most recently, recall the HP Unix experience of Meredith and Schultz).

LIMCRD values ending in 999 (e.g., 6999) have special meaning beginning March 31st. This is a special switch to solve a problem that first was observed by Jeff Peggs of Virginia Power in Richmond. DATA BASE MODULE was being used on a file of some 1300 input data cards, and there was overflow or overlapping in the output. Why? Because of automatic LIMCRD reduction logic

that used 500 as a reasonable limit on punched cards. Well, once upon a time (those days are long gone, it would seem). Rather than merely increase the fixed limit, it seems better to give the user a veto over the automatic reduction. It seems unlikely that any user would now have a value that is one short of an even thousand, so most likely the change will not upset much if any present usage.

COMPTACS is a new DOS parameter that allows the user of compiled TACS to choose between MAKE and USE outside the data file. If COMPILED TACS MAKE or COMPILED TACS USE **is** part of the data, the content of COMPTACS is immaterial. But in the absence of a request in data, the content of COMPTACS will be used. There are 3 alternatives: 1) MAKE 2) USE; 3) anything else (nominally blank, which is the default value). This usage began April 29th.

RUNTP.BAT is the batch file that executes ATP by passing its name and parameters of execution (arguments of the file) to DBOS utility RUNN77. It has been known for years, and occasionally is rediscovered, that positioning of the RUN77 command is not arbitrary. It should be, but is not. As distributed by the user group, there are two blanks preceding the /PARAMETERS declaration, and just a single blank between all other non-blank items. This spacing works for DBOS ver. 2.66 as used by your Editor. It may not be necessary, but it works. Some other spacing will not work. For example, if an extra blank (making two) is added both before the ATP program name and after the /PARAMETERS word, execution will die prior to data input because DBOS will report the first parameter to be the letter S (apparently the last letter of the /-declaration). Since unrecognized, it is taken as a disk file name. But no such disk file generally will exist, so there will be an error halt. Summary conclusion: the RUN77 line of RUNTP can be modified, but only with caution to preserve blanks.

Program BATCH.EXE can be used to create a batch file to execute Salford EMTP in batch mode for a family of ATP data files. A separate story explains details that include the return of compatibility with .TEX files.

Improvements to Salford TPPLOT

RMS is a new MATH command that was added June 6th to satisfy the needs of BPA's Jules Esztergalyos. It seems that the RMS (root mean square) value of a signal can be found using Randy Suhrbier's plotting program for DEC VMS, so it was requested for TPPLOT, too. Well, the capability now exists, subject to an important restriction: the time instants of the input signal must be uniformly spaced. So, for example, do not try to use SKIP with RMS. In theory, the use of SKIP should not pose any problem, but in practice the retention of relative extrema makes spacing non-uniform. The RMS meter has only one mandatory parameter: the floating point time for averaging.

It applies to the accumulator, so is not limited to an input signal (although @MATH7 illustrates such usage). Later, if need can be demonstrated, the RMS logic might be generalized to allow arbitrary spacing of time points. But that requires substantially more storage and code, and will execute substantially slower. So, the general case was not allowed initially.

OBSERVE PARALLEL MONTE CARLO (or OPMC in its abbreviated form) is the ATP request word that provides access to an interactive utility dating to 1988. See a separate, later story for details about this work on parallel Monte Carlo simulation using a PC with multiple Pentium Pros --- the idea of computer expert David Szymanski. Well, TPPLOT has been extended to include the original display capability. The following progress was reported to Szymanski in E-mail dated June 17th: *"The interactive monitoring of progress was by the OPMC command as coded for Apollo 9 years ago. It worked well with Apollo because the windows were scrollable, and I could copy and paste, too. But with Salford, this doesn't work, so I wanted to do something nice. Yes, I know DBOS will not run under an OS that supports multiple processors, so there is not a whole lot of future for this, but I wanted to do the work anyway. So I did. I added the OPMC sub-command to the FILE command of Salford TPPLOT. This operates in its own special temporary window, uses the mouse, and works well for all but the **Edit** command (not yet coded). To conclude, I have neat observation software, even if it will not run on the computer of expected usage."*

USE TPPLOT BEGIN is the ATP declaration that precedes TPPLOT data for purposes of batch-mode use as illustrated by DC-1 (where superposition and offsetting are used to separate 9 signals) and DC-63 (where WINDOW plotting provides the separation). Of course, the average user does not see such use because NOTPPL is set to unity as distributed by the user group. Well, from time to time the feature is tested, and often correction is required. One such adjustment was made July 18th. Prior to that, the required alignment of all COMMON blocks did not exist because storage associated with Walter Powell's pocket calculator (see April issue) had not been explicitly declared. In the process of correcting this mistake, it was discovered that the Salford linker, like the DEC VAX / VMS linker dating to 1979, allocates COMMON space based on the longest block rather than the first block. This is a tricky detail that should not be forgotten. VARDIM output (disk file NEWMODS) is fed into the linker first in an attempt to control dimensioning, but it will determine COMMON block sizes only if these sizes are bigger than all other declarations in all other code that is linked.

Program BATCH is summarized in a separate, later story. About TPPLOT, it should be explained that some thought was given to making BATCH some sub- or sub-sub command of TPPLOT just as OPMC (see preceding paragraph) was. This still could be done, although no such initiative has yet been started. In order that the reasons not

be forgotten, a summary of current thinking will be provided. First, there is apparent lack of need: With a convenient, small (9-Kbyte) utility available, why bother with a big program? In keeping with TPPLOT practice, the display window would need to be made smaller, and it is difficult to see why the user should want this. Following the creation of any new RUNIT.BAT (the default name of the output file), the user normally will want to look at the result first, and then use the result (execute Salford EMTP). Since execution is not possible from within TPPLOT, the user most often would be leaving, anyway. So why enter in the first place? DOS EDIT or Vernon Buerg's freeware LIST can be used more conveniently outside of TPPLOT than they can inside. If any reader has a different point of view that favors integration, he is invited to share it.

NINE.WIN is the latest illustration of WINDOW plotting. It follows SIX.WIN as mentioned in the July, 1996, issue. The limit of two full screens was eliminated July 24th, with an arbitrary number now allowed. The difference between SIX.WIN and NINE.WIN is a third screen containing three more windows. The HP-GL and PostScript output are unaffected by screen paging, recall (such output continues downward as far as necessary to represent all windows). In practice, the dimensioned limit of 9 windows now seems to provide the practical limitation to WINDOW plotting. Should this be increased? Who is using more, and for what? An expansion will be made if and when a practical need is demonstrated.

News from Outside USA and Canada

Credit cards can not be used to pay for the reproduction and shipping of ATP materials, as far as your Editor knows. Certainly Dr. Kai-Hwa Ger offers no such service from here in Portland (see LICENSE.ZIP of which pages 7 and 8 are Dr. Ger's order form). Neither does EEUG (the European EMTP User Group), as explained by Prof. Mustafa Kizilcay during his visit to BPA on June 27th. Cost was found to be prohibitive. If any other user group will honor international credit cards without a special added charge, send details in order that they might be summarized for future publication.

Wiring of money provides an alternative to credit cards for those who can not easily procure a check having the required magnetic encoding at the bottom (to allow free processing by American banks). No, wiring is not free, but it might be cheaper than using snail mail and a conventional check (recall the $60 collected by Citibank as mentioned in the July, 1996, issue). On the Portland (Dr. Kai-Hwa Ger's) end, handling is not free, but it is a lot more reasonable than $60. During recent months, Dr. Ger has been using an account at a branch of Bank of America where the processing fee is $12.50 As long as the person placing the order adds this amount to the total, the wiring of funds is a new and acceptable method of payment for ATP materials that are to be shipped by Dr. Ger.

Japanese Web pages for ATP users were explained by Masahiro Kan of the Hamakawasaki Works of Toshiba Corporation in Japan. Immediately following Laszlo Prikler's announcement of expanded EEUG information (see separate story), Mr. Kan explained about sites in Japan. Using public E-mail of the Fargo list server dated Jul 31st, Mr. Kan wrote: *"We in Japan are also operating ATP related Web pages on a volunteer basis. We now have the following three sites:*

http://www02.so-net.or.jp/~m_kan/
http://pels.pwr.eng.osaka-u.ac.jp/~atp/
http://www.kisarazu.ac.jp/~kasiwagi/atp/index.htm

Very recently, we added an English version. We also are mirroring the aFTP server of MTU after receiving permission from Prof. Bruce Mork and the Can/Am user group: ftp://pels.pwr.eng.osaka-u.ac.jp/pub/atp/ The following ATP and EEUG related information can be found there ...."

Masahiro Kan's announcement (preceding paragraph) ended with an explanation that might not have been understood by many subscribers: *"Because of the political reason (involvement of CRIEPI), Japanese EMTP Committee (JEC) has no formal connection with Can/Am EMTP users group now. I hope the formal connection between JEC and Can/Am and also that between JEC and EEUG will be established in the near future."* It is true: the Japanese EMTP Committee (JEC) headed by Chairman Akihiro Ametani is not yet an ATP user group. The first EMTP user group in the world, JEC continues to allow equal access to any organization having interest in EMTP, and that includes DCG member CRIEPI. In this sense, JEC is fundamentally different than other EMTP user groups of the world with which BPA and the Can/Am group have contact. ATP information is shared with Prof. Ametani, his colleagues, and students at Doshisha University in Kyoto as collaborating developers, but not as an exchange between user groups. With the exception of newsletters, free access to ATP information is denied to CRIEPI, of course (this is reciprocity).

A translation from English to some other language was mentioned by Mr. Kan as part of the discussion about FREEP's proposed scanning of the ATP Rule Book. As explained in a separate story, your Editor had written that the modification of existing files for an unanticipated use required permission of the present owners. But what about translation from English to some other language? Mr. Kan raised this problem in public E-mail of the Fargo list server dated April 28th: *"absolute prohibition for modification of ATP documentation will affect our translation activity in Japan. Some volunteer in Japan is doing translation of ATP Rule Book written in English to Japanese. I plan to distribute these translated disk files to the ATP users in Japan. From the context, this sort of modification (translation from English to some other langugaes) might be permitted. I hope this exception will be added in the prohibition terms."* As one of the many owners of parts of

the existing Rule Book, your Editor certainly would not object to such non-commercial use. Also, he notes that he has read no objection from anyone else, owner or not, following Mr. Kan's public explanation of the problem. If anyone reading this paragraph disagrees, he is asked to make his thinking public. As a practical matter, it is hard to imagine how there might be any trouble as long as the use remained noncommercial, and did not involve substantial sums of money. This is where EPRI, DCG, FREEP, and others involved in *EMTP commerce* have created their own problem of substantial proportions. Without the involvement of substantial sums of money, who would sue? Certainly any American court would be unlikely to award substantial monetary damages unless substantial money were involved. McDonald's of England excepted, one generally sues profitable commercial operations having deep pockets rather than well-meaning volunteers having essentially-empty pockets.

More about Electronic Mail (E-mail)

Mainland China (the People's Republic) seems not yet to be using E-mail much within the electric utility industry. That same Dr. Yuan Bin of Tsinghua University (see January issue) provided an explanation in public E-mail dated April 18th: *"I do not think the computers in High Voltage Department of Hua-tong Power Testing Research Institute have been connected with the Internet. In China, the computers in almost every university can send or receive email, and use WWW. But for utilities, the people there can only use the Internet using telephone line. This is very slow and also very expensive, so it is not easy for Mr. Ma to use the Internet.* The Mr. Ma of interest is Ma Ren-ming, who did so much creative work with TACS during 1983 and 1984. There is this undocumented Type-67 device (see April newsletter for explanation) that Mr. Ma probably added, and your Editor had asked whether any subscriber to the Fargo list server was in E-mail contact with Mr. Ma, who has since moved from Wuhan to Shanghai.

Unannounced changes of E-mail address have plagued several persons this past year, and one is your Editor. On May 3rd, the Fargo list server rejected your Editor's first attempt as follows : *"You are not authorized to send mail to the ATP-EMTP list from your atp@rdrop.com account."* When questioned about this, owner/operator Alan Batie responded promptly that same morning: *"Sorry about that; I've changed it back. It sounded like a useful thing to do while I was changing the mailer, but I should have given some warning."*

Free E-mail is a suggested possibility that was noted at the bottom of a message from Robert Sarfi, formerly a doctoral student at the University of Waterloo in Ontario, Canada. The message came from **rsarfi@hotmail.com** on July 31st, and it ended with the following line: *"Get Your Private, Free Email at http://www.hotmail.com"*

Libraries in some of the least computer-literate parts of the USA and Canada are being helped onto the Internet by the Gates Library Foundation. Yes, that is Gates as in Bill and his wife Melinda, who have donated $200 million dollars to the effort. According to a story on page C2 of the June 25th issue of *The Oregonian* newspaper, *"Microsoft is chipping in an equal amount in software ... for a total start-up commitment of $400 million .... The Microsoft statement said about 45% of U.S. public libraries have some Internet access, but in most cases it is restricted to staff."* But will Bill G even notice any of his money is missing? *"Gates long has planned to give away most of his vast fortune --- nearly $35 billion and counting."*

NASA's Pathfinder mission to Mars has proven to be a very popular subject among Web surfers. A short story on page D1 of the July 9th issue of The Oregonian quotes a NASA spokesman as follows: *"We're saying we've had 150 million hits since the 4th of July. I've seen a lot of Web traffic on other missions, but nothing like this."* Of course, there are interesting color pictures of the Martian surface. If an interested reader can not find a more convenient mirror, the original has address **http://mpfwww.jpl.nasa.gov** Acronyms involved here are JPL for the Jet Propulsion Laboratory in Pasadena, California, and NASA for the U.S. National Aeronautics and Space Administration.

Some mail programs require text along with attachments as proved by Masahiro Kan of Toshiba Corporation in Japan. His message dated April 28th, which followed several experiments, explains this is detail. When BPA sends text plus an attachment, the header involves the Content-Type declaration "multipart/mixed; boundary" On the other hand, if there is no text (just an attachment), the declaration is "application/octet-stream" According to Mr. Kan, *"my mailer tries to do something according the Content Type field, but fails to recognize it for the mail of category 2"* (attachment without any text). So, a prudent rule is always to send a few bytes of otherwise unused text along with an archive. Typically your Editor now keys "dummy text" at the top of the message window prior to attaching an archive such as GIVE1.ZIP.

Electronic signatures are coming to Oregon as they already are allowed in some other states. But this is **not** in the form of FAX (a low-resolution, monochrome bitmap) of a signed paper document. Neither is it in the form of a high-resolution, possibly-colored, bitmap of some document for some publishing program. Unfortunately, the distinction must be made many times a year in response to prospective ATP licensees who do not want to wait for snail mail. No, neither FAX nor E-mail will do the job. Later this year, E-mail might be legal for signatures in Oregon, but the user group has no intention of quickly, if ever, adopting this latest extension to Oregon law. A recent news story in *The Oregonian* made clear that the new electronic signatures are neither cheap nor simple. In fact, a written signature is not involved at all. Instead, special licensed companies

will be providing unique passwords, which then will be encrypted. There is some similarity to the password that a bank provides to the user of a credit card (plastic): in theory, only the bank knows. In that the open Internet rather than a closed bank network would be used for communication, encryption would be required. Yet, this faces problems in the form of the U.S. government, which may continue to insist on the key. It is entirely possible that Oregon and other state law will be overridden by federal law long before usage becomes widespread. In any case, the complications far outweigh the value to the user group, for the foreseeable future. There is no intention of pursuing this for purposes of ATP licensing.

MIME now is being used by BPA in place of the older UUENCODE as explained in the preceding issue. As long as archive size is not a problem for the recipient, this seems to be satisfactory. However, it is inefficient for those who are unable to accept a 2-Mbyte E-mail message. This is because there is no known way to avoid double encoding, if segmentation is necessary. If the archive is UUENCODEd prior to attachment, it still will be MIMEd by BPA's MS Mail within WinNT. I.e., not surprisingly, there is no recognition of the UUENCODEing by BPA's MIME as carefully documented by Prof. Laszlo Prikler to T.U. Budapest in Hungary. His E-mail dated April 4th reported: *"Without deMIME-ing (base 64 decoding) the file size is 1.052.182 bytes. Decoding resulted in a 768.030 byte TPBIG.UU1. Eureka! The size is the same as on your side. MIME-ing caused 37% overhead. But why do you not get rid of the MIME? The file *.UU1 is already uuencoded, so further coding is not needed. My mailer (WinPmail 2.53) gives such option. Pmail options: mailer decides, no encoding, uuencoding, Basic MIME (=base 64). Is it unbelievable that Bill G gives less freedom for users of his MS Mail?"* Yes, it is, unfortunately --- either Bill G or his helpers in the BPA computer establishment. Using MIME rather than UUDECODE to produce each half does not help, either. Yes, MPACK will do the job, but then BPA's E-mail repeats the operation (MIME on top of MIME, which is even more inefficient than MIME on top of UUENCODE). As reported by E-mail to Dr. Alexander, Chelaznov in Russia on June 6th, *"Bad news: this is exactly what seems to have happened. The file received by Agora is nearly 50% bigger than the MIME-d output of MPACK that was sent."*

European EMTP User Group (EEUG)

A free *"one-day ATP-EMTP Workshop"* in German is being organized by the EEUG Chairman, Prof. Mustafa Kizilcay of FH Osnabrueck in Germany. His English-language summary appeared in public E-mail of the Fargo list server on July 26th. This declared the goal to be: *"Exchange of experience on modeling of components and simulation of transients in power networks, optimal use of ATP-EMTP and related supporting programs on PCs under MS-Windows 3.x / 95."* The date is September 29th,

and the location is the Power Systems Laboratory of Prof. Kizilcay's university. An attached registration form included space for additional subjects of interest, and a place where a participant can volunteer to make a 10-15 minute presentation. By IPST Seattle standards (see mention in the preceding issue), the cost of a hotel room seems reasonable enough: *"single room incl. breakfast: DM 85 .. 110"*

The EEUG Web page *"has recently been re-designed and updated"* according to public E-mail of the Fargo list server having date July 29th. According to author Laszlo Prikler at T.U. Budapest in Hungary, *"The only thing that has not changed is the address: http://www.vmt.bme.hu/eeug The following ATP and EEUG-related information can be found there: 1) About the ATP program; 2) About the EEUG Association; 3) European ATP License Form (HTML, WordPerfect and WinWord) 4) EEUG Membership Application Form (HTML, WP, WW) 5) ATP order forms for EEUG members/non-members (HTML, WP, WW) 5) ATP related course announcements 6) Announcement of the next EEUG Meeting in Barcelona 7) Announcements of power system transient conferences 8) EEUG membership directory (coming soon) 9) List of EEUG licensed ATP Users (coming soon) 10) Table of Contents of EEUG News (the newsletter of the Association) 11) ATP related Internet resources 12) On line support for new users of ATP 13) ATP FAQ (under development). Netscape 3.0x, Ms-IE 3.0 or any other compatible frame compliant browser is required to display our Web pages properly."*

Windows by MS and OS / 2 by IBM

IBM's OS / 2 has been used for about three years for the support of ATP by Robert Meredith and Robert Schultz of the suburban New York City area. The Watcom FORTRAN compiler is used. Although Watcom use is expected to continue, the fate of IBM's OS/2 for the support of ATP is less clear.

"Having just dumped OS/2 in favor of WNT4.0 in the last two weeks, I expect some nice NT developments in the near future!" This was the way Robert Schultz concluded his public E-mail dated June 3rd. It also is the way the general public first learned of the changed operating system for the support of Watcom ATP. A day earlier, in private E-mail, Robert Meredith had provided considerable background: *"We have looked at WNT4.0 and found it so much like OS/2 now, that we are trying to convert to WNT4. Both Bob Schultz and I bought WNT4 over the weekend at a computer show in White Plains. It was included as part of a promotional J++ package from MS. We got the package for $75 plus tax, …. Price no longer seems to be any part of the reason to choose OS/2. NYPA is starting to convert everyone to Win95 and Office 97. They have told us they can let us stay with OS/2, give us a second*

computer, convert us to WinNT or 'build a wall around us'. To encourage movement to Win95, NYPA has gotten a licensing deal that allows us to install Office 97 on our home computers for free …. Schultz and I have decided to quit 'pushing a rock up a hill' (Bob's quote) and try WNT4. OS/2 is an excellent rock, but did require constant effort to stay up to date with the never-ending stream of (free) improvements from IBM. What we see so far about WNT4, as I said at the top, is good. We still have problems with tape backup. (There is no stand-alone method of recovery from just tape. One has to reinstall WNT from CD before tape can be used. OS/2 allowed booting from disk to fully restore from a tape in one step.) We still need to figure out how to get direct graphics from Fortran, but OpenGL looks like our salvation for both WNT and OS/2 support, if we do such work. We also need a good programmer's editor to replace Notepad -- a pitiful substitute for OS/2" EPM editor. But on the whole WNT4 seems to have good potential to replace our use of OS / 2 . We'll be busy experimenting at work and at home for a few weeks, it seems."

Watcom compiler trouble was mentioned in passing in the preceding issue. There now is more space for details. It was during February that a very minor and unlikely problem (loss of DC45.PL4 during the associated simulation of DC-46) was observed. This was reported in public E-mail dated April 21st. Next, ATP source code was moved to the 90-Mhz shared Pentium, which has a newer compiler (version 11.0 which has an FREADME.TXT file dated 10 February 1996). This performed much worse. It was impossible to obtain output to the screen, although output to disk seemed normal. Finally, a 10-line version demonstrating the trouble was sent to Watcom for consideration there, and Haralambie ("Hari") Stirbet of that company confirmed the error promptly on May 16th: *"Indeed there is a problem with our compiler. It seems that if you use the flag /SC it causes problems. You make use of that flag? Removing it, for the moment, will solve the problem."* A copy of the response from BPA later that same day was sent to Mr. Meredith because of the following mention: *"About /SC, this is believed to come from New York Power Authority in White Plains. My recollection is that it has to do with argument passing between fortran and c."* That was Friday. The following Monday, Mr. Stirbet was informed of the following reply from Meredith: *"My notes say that /sc is to use stack calling convention. Schultz found it the best way to go; it is required in **all** routines, if it appears in **any** of them."* The conclusion from BPA was as follows: *"So, we do not know what to do next. We could drop /SC if we removed all C language, although we do not want to do this. The C provides enhancements that users of Watcom ATP have grown accustomed to."* Having heard of no resolution, BPA's use of Watcom's DOS extender WAT4GW has been discontinued.

"This is the Powersoft FTP site (ftp.powersoft.com), run by Powersoft Corporation in Concord, MA …" This

MA is an abbreviation for Massachusetts, with Concord being a suburb of Boston on the Atlantic coast. This aFTP site was used to communicate files to Hari Stirbet as described in the preceding paragraph. It would seem that Watcom might no longer be an independent business in Waterloo, Ontario, Canada. If any reader knows of a public account of what has happened to Watcom, your Editor would appreciate being informed. One reliable contact who preferred not to be quoted has offered his understanding that *"Watcom is now being run by Sybase/ Powersoft."* Who can supply a publishable story of the change, and what if anything it might mean to ATP?

About the stability of WinNT 4.0 as used by Dr. Tsu-huei Liu on a 133-MHz Pentium at BPA, little that is good for the DOS user can be reported. Although NT might finally be protected from the network, it obviously is not powerful enough to control DOS! Trouble reading floppy disks has forced a restart on more than one occasion. One time Vernon Buerg's LIST was used, and on another DIR was used to inventory a floppy. Whereas ordinary old, real MS-DOS would simply time out the operation if it failed for some reason, Bill G's newest operating system seems to wait indefinitely (disk light on permanently). Sometimes Ctrl-Alt-Del will allow killing the DOS window, but other times it will not. For some unknown reason, the stuck process is reproduced in the termination menu. The copy then can be killed, but the original remains. Not good. We pay extra for this, and give up Envoy output of WP 7 in the process? Microsoft seems to have given new meaning to its term *preemptive multitasking*. In case of a DOS window, sometimes nothing can preempt it.

News About TACS and MODELS

The need for MODELS working space increases as a function of simulation time. Thus began a paragraph in the January newsletter. Well, author Dube **did** eventually find and correct his memory leak, which he explained to the general public in E-mail of the Fargo list server dated May 25th This began: *"Memory overflow error in MODELS. During a modification made to MODELS in ATP in January 1996, a line of code was inadvertently duplicated in the program, resulting in an extra word of integer storage to be consumed at each time step. …. eventually the program stops with the error message KILL = 642. The integer stack is overflowing ….The correctness of the results was not affected by this."* Privately, author Dube provided the correction, which was applied immediately.

Szymanski Uses Dual Pentium Pro PC

True parallel processing of ATP Monte Carlo studies first was suggested by computer expert David Szymanski during a telephone conversation on May 19th. Within a week, all required program changes to Salford EMTP had

been made to prove the concept. This is for Intel-based PCs, of course. The same basic simulation is performed over and over again, with only the switching times differing (the result of rolling dice for each STATISTICS switch). Two or more Pentium Pro microprocessors now can be used efficiently for such simultaneous, parallel simulation, as the remainder of this story should summarize.

The idea of dual Pentium Pro microprocessors is not new, recall. In the October, 1996, issue, Szymanski's thinking was summarized as part of the discussion of threads. No, nothing more has been done with parallel computation using threads, but parallel computation using ATP has arrived anyway. Szymanski's thinking about cost would seem to have been confirmed rapidly. During that May telephone conversation, he made the point that he could purchase a second 150-MHz Pentium Pro for his motherboard at a cost of about $140. Together with low prices for more RAM (required for computers that do not already have an abundance), this means that parallel Monte Carlo simulation is suddenly very affordable. Those who are actively involved in the statistical design of transmission lines and associated equipment are advised to pay attention.

Although Salford EMTP was used for development and testing of the basic procedures, DBOS is not expected to be used for the actually parallel Monte Carlo simulation. Operation under Win95 is possible, but this operating system offers support for just a single processor. One can have simultaneous simulattion, but not really parallel simulation. Either Unix or WinNT seem best suited for the serious user, with Szymanski using the latter along with the MS PS FORTRAN compiler. IBM's OS/2 is another possibility. However, with Messrs. Schultz and Meredith switching from this to WinNT (see mention elsewhere), it is hard to imagine more work using the IBM alternative. If and when GNU g77 might support multiple processors, Linux (free Unix) no doubt will be an attractive alternative. But today, the concentration is on MS Windows NT.

Full program tables previously were required for the statistical tabulation of Monte Carlo output. If tabulation was not performed during the same execution, then tables would be restored from disk using START AGAIN as illustrated by DC-40. Well, that was the old way. With the new parallel Monte Carlo, no such tables are required or desired. In their place, a special .PL4 file is used. This has the advantage of being smaller, readable by humans, and also independent of computer --- when the FORMATTED alternative is used.

SHOTS: and PART: are new parameters of program execution that are required for use of the new logic. This is as a parallel job is started. For example, to start the first and third pieces of DC-66 simulation --- each with 50 shots, the DOS commands (for Salford EMTP) could be:
```
RUNTP  DISK  DC66.  *  -R  SHOTS:50  PART:1
RUNTP  DISK  DC66.  *  -R  SHOTS:50  PART:3
```
The value of NENERG within the data file is immaterial in this case; it will be overridden by the number following the SHOTS: tag.

Space for statistical tabulation has been increased drastically for those linkers that allow the ordering of COMMON blocks in memory. The total virtual address space of the program has not been increased significantly, however. Instead, existing storage for other things also can be used for statistical tabulation. As distributed to the general public, Salford EMTP has L23TOT = 1420520 floating point words of such storage --- more than ten times what was available prior to the reforms of May. So, anyone who ran into this limit while tabulating should be pleasantly surprised by a new version. Just as with the 28 and a half million words of storage available to Salford TPPLOT, one does not pay for the new space unless it actually is used; and then one pays only for what one uses.

PART:1 is special in that it produces the .PL4 file that is to be used for tabulation. The first energization of this must be completed before the .PL4 file will be released. PART:-1 is special in that it will initialize the CENTRAL STATISTICS FILE (CSF, the data base that keeps track of progress of the different parts). Current thinking is that this should involve a separate directory that is empty at the start. All simulations involving SHOTS: then will be placed in that isolated directory. The user need not manually connect a file for LUNIT9 output as shown in DC-24. Output will automatically be placed in the directory of CSF usage. As for file names, USERID of STARTUP will be used as a root, although this can be overridden by the declaration USER IDENTIFICATION in the data. This root will be followed by serialization using the PART: number. Finally, the appropriate file type will be appended: either .LIS for the printer file or .EXT for the LUNIT9 file of extrema. This assumes parallel file naming (KTRPL4 < 0).

MINIMUM TABLE SIZES (MTS) is a new special request word that is ignored except during initialization of the central statistics file (use of PART:-1 as explained before). Then the declaration is a request for one shot followed by the creation of a LISTSIZE.DAT file corresponding to minimum sizes. This file will be created in the CSF directory, and will be given the special file type .PMC to remember the usage with parallel Monte Carlo. If present at the time a simulation involving SHOTS: begins, it is this file rather than LISTSIZE.DAT that will be connected to establish program table sizes. Although automatically created during initialization, nothing prevents a user from editing the file manually if he believes he knows more or better than ATP about how to economize on tables. After all, logic of the ATP creation is simple, so an intelligent user almost always can do better.

OBSERVE PARALLEL MONTE CARLO (OPMC in its abbreviated form) is the request word that provides access to observation and control of the central statistics file of parallel Monte Carlo. TABULATE STATISTICS is a new request to transfer to the code of statistical tabulation

after first loading all extrema that are found by a preceding SHOW ALL command. This is the new, automated way. Previously, LOAD MORE SHOTS was required, following the manual connection of each partial result using $OPEN. Then START AGAIN would enter the time-step loop as if additional simulation might be required. That was the old way, as illustrated in DC-40 --- which would be cumbersome for use with many (e.g., 16) processors. For an example of the new automated statistical tabulation, see the final subcase of DC-66.

The SHOW ALL command of OPMC now has a second row of summary parameters at the bottom. New entries include the following four: NENSUM, % done, INDSUM, and % full. The first of these is the sum of the NENERG of all parts --- the total shots for the family, if and when all parts complete normally. The "% done" column is the fraction of NENERG that KNTSUM (the total completed shots for the family) represents. INDSUM is the total floating-point words of storage for the family, and "% full" expresses this as a fraction of the previously-mentioned L23TOT.

Robert Schultz's Turbo table dumping and restoration had a related goal, as explained in the October, 1993, issue. The reader might be wondering how this compares with .PMC usage, and whether one does away with the need for the other. In fact, both are needed. First, why is .PMC needed, if Schultz does a good job? The answer is simple: Schultz must test every cell of every vector to see if it has been used. As long as there is adequate RAM, this is very fast. But if RAM ever becomes inadequate to hold all of the tables, paging to disk will result, and the process will slow by an order of magnitude, typically. For a single processor, the average computer has had plenty of RAM during recent years, so there was not much concern. But consider what happens if the RAM remains fixed while a second processor is added to the motherboard. Suddenly, the RAM available to each simulation is halved. The result could well be thrashing (excessive paging to disk) by both processes if effective counter measures were not taken. Use of a minimal LISTSIZE.PMC file is such a counter measure --- important if RAM might be in short supply.

What about the reverse situation? Why does the use of LISTSIZE.PMC not eliminate the need for Schultz's logic? Consider extreme cases. First, if all program tables were simple, and if MTS logic were perfect, there would be little for Schultz to do. For the data of DC-66, this is about what happens. The saving reported by Schultz's logic is only about 3% --- rather than the 99.27% reported when dimensioning is 3 times default. But this is for simple and old data. Other, more-complicated forms that came later in the evolutionary development are less cooperative. For example, take TACS, which was variably-dimensioned in the late '70s by Bob Eifrig using offset subscripting. There will be negligible reduction for such data, whether tables are empty or not --- unless the data case involves use of minimal ABSOLUTE TACS DIMENSIONS as well.

Another example: some switch data is stored in inverse order, from the bottom of the table upward. Schultz neither knows nor cares. He will remove unused portions no matter where he finds them. But will your Editor's MTS logic? It does not yet, and may never do so. So do not plan on the elimination of Schultz's table compression any time soon.

Parallel Monte Carlo simulation was developed about 9 years ago for networked computers. That was when BPA had 5 networked Sun workstations, and LEC had several networked Apollos in its Leuven offices. Your Editor recalls perfecting the logic during his 1988 visit to Belgium (the month of October). But then Intel began to win the PC and workstation war, and one PC became powerful enough to solve an entire Monte Carlo study on its own; so the 1988 work fell into disfavor. But it has been rediscovered and modified for Szymanski's use in response to Szymanski's important idea. As used today, no network is required or desired, of course. What once was spread geographically over two or more computers now will be concentrated on a single disk, often. This has both advantages and disadvantages in terms of reliability, although that aspect need not concern us here. Today, PCs are so reliable that putting all of one's eggs in one basket no longer involves the worry it once did. Today, it is more likely to have a power outage than it is to have a computer failure; and if the power goes out, all computers will stop whether networked or not (the network offers no added security).

CABLE CONSTANTS, PARAMETERS

CABLE CONSTANTS and CABLE PARAMETERS of ATP are the contribution of Prof. Akihiro Ametani of Doshisha University in Kyoto, Japan. Following the IPST '97 meeting in nearby Seattle, Prof. Ametani spent the day with ATP developers at BPA. This visit prompted two items of interest to those who model cables.

Variable-dimensioning of the CABLE PARAMETERS code is underway as this story is begun on June 29th.. While Prof. Ametani merely explained the practical need for larger dimensions, your Editor quickly concluded that anything short of arbitrary, user-requested dimensions would be a mistake in the long run. So, the variable dimensioning of all arrays previously having fixed dimension 12 now is underway. Conclusion: work was completed July 9th, when the new TPBIG was sent to Prof. Laszlo Prikler in Budapest by E-mail. The answers of standard test cases (DC-27, 28, 52, and NEW-6) are unaffected, of course. The only obvious sign of change is interpretation of the request card, which now shows the maximum number of phases (38 for the case of 240K words at the bottom of LISTSIZE.DAT and .BPA as distributed by the user group).

Overhead conductors that nearly touch would seem to be compatible with CABLE CONSTANTS rules for cables,

but actual use is troubled if there is *snaking* (continuous transposition). This was explained by Paul Gruber of ESKOM in South Africa, using public E-mail of the Fargo list server dated April 3rd. Illustrative data was provided. A partial explanation of the problem later was provided by BPA's Dr. Tsu-huei Liu. Her public E-mail dated July 23rd included the following: *"Mr. Gruber ... noticed that one modal propagation speed was much larger than the speed of light. The author of this routine, Prof. Akihiro Ametani ... visited BPA on June 27. We were fortunate to be able to have Prof. Ametani investigate this case while he was here. I will now attempt to summarize Prof. Ametani's findings. The modal propagation speed that exceeds the speed of light seems to be due to a program error in SUBROUTINE SNAKE, which handles continuous transposition (snaking) of a cable system. This trouble might only occur for a system that consists of more than three, and not a multiple of three, cables --- such as the 4 cables (actually, just cores) of this case. Of course, in general a cable can have three layers of conductors: core, sheath, and armor. As a result, the logic for handling the snaking of cables is substantially more complicated than that for the transposition of overhead lines. .... In the interim (before a modification might be provided), Prof. Ametani asked that the following recommendation be shared with others: As a reasonable approximation, the 4-cable system of interest can be modeled as a transposed, 4-phase overhead line."*

The CABLE PARAMETERS data case was preceded by a CABLE CONSTANTS request, and followed by the blank card ending such data. This has been the required structure since first implementation. Because substantial amounts of such data already have accumulated, the old format will continue to be honored. Yet, it is illogical. The mention of CABLE PARAMETERS is irrelevant, and it can be omitted, along with its associated blank card after the CABLE PARAMETERS data, if the user desires. In fact, CABLE CONSTANTS is not entered at all for any data that involves CABLE PARAMETERS, regardless of whether or not the user employs a preceding CABLE CONSTANTS declaration. The user may not see the change, but the two codes have been completely separated.

Just Who Was Bonneville ?

As BPA's reputation for power system engineering continues to worsen because of ongoing *reengineering* or *reinvention* (euphemisms for reductions that compromise quality), your Editor wants to inform others of the origin of the name. The following story has been delayed for years since it was written during 1993. Newsletter issues always overflowed, so the story was delayed issue after issue (after all, the story was not time-critical). Well, no longer. While portions of BPA's once-good name still remain, the following four paragraphs are being flushed from the archive of unfinished stories:

The name Bonneville comes from *"one of the U.S. Army's favorite sons, Captain Benjamin Louis Eulalie de Bonneville."* So begins an interesting account by Gene Tollefson, BPA's historian, on page 8 of the July, 1992, issue of BPA's employee newsletter, *BPA Circuit.* Your Editor has copied Mr. Tollefson's title. Needless to say, the average BPA employee had no idea where the name came from.

Thomas Paine, an architect of the American revolution, was involved. After independence from England had been won, Paine moved to Europe and lived with the Bonneville family in France *"without charge for five years and owed them a deep debt of gratitude. When he finally returned to America in the summer of 1803, he landed in Baltimore accompanied by Margaret Bonneville and her three children. ... With Paine's help, Bonneville's son, Benjamin, entered West Point. He graduated in 1815 and went on to have a long and distinguished career in the Army. He served in the Mexican and Seminole wars and was garrisoned throughout the west."*

"Much of the interest in Bonneville focuses on the two years' leave he took from the Army from 1832 to 1834 to trap and test his belief that wagons could be taken over the Great Divide and on to the Columbia. ... Bonneville made history by crossing the Continental Divide at South Pass in 1833. South Pass --- in what is now Colorado --- is a sagebrush plain about 20 miles wide, a saddle between the Wind River Mountains and the badlands. 'It was,' reported historian Bernard DeVoto, 'the gate through which the United States would reach its empire.'"

"Eventually, the first dam to cross the Great River of the West was named for Bonneville by the U. S. Army Corps. of Engineers. So too was the federal power marketing agency for which we work."

Late-breaking news: BPA Administrator Randy Hardy announced his resignation in a message to all employees dated July 30th. This was front-page news in Portland's dominant newspaper, *The Oregonian*, the following morning. As preposterous as it sounds, the official explanation involves a family in Seattle: *"Hardy, 53, says he wants to spend more time with his family. He has commuted for the past six years ..."* When the guy took the job, he did not bother to note that it was located some 150 miles away from home (joke)?! Putting it another way, Mr. Hardy never thought about moving from Seattle to Portland --- in order to be able to spend more time with his family (a common justification of liberal politicians these days: doing things for children), of course? What about the politicians who selected him for the job some six years ago? Did none of them bother to check whether Mr. Hardy intended to become an absentee administrator? In any case, a final bizarre excuse ends years of bureaucratic tumult. In that troubles of the agency are highlighted once again for the public, the story is useful. Section headings later in the story about Hardy

are three in number: 1) *A grim outlook*; 2) *'Thankless job'*; and 3) *Fish and finances*. It is the final point that promises irreconcilable conflict during the selection of Hardy's successor: *"Many customers will push for a new administrator willing to take a hard fiscal line with the agency's bureaucracy."* That final word is Oregonianese for *wacko environmentalist*, it would seem --- those politicians who favor the spending of BPA money on things that have little or nothing to do with the power system. That is one side: the customers. But there is another. *"We need somebody at BPA who views fish production as equally important as power production."* This quotation is attributed to *"Pat Ford, conservation director of Save Our Wild Salmon."* No matter who prevails, the status and quality of engineering within BPA are expected to continue to decline as BPA employees and contractors continue to shrink in number, and resources to support them are reduced.

ATP Education on CD - ROM ?

Tom Field of Nashville Electric in Tennessee has been the driving force behind a bold initiative to offer ATP education on CD-ROM in the foreseeable future. This story, which began in the April issue, now is being continued. There were some drastic changes between mid-April and late May.

Debate using public E-mail (Prof. Bruce Mork's Fargo list server **atp-emtp@listserv.nodak.edu**) began with a brief mention by your Editor on April 21st: *"Tom Field … is encouraged to discuss his FREEP proposal for Rule Book storage using Adobe PDF format. This writer will initiate the subject only if no public explanation is received from some FREEP representative within 48 hours."* The proposal to use PDF storage was not controversial, of course, but the means of creating it certainly was. In private E-mail dated April 17th, Mr. Field first had provided a hint of where FREEP work on ATP educational materials was headed: *"I have asked Dr. Camacho to digitize the ATP Rule Book. However, before he starts I wanted to make sure it was acceptable to you for him to do so."* Your Editor responded privately as follows the next day: *"You write 'digitize,' which might mean 'scan' with an optical scanner. On the other hand, it might mean 'key' using a keyboard. What do you have in mind, and which chapters?"*

Keying and optical scanning differ profoundly in at least two distinct ways. First, there is quality. Keying leads to perfect storage (character codes for letters) whereas optical scanning results in distortion of distortion (the paper copy that is scanned typically is a copy of a copy of …."), and much larger disk files.   But that is a technical detail. A more disturbing difference lies in modification of the work of others (in the case of scanning) as opposed to original writing (in the case of keying).   Anyway, one might hope that FREEP keying would involve original writing as opposed to copying writing that has been done by others.

FREEP involves several organizations or individuals who are not ATP licensed. This point was prominently made by your Editor in his public E-mail dated April 24th.: *"Prominently included among some 41 addresses on the FREEP mailing list are the following …"* Listed were 8 names and addresses of persons or organizations that are believed to have been involved in EMTP commerce. General ATP information can not be shared with such persons, of course. But how are they to be active, contributing members if they must be kept ignorant of ATP information in the tutorial? *"How is this going to work?"* your Editor asked. *"How well coordinated would or could the result be? … Prof. Dommel and others engaged in EMTP commerce not only must be kept ignorant of ATP information, they also must be kept ignorant of their ignorance!"*

Passwords would seem to be the FREEP answer to doubts about the feasibility of separation. Mr. Field wrote: *"As for the ATP information, it is guarded with password protection on the website   http://www.emtp.com.   The people with access to this area must have an ATP license. The same is true of the commercial versions available. The general commercial section is the only section open to all developers. All of the ATP information to be put on CD format is separate from the   CD   that the commercial people use. This allows the commercial people to look at their material without compromising the ATP material. Finally, in order to purchase the tutorial, a person must have an ATP license. This should keep all of the ATP security as good as it is now."*   Commercial developers *"will also be able to see the commercial CD which will include limited versions of their program that they provide, templates, applications, etc."*

Novell Envoy is a competitor of Adobe Acrobat and PDF as explained in a separate story. This was learned following your Editor's mention of a problem with PDF format: *"This PDF is understood to be Adobe's Portable Document Format as explained in the October, 1996, newsletter. The freeware reader 'Adobe Acrobat' can be used on various platforms, so there is much to recommend the concept. On the other hand, how many ATP developers can create PDF files conveniently today? The new WP 7 from Corel was advertised (if not by Corel itself, by a supplier of the product) to support such documents. Largely on the basis of this misinformation, BPA ordered the upgrade from WP 6. But BPA's Dr. Tsu-huei Liu can find nothing about PDF in the user instructions. If any reader knows how to create PDF files using either MS Word or Corel WP, he is encouraged to share the secret with others. In the absence of PDF support by commonly-used publishing programs, what are the alternatives? It is true that difficulty of creation does not affect end users (free Adobe Acrobat nicely solves their problem), but it certainly is real for developers (those who would be doing the writing)."*

Optical scanning was questioned by your Editor, who wrote: *"About digitizing, this writer remains skeptical. Optical scanning works far better in theory than in practice, from what has been seen at BPA. If figures are to be left as bitmaps, this is an obvious disadvantage (compared with quality, sparse storage as used by EEUG for its TACS chapter). Also, it remains to be seen how, and how well, FREEP might handle mathematical symbols, Greek letters, subscripts, superscripts, tables, and other unusual features. At BPA, these were complications that prevented use of an HP scanner for the EMTP Theory Book during the summer of 1994."*

About permission, your Editor noted : *"... permission is required, note. FREEP probably could write its own book about ATP, and sell this to licensed ATP users without permission. But that is not what is involved in the present case. As the FREEP proposal is understood, FREEP would not be writing its own book in the sense of a work that could be copyrighted as an original creation. Rather, FREEP has proposed copying or translating (in this case, from one storage medium to another) the work of others (the existing ATP Rule Book), and then selling the derived product. One can not do this without permission. Those who did the writing remain the owners, so the permission of many would be required. It is not a question of merely Can/Am management giving its approval. The situation is more complicated than this."*

During more than 4 weeks, your Editor and Dr. Liu watched as objections were made by Keith Walshe in Australia, Gayle Collins in England, and Masahiro Kan in Japan. The FREEP responses were numerous, spirited, and voluminous. Eventually, Prof. Mork intervened by reissuing his rules of etiquette for use of the Fargo list server (see the January, 1996, issue). Anyway, by that time the Can/Am user group had made up its mind. The title of its public response on May 27th was: *"Can /Am User Group Expects NOT to Cooperate with FREEP."* The first paragraph ended with the following summary: *"There never has been any collaboration, and it is not expected that there ever will be, for the foreseeable future. Neither will there be any approval to modify ATP materials for commercial purposes."*

About property rights, your Editor wrote the following clarification: *"FREEP contends the Can/Am user group itself might grant permission by acting on behalf of other contributors as well as itself. But what owner of Rule Book material has agreed with this interpretation? Once again, the Can/Am user group can recall no communication mentioning any such opinion by any Rule Book contributor. In the absence of binding, written approval, the user group would not be so bold or assertive or reckless as to believe it had the authority to grant what FREEP wants. For one thing, it does not believe this interpretation (that it has the power). For another, it is not prepared to defend either itself or FREEP in court. Imagine that the user group might give its blessing, and that FREEP might proceed --- followed by the decision of some disgruntled owner to sue everyone in sight (the American way). The user group wants none of this. It avoids such problems by insisting that each owner be responsible for his own property, should unforeseen usage be considered."*

CD-ROM might be ideal for FREEP's storage of scanned pages, but it seems not yet to be of interest to ATP user groups. Your Editor wrote about this difference of perspective: *"Bit-mapped storage might be adequate for commercial distribution using 550-Mbyte CD-ROM, but it is not adequate for today's distribution by E-mail or conventional 1.44-Mbyte floppy disks as used by BPA and the Can/Am user group. Is any ATP user group today distributing materials to members on CD-ROM? This writer knows of none. In time this will become common, of course, but interest in CD-ROM seems premature for user groups today, as this writer sees it."* The question was important because FREEP **did** agree to share with the user group any copy of the Rule Book that it might scan, thereby allowing free distribution to others. But how? What if storage occupied 100 Mbytes? Neither E-mail nor floppy disks would offer much hope in such a case --- even if the files might be deemed desirable (speculation at this point).

The following two paragraphs were copied from the end of your Editor's response on May 27th. They are not the end of the story (more next time), but they do represent a convenient stopping place. Think about the following bigger and more general issue, readers:

Unauthorized modification for commercial purposes seems to be the common thread that connects earlier concerns about source code (see the January newsletter story entitled "No Unauthorized ATP Modifications!") with the present concern about ATP documentation. Current thinking is that a sentence or two should be added to ATP licensing agreements about this subject. This would state explicitly that the right to disclose ATP materials to others does not include the right of modification in any way or form. About paper, each licensed user would have the right to share photocopy. About disk files, each licensed user would have the right to share the disk files unmodified. In either case, neither additions nor subtractions nor modifications would be permitted. What subscriber might object to such a change, and why?

Future contributions to the user group almost certainly will be jeopardized unless authors are assured of protection (that their work will not be modified without their approval). This seems to be the big change of recent years: modification for commercial purposes now seems feasible. Think of that devious program developer (the January newsletter), who probably would have been happy to contribute his modified ATP (without the dynamic link library containing his own commercial software, of course!) to the user group free of charge. Note that the user group would have had no use for it. It would not have represented

any improvement for either the user group or for any other user who did not purchase the missing library from the developer. The point is this: making a modification available to everyone free of charge is not enough to ensure that the modification is either non-commercial or desirable to the general user. Times have changed, thanks to dynamic link libraries and CD-ROM Should not LICENSE.ZIP change accordingly, so as better to reassure future contributors to ATP development (both code and documentation) that their work will not be used for commercial purposes without their explicit approval?

Jerry Daniel at the University of Newcastle upon Tyne in England made an important public contribution on May 19th. Your Editor agrees with this thinking, which included the following: *"There appear to me to be two courses, one of which they may not have considered and which may make their proposal more acceptable. 1) (The existing proposal, as I understand it) That the Can/Am user group grant FREEP the right to use ATP licensed material (without restriction). 2) That the Can/Am user group grant the FREEP group the right to reference the ATP rule book (and theory book if required). …. The advantage of the second alternative is that the Rule Book would be kept complete (and the Can/Am group's version of ATP history included). Only the right to copy the whole work (as it currently exists) would be granted, not the right to abstract and/or edit parts of it. Ownership of Copyright would clearly remain with the Can/Am user group, whereas ownership of edited material would always be questionable."* More next time (the story continues).

Compensation Represents Series R-L

[R][L] and Z0Z1Z2 are the names of new Type-91 MODELs (not to be confused with MODELS from Laurent Dube) that use compensation to represent series R-L branches. Of course, Type-51,52, … branches have been used for the task since year one, but they suffer from the restriction that both [R] and [L] must be symmetric. This limitation can be avoided by the use of compensation. As explained in the January issue, Type-91 branches are used, and MODEL Z0Z1Z2 or MODEL [R][L] are to be keyed in the BUS3/BUS4 data fields of columns 15-24.

Symmetrical components inspired the name Z0Z1Z2, of course. For balanced, 3-phase systems, the symmetrical component transformation will decouple branch equations into zero, positive, and negative-sequence impedances. The Type-51,52,53 branch allowed such input for symmetric matrices by detecting zero or blank parameter values of the third (Type-53) branch card. For that case, Z2 and Z1 were identical. But in general they are not. The new Type Z0Z1Z2 model requires that all 3 sequence impedances be keyed on the three branch cards as illustrated by new standard test case DCNEW-22.

For unbalanced 3-phase cases, or for other numbers of coupled phases, the symmetrical component transformation will not decouple branch equations, so are of little practical use for data specification. Instead, full [R] and [L] in the phase domain are specified. This, too, is illustrated in DCNEW-22

August 1st is the date [R][L] and Z0Z1Z2 MODELs first became available to the general public. The only installation-dependent feature is for possible data storage in an external data file, and this is not mandatory, and can be avoided, so need not concern the user now. For practical initial uses, the feature can be considered universal. It also is variably-dimension, with obvious, logical burden: one cell of List 9 is required for each phase, and the square of the number of coupled phases is required of List 10. Just as for compensation of the Universal Machine, the coupled phases of each Z0Z1Z2 or [R][L] use must be isolated in some subnetwork from all other uses of compensation.

USE AR data is not yet accepted by the new model, even though this is a second obvious use. The first obvious use is for rotating machinery, where direction of rotation makes the positive sequence impedance (associated with a forward-rotating magnetic field) different from the negative-sequence impedance (associated with a reverse-rotating magnetic field). This first case has a simple physical interpretation. But there is none for the second, which is a simple consequence of matrix multiplication. Even though [R] and [L] might be symmetric for any magnetically-coupled coils, the matrices of USE AB might not be symmetric. This is because the product of two symmetric matrices is not necessarily symmetric. What reader has an important practical case that would justify the work to extend the new modeling to USE AB data? Alternatively, if such use is **really** important, maybe it is time to think beyond compensation to removal of the assumption that the nodal admittance matrix [Y] is symmetric. Beyond series R-L branches and impedance approximations for rotating machines, what might some other useful applications be?

Inadvertent Energization of Generators

Inadvertent energization of a generator was of interest to Bruno Ceresoli of ENEL S.p.A. Electric Research Center in Milano, Italy. He described trouble simulating this in public E-mail on April 18th. But why was there trouble? What was inadequate about the Type-59 modeling? The story is fascinating, and it had a happy ending thanks to the thoughtful collaboration of Gabor Furst in suburban Vancouver, B.C., Canada.

Explanation of the trouble came from Mr. Ceresoli in public E-mail dated June 5th. First, about the mistake: *"The initial conclusion reached was that all the SM59 like data inputs produce incorrect results, whereas the standard UM type #1 model, with coil inductance inputs, gives the right answer, which, as far as the stator inrush current is concerned, can easily be checked by a simple manual*

calculation. After performing a variety of tests, Gabor Furst concluded that the problem could be a data error rather than a bug in the SM59 or the new SM58 model, and so it was. What happened was this: the SM59 simulation used the per unit L version of input. In calculating the per unit L's, it was assumed that the model converts from per unit L's to inductances using the frequency 50 Hz, specified or implied in the data file as the power frequency, and not the initial rotor speed (frequency) which was specified as 1.0 Hz. With this assumption, we both fell into the same trap. It should be noted that the per unit inductances have to be referred to an inductance base which is a function of omega : L(base)=Z(base) / omega with Z(base) = V^2 / (MVA). So, dividing the per unit inductances by omega (initial) / omega (50) = 1 / 50, the correct results were obtained also with the SM59 or SM58 model."

There are other tricky aspects, too. This business of simulating rotating machinery with unusual speed is not for amateurs: *"Using the standard UM type 1 model, the field current has to be scaled manually or via TACS/MODELS, based on a subsidiary run or a SM59 no load run. Neither of the two models give the the true currents in the damper windings as these windings are modeled by equivalent coils, the characteristics of which, such as number of turns etc. are not known and indeed may not even exist as in the case of the equivalent coil for the rotor steel of a round rotor unit."*

On - Line Records of ATP Licensing

MS Excel is used by Dr. Tsu-huei Liu for the storage of Can/Am licensing records, as has been explained before. Improvements have been made. Every single entry of the computer storage has been double checked against storage of the paper licenses, and a new column has been added for organization. In any given row, the name is in column 1, followed by organization in column 2 --- blank for an individual license. The distinction between a personal license and an organizational license now is crystal clear. Previously, it was less obvious.

The removal of street addresses from Can/Am records was thought to be the biggest problem remaining before the list of all licensees could be made public. Recall (see the January issue) the agreement not to include detailed addresses, in order to prevent commercial use. In the MS Excel storage, street addresses are present, but they were not separated from the city, state, country, and postal code. Human intelligence clearly would be required to remove resolution finer than cities. With some 1500 licenses, the job would be substantial. But Dr. Liu has suggested a possible alternative. It would be trivial to omit the entire column containing the address. That would leave just the name, organizational name (if any), and country. What do readers think? Might this be adequate?

A serious potential problem has arisen, however, about the use of any such records. As explained in the January issue, a common use was expected to be verification of licensing in response to a request that is received by E-mail from some otherwise-unknown person. Robert Meredith of the New York City area receives these regularly from persons around the world who would like to receive a copy of Watcom ATP. Here is the problem: it may not be possible to know the identity of the person making the request. Also, it may not be possible to know where in the world the message originated. CompuServe provides a good illustration of the latter problem. Each E-mail address consists of a pair of numbers (separated by a period) followed by **@compuserve.com** Every CompuServe user in the world has such an address, and it is impossible to know where the person is. Recall how Prof. Mustafa Kizilcay would use his same address either back home in Germany or on the road in Jakarta, Indonesia (see the July, 1994, issue). In the case of a request by snail mail, postage stamps and their cancellation provide an indication of the country, and in response, ATP materials are mailed to some particular address in some particular town of the country. With E-mail, there is no such precision. This problem was discussed with Profs. Ametani, Kizilcay, and Prikler during their visit to BPA on June 27th following IPST'97 in Seattle. Is there a solution that does not rely on the honesty of the person making the request?

GNU ATP Runs Under DOS

This is a continuation of the same story about the use of the free DOS extender DJGPP in the preceding issue. GNU ATP for Linux also is considered.

That Type-58 S.M. code from Tokyo Electric Power Company (see story in preceding issue) caused trouble for DJGPP use, for some unknown reason. The preceding issue reported that all standard test cases had simulated perfectly following the segmentation of several stacked data cases. Yet, segmentation should not have been necessary. The need to use it was a sign of hidden, barely-controlled trouble of some sort. Addition of the Type-58 S.M. code from TEPCO seemed to disturb a precarious equilibrium. Although compiling and linking seemed normal, execution under DJGPP within a DOS window of WinNT was troubled following the Type-58 addition. Substantial numbers of the standard test cases (maybe a third?) resulted in execution that was ended by the operating system. Not knowing what to do after a week of thinking, your Editor and BPA's Dr. Tsu-huei Liu referred the problem to the GNU expert, Masahiro Kan of Toshiba Corporation in Japan. E-mail dated April 7th reported the trouble as follows: *"Execution often ends with an error termination such as the following: General Protection Fault at eip=001f4c8c eax=ff560000 ebx=00000000 ecx=000001f9 edx=ff560000 esi=00004000*

edi=0000000b
ebp=01a09290 esp=01a09280
 program=E:\GNUNT\TPBIG.EXE
cs: sel=01c7 base=01f90000 limit=7e05ffff ….
Call frame traceback EIPs:
 0x001f4c8c _malloc+308
 0x001f4c09 _malloc+177
 0x001fb994 __filbuf+80
 0x001f4e32 _getc+38
 0x001e63d7 _xrd_SL+27
 0x001ec297 _rd_ned+151
 0x001e5840 _do_fio+312
 0x0000cd34 _rstart_+92
 0x0001f6ea _spysix_+2790
 0x0001fffd _rfunl1_+13
 0x000283c5 _over1_+689 ….

We recognize names of our subroutines (over1, rfunl1, spysix, and rstart), but what do the numbers mean? …. Other cases that die in plotting return much too large numbers (e.g., 28K) to be line numbers. Prior to such output, there is a line on the screen that reads: 'Exiting due to SIGSEGV', which we take to mean a segment violation (SEGV). Some cases do work. Also, I have noticed that cases which die when sent to disk sometimes run correctly if output goes to the screen. It would seem that resources are being exhausted, and storage on disk aggravates the situation."

Newest WinNT version 4.0 is more tolerant of DJGPP use, for some unknown reason. This discovery by Mr. Kan was the first of two big breaks in repair of the damage of the preceding paragraph. In E-mail dated June 16th, Mr. Kan reported the good news: *"Today, I ran ATP/DJGPP under both WinNT 3.51 and WinNT 4.0   The results are as follows ."* Mr. Kan's table shows that DC-51 terminated normally using version 4.0 whereas version 3.51 produced *"Abnormal termination with SIGSEG fault."* The report from Portland came that same day: "Nearly all day, Tsu-huei and I have been working with GNU ATP for DJGPP. It appears that everything works perfectly provided we use the TPBIG that you supplied. We can even avoid the file segmentation that once was required for DC29, DC59, DCN3, DCN5, and DCN6. …. But then we tried to create our own TPBIG, and in this we were only partly successful. The result works exactly as it did before the TEPCO change. We need segmentation of the afore-mentioned data cases in order to avoid an operating system interrupt associated with an I/O unit, typically."

The second of two breakthroughs by Mr. Kan had to do with understanding and control of the environment of creation by GNU compilation and linking. As long as one person has creation under control, that is all the user community of the world needs. E-mail from Mr. Kan on July 23rd summarizes what he does to create perfect TPBIG for use with DJGPP in a DOS window of WinNT 4.0

A special plotting program for use with GNU ATP is being developed by Masahiro Kan. In E-mail dated July

15th, he reports encouraging progress: *"I will send my plotting software, which is included in the beta distribution of GNU ATP for DJGPP … This is basically DOS-based software now, and was proved to work under Win95. I don't know whether it works under WinNT or not. It supports only C-like and GNU binary PL4 files. It supports only PostScript files for printing. I am using Ghostscript for printing PostScript files. …. You can run by invoking as follows: C> dispatp   Then, you find the list of PL4 files. Select one by entering a number. Then select nodes (max. 6) by entering numbers. You can display waves or create PostScript files. …. You can choose 6-axis or 2-axis mode. …. Borland C V3.1 (which is old) is used to compile it."* To conclude, this is a nice extension to PCPLOT by Prof. Mustafa Kizilcay, which presumably would require FORMATTED .PL4 files from GNU ATP. Mr. Kan's program supports the more-compact and efficient C-like and UNFORMATTED files.

Simulation speed of GNU ATP compares favorably with Salford EMTP. While starting is a little slow using DOS extender DJGPP, this is negligible for a big case, and can be eliminated by using Linux. In E-mail dated May 26th, Mr. Kan reported times for his TEST_ATP.DAT --- a large test case having 354 nodes, 471 branches, much TACS, and 54 phases of compensation (List 24). For four different programs and operating systems, seconds spent in the time step loop, and total seconds, are:

ATP/Cygnus-gnuwin32-b18	128	152
Salford EMTP using DBOS	123	126
GNU ATP using DJGPP	101	104
GNU ATP using Linux	101	105

Only full seconds are shown because DBOS ver. 3.50 was used, and this reports no fractional sections, unfortunately. As for test conditions, Mr. Kan reported: *"The compiler used is g77-0.15.19.1 for DJGPP / Cygnus-gnuwin32 / Linux. ….Environment: P5-200; 48 MB memory; Win95J (DJGPP / Cygnus-gnuwin32-b18 / Salford DBOS 3.5) … The simulation speed of DJGPP is comparable to that of GNU ATP for Linux, and is about 20% faster than that of Salford DBOS. The simulation speed of Cygnus-gnuwin32-b18 is the slowest. Taking into account the fact that the simulation speed of Cygnus-gnuwin32-b17.1 was faster that that of DJGPP, the speed degradation of b18 might be questioned."*

About Cygnus ATP, Mr. Kan seems to be testing different releases of the software from Dr. Mumit Khan at the University of Wisconsin. Earlier reported results were clearly faster than Salford EMTP. What happened this time is not known. Anyway, on May 2nd, Mr. Kan reported that *"you can get g77-0.5.20 binaries for Cygwin32 from the following URL : http:// www.xraylith.wisc.edu / ~khan / software / gnu-win32"*

There is more about GNU ATP and its support by Masahiro Kan. After the preceding was written, a summary was received August 7th, just as the issue was being closed for publication. Details must await the next

issue (no space now).   But one new item can be noted: NEC PC98 (presumably a Salford-incompatible system).

Use of .TEX files with Salford EMTP

Program BATCH.EXE was mentioned in a story of the April, 1991, newsletter. At that time, before the availability of program parameters (see the RUN77 execution line of RUNTP.BAT) to Salford EMTP users, .TEX files were used to hold the 3 or 4 user responses to program prompts. For example, DC25.TEX to simulate DC25.DAT would contain the four lines: DISK

        DC25.
        -R
        STOP
The final STOP may not have been needed for DISK use, but it seemed like a good idea as a symbolic end. Program BATCH would create interactively a family of such .TEX files as well as the single associated .BAT file to order the associated program executions. This remained in general use until /PARAMS usage was suggested by Prof. Mustafa Kizilcay (see mention in the October, 1992, newsletter). Then the average user forgot about .TEX files. Why bother with the old when there is a new, better solution? Answer: some serious users had accumulated a lot of data that was executed sequentially in batch mode using them.

During the past two years, more than one person has asked why Salford EMTP no longer honors the use of such .TEX files. Perhaps the most prominent inquiry has come from GEC Alsthom in England.   Added to the private inquiries of Martin Jones (famous for his timely conversion of LEC's Lotus Manuscript files of the Rule Book to WP 5.1 format) were public (E-mail of Prof. Bruce Mork's Fargo list server) inquiries by Les. Denning. Quoting from one dated August 15th, 1996:   *"Has the way the program works been changed to prevent piping input from a .TEX file or am I doing something wrong? I can run a set of data case with their .TEX file using my pre-EEUG version of ATP called TPDYN.EXE but the same set of data cases will not run using the same .TEX file with TPBIG (March '96). .... Any help would be very much appreciated. It would be very disappointing if the piping in facility has been defeated in the latest version of ATP ...."*

A change from READ (* to CALL FLAGER seems like the most likely explanation for the loss of .TEX file compatibility. In theory, either should be equally effective for returning keyboard input. But research performed on July 19th demonstrated that the pipe failed for FLAGER whereas it was honored by the READ from standard input. So, why not give the user his choice? This is the new function of the otherwise-unused field to the right of HLETT1 in STARTUP. If value 88555. is used, use of the usual FLAGER will be replaced by READ (*. This works on your Editor's Pentium and Dr, Liu's 486 DX/2. The first beta tester was GEC Alsthom. Martin Jones was supplied by E-mail on July 23rd after agreeing to share with

Mr. Denning.

Neither the mouse (as requested by MOUSET) nor the **Esc** key should be used in response to the opening prompt ("ATP begins …") if value 88555. is used as explained in the preceding paragraph.   The   READ ignores the mouse while waiting for a line (to be ended by the **Enter** key) to be supplied. Pressing **Esc** will do nothing other than waste a line on the screen, where a backslash is seen on computers in Portland.

An all-new BATCH.EXE has been written in spite of the preceding progress with .TEX files. Public E-mail of the Fargo list server carried an announcement on July 14th with title *"Salford BATCH.EXE builds RUNIT.BAT for a family of data files."* Rather than create .TEX files as the old program did, the new BATCH.EXE only creates the associated .BAT file (name RUNIT.BAT is the default) to perform the requested simulations. For each disk file of interest, there will be a CALL RUNTP line rather than a RUN77 line. This is the modern way (use of parameters of the execution command).

Cornel Brozio of the University of Stellenbosch in South Africa contributed an important detail to program BATCH.EXE   As your Editor had explained, Salford FILES@ was being used to inventory the members of a family of disk files. Unfortunately, resulting information about date and time are stored *"in the DOS compressed format"* according to page 21-11 of the FTN77/486 Reference Manual Revision D.   Your Editor could not figure this out, so asked for help. Mr. Brozio explained that: *"DOS Int 21/57, which I presume DBOS/FTN77 uses to obtain the date and time-stamp of a file, uses the following format ....."*   This did work, and it allowed removal of code to read the ever-changing output of DOS DIR (a patch that lasted no more than 2 days). An even number of seconds is a peculiarity of the display that should be mentioned, nonetheless. The DOS compressed format provides for only 5 bits to represent seconds within each minute, so 2-second chunks are used.   Program BATCH multiplies the recorded values by two. While less than perfect, this is a big improvement over the temporary use of DIR output since DIR provides resolution no finer than one minute.

BATCH.EXE was written as an interactive program that opened a scrollable Salford window.   An MS-compatible mouse was required for use, and details were largely self-explanatory (program execution begins with a screen filled with general advice). But then a batch mode of execution was added.   If one or more parameters is detected, no window will be opened, and no other input will be considered. For example, the execution command RUN77 BATCH DC*. results in batch mode because of the single parameter DC*. that will create RUNIT.BAT (the default name for the output file). No window will open during this execution. For a different output file name,   add a second parameter (the output file name).

DISK is the default choice. If the batch-mode user wants BOTH instead, he should SET BOTH=BOTH prior to execution. The interactive user need not bother since he is able to click his mouse on the BOTH button of the heading.

Limits of 1500 data files and 5000 ATP executions have been provided. If any user can think of a need for more, it could easily be provided. Salford DBOS has no known limits, and the user seems to pay for only those parts of total virtual memory that he actually uses.

Mark Giacoppo, writing public E-mail from somewhere in Australia, prompted the recent reconsideration of BATCH.EXE for Salford EMTP. His private response dated July 17th provided quite a testamonial to automation: *"I used it with no problems. .... I use Windows 95 ... I changed the RUNTP.BAT file ... to:*
        CALL DBON
        run77 C:\atp\prg\tpbig.exe /params %1 %2 ...
        CALL DBOFF
To make the actual batch file, I created a shortcut to the BATCH.EXE file with the following specs .... To run the batch program output file, I created a shortcut to the RUNIT.BAT file, with the following specs ... To get the batch file creation up and running I simply click the BATCH.EXE shortcut icon. When that's finished, I simply click the RUNIT.BAT shortcut icon and walk away. This is very, very convenient ...."

Dependent Variables of $INCLUDE

ABB use of $INCLUDE with dependent variables was mentioned in the preceding issue. The present writing is a continuation of that initial story, which developed from a request by Jeff Peggs of Virginia Power.

The changes to ATP have been made, and resulting rules almost certainly are incompatible with ABB use. By the time coding for ATP began, nothing was remembered about the ABB example, so your Editor simply made changes in a way that seemed logical and simple to him.

For the record, the rules used by that ABB data --- apparently applicable to DCG / EPRI EMTP --- were not followed because no one associated with that usage ever contacted your Editor about his request for permission (see preceding issue). So we now have yet another difference from the commercial competition, and responsibility for this one rests clearly with those commercial developers.

An error associated with the Powell pocket calculator has slowed use. A new 3rd subcase of DCNEW-21 and its associated data generation (the DCN21INC.DAT file) in a new 3rd subcase of DC-36 are the limit to such usage thus far. These were added July 24th. Look for a generalization later, after Walter Powell can find the time to improve his logic. He is very busy now.

Randall FREQUENCY SCAN Angles

An extension to FREQUENCY SCAN was suggested by James Randall of BPA on June 18th. Why, he asked, should angles of Type-14 sinusoidal sources remain fixed as frequency is varied? There are cases where the angles should be scaled linearly with the frequency, he observed. Whereas the angles might be assumed to be balanced at the fundamental frequency, the user might require all three to be in phase at the third harmonic. The new fundamental frequency FREQFS on the FREQUENCY SCAN request card will provide this if it is given a positive value.

The new Randall logic was added to UTPF modules REQUES and SUBR10 later the same day. The effect can be seen by new standard test case DCNEW-21. The first subcase illustrates old modeling with fixed angles, and this is followed by a second using the James Randall Memorial Frequency. The difference of the two solutions is striking at 180 Hz as documented on comment cards. A delta-connected transformer is involved, not surprisingly, and this provides no path for zero-sequence current.

It seems strange that it took two decades and a younger engineer (James Randall) to suggest this now-obvious extension to a simple procedure. How many other such simple but important extensions to the program have been overlooked by everyone for years? One has to wonder.

Hoidalen Improves ATPDRAW

ATPDRAW for Microsoft Windows was announced to the general public by Prof. Bruce Mork. He began an E-mail message of his Fargo list server as follows on June 16th: *"The new windows versions of ATPDRAW, provided by Hans Hoidalen, have just now been transferred to the Michigan Tech Univ. ftp site. It will also be available on the mirror sites. The directories are within ftp://ftp.ee.mtu.edu/pub/atp/gui/atpdraw/. This is a very important advancement for ATP users who are using Microsoft Windows. Hans Hoidalen will soon issue some release notes. For now, I'll paste excerpts of his brief notes to me ...."*

ATPDRAW author Høidalen of EFI in Trondheim, Norway, began his information as follows: *"I have copied the new program system to 4 directories under the ATPDRAW directory ....: /ad_win32 : contains the ATPdraw for Windows 95/NT program ad_win32.exe and readme.32; /ad_win16: contains the ATPDraw for Windows 3.1 program ad_win16.exe and readme.16; /atp_lcc: contains the ATP_LCC program for Line / Cable constant support for Windows 3.1 lcc.exe and readme.lcc; /convert: contains a program CONVERT for*

conversion of the old ATPDraw DOS files (.CIR and .SUP) to the new format: conv.exe and readme.con"

The new compares with the old as follows. According to author Hoidalen, *"The ATPDraw for Windows program has a functionality similar to the DOS version. The selection menu (where the user selects components) is hidden, however, but appears after a right button mouse click in open space in the circuit window. Left button moves and selects object while right mouse button shows input dialog boxes. Draw connections between nodes with left mouse buttons. A User Manual does not exist for this new version, but a limited Windows help file system is available as an introductory guide."*

LINE CONSTANTS and CABLE CONSTANTS are supported, it should be noted. Author Hoidalen wrote: *"The ATP_LCC program supports most of Line/Cable Constants except Semlyen lines. In this program the user specifies line/cable geometry in input windows, sees the cross section drawn in the main window (click to zoom) and creates the required ATP file. The punch files from Line/Cable Constants can in most cases be read from the new ATPDraw version (Overhead lines (PCH) at the bottom of the Selection menu)."*

About source code, author Hoidalen explained: *"The ATPDraw for Windows program is written in Borland Delphi 2.0, which is a 32-bit Pascal compiler for Windows 95/NT with a built-in powerful design editor. About half of the old DOS source code (Borland Pascal 7.0), related to generation of the ATP file, has been kept. The rest of the code has been rewritten or extensively modified. The work has been performed by Odd Gunnar Dahl at Dahl Data Design in Trondheim, and we at EFI are very satisfied with this work. The program written in Borland Delphi 2.0 runs only under Windows 95 and NT since Delphi does not support the Win32s standard in Windows 3.1. Therefore the program has been recompiled and rewritten for Delphi 1.0 which creates 16-bit code executable on Windows 3.1/95/NT. The 32-bit Delphi 2.0 program is better and faster, however."*

Would Bill G be proud of the change? Probably. *"The ATPDraw program now has a standard Windows layout and interface. All program settings are user selectable and profileable via the standard main menu: ...."*

What might be missing? *"All the facilities present in the old DOS version are included in the Windows version except the following exceptions: Not possible to run ATP / TPPLOT directly from ATPDraw (this has been left out to avoid problems related to DBOS incompatibility), the 3-phase Fortran TACS object is removed (it should be replace by 3 single phase Fortran TACS objects)."*

Improved robustness and security are claims that are made for the new program: *"In this category come the new file formats of circuit and support files. The old circuit file was on a simple text format which was very disc space efficient but if the file for some reason was on the wrong format a program crash occurred. The new circuit file format is a binary dump of the data structure in memory. This is very fast, allows a test of the correct file format, makes it easier to distinguish between different versions."*

User convenience and flexibility also seem to be considerably enhanced: *"In addition to this some more data has been added to the file, ... The full path to the support file is included in the data structure so that the user can store the .SUP files anywhere he likes .... The support files are editable via Objects in ATPDraw's main menu. A new ATPDraw.ini file has also been added on a standard Windows format. This file is editable via Tools|Options in ATPDraw's main menu. In this file the default miscellaneous ATP data are stored along with settings of directories, Auto Save and UnDo/ReDo buffer settings and window color etc."*

General principles remain largely unchanged: *"There is no change in the way the user builds up a circuit in the circuit window, except that the selection menu is normally hidden and appears after a right mouse click in open space in the circuit window. Left mouse button moves and selects/unselects objects while the right mouse button performs the input windows. Connections are drawn by left mouse clicks on nodes. Clicking left mouse button on an object selects this object and makes it moveable."*

On-line advice seems to have expanded: *"A Windows help file for ATPDraw is also now available. This file provides help on all windows and menus in ATPDraw and how to built up a circuit. Several links between help pages and a relatively large index register for searching exists. However, little technical information related to ATP is yet available. The available help is anyhow more extensive than for the DOS version. It will be possible to extend the help file considerably, including more bitmaps and e.g. an ATPDraw tutorial."*

Geometric and conductor data for lines and cables now is recognized: *"A completely new program called ATP_LCC for Line/Cable Constants support has been written in Borland Delphi 1.0. This program is a 16-bit program executable under Windows 3.1/95/NT. In the ATP_LCC program the user can specify the cross section data and material data for an overhead line or a cable system in input windows. The specified cross section is drawn in the main windows and zooming and export to the windows clipboard is supported."*

Conversion of old data to new also has been provided: *"A small program called Convert.exe which converts old DOS version circuit and support files to the new format has also been created. This program is written in Delphi 1.0 and runs under Windows 3.1/95/NT. In this program*

the user specifies the Windows directory and the DOS directory and which type of files to convert."

To conclude, the latest work on ATPDRAW in Trondheim seems to be revolutionary and impressive. It should provide a big incentive for many who thus far have resisted the use of MS Windows for their ATP-related computer work. Suddenly, there is a very good reason for an ATPDRAW user to work within MS Windows. Meanwhile, what has happened to the work by Tamir Orbach? See the story entitled "Orbach Pricing: $20K → $600?" in the July, 1996, issue. Does any experienced and credible ATP user still have serious interest? If so, a comparison between the two ATP data assemblers that run under MS Windows would be welcomed.

Prof. Mack Grady of the University of Texas at Austin reported interesting ATPDRAW use. From E-mail dated April 24th: *"I recently completed the power quality guide for PacifiCorp that revolves around ATPDRAW and ATP, and uses MODELS extensively for harmonic loads. If you would like to see it, you can download it from my web page .... http://www.ece.utexas.edu/~grady/*

Transformer Fault Simulation

Instability of the simulation of a transformer fault has been another ATP mystery that has been clarified by the experienced analysis of Gabor Furst of suburban Vancouver, B. C., Canada. The problem belonged to Peter Palmer-Buckle of Texas A&M University, and the explanation (next paragraph) was made public in E-mail from the Fargo list server dated July 15th.

Messrs. Furst and Buckle wrote about *"a model representing an internal HV winding to tank fault in a single phase distribution transformer. The model was created by MATLAB generating the equations of the faulted transformer. The instability problem was quickly cured by either reducing DELTAT or renaming nodes. It was, however, observed that the model yielded incorrect results. The reason for this is still being looked at .... It may be of interest to note that there is a simple EMTP solution to the problem, which does not require the forming of a set of equations describing the faulted transformer outside EMTP. The winding to tank (ground) fault can be modeled by a simple autotransformer, with its lower voltage tap being the faulted point in the winding. The transformer can then be modeled using BCTRAN (or the regular saturable transformer model). The only problem the user has to tackle is to determine the leakage inductance between the two parts of the HV (or LV) winding, namely terminal to fault and fault to ground terminal. This can be quite tricky as it depends on the actual winding configuration. For example this reactance is very high for faults near the neutral point, which is of course known from practice, as such faults are very difficult to detect."*

Determination of *"the leakage inductance between two parts of the HV-LV winding"* might proceed as follows according to the advice of Arvind Chaudhary of Sargent and Lundy in Chicago: *"The best bet is to look at 'The theory of Alternating-Current Machinery', by Alexander S. Lagsdorf. The derivation of the transformer leakage inductance formula is shown and may help to derive your particular leakage inductance. Other books are J & P Transformer Book, and 'Transformer Engineering' by Blume & Boyajian."*

Publishing Programs and Viewers

WordPerfect 5.2 might have trouble reading 5.1 files as used by the user group. This frightening possibility was suggested in public E-mail dated April 12th, when Dr. Lance Grainger of Edmonton, Alberta, Canada, reported: *"Upon attempting to open the files using my WordPerfect version 5.2 software I was unable to do so as the 'Enter Password' message appeared."* Five days later, your Editor responded publicly as follows : *"Needless to say, files are not supposed to be locked. Is this a peculiarity of version 5.2 software? If anyone else has observed the phenomenon, he is asked to report his findings including the name of the file that can not be opened."*

Grammar is more difficult to check than spelling because it requires human intelligence. Yes, there are grammar-checking computer programs, but is any of them worth using? From what your Editor has seen of the offering within MS Word for Windows version 6.0, the answer might be no. Operation on the July, 1996, issue of this newsletter was found to be so laborious as to be practically useless. Over and over, the MS grammar checker would complain about a *passive voice*. Prof. Laszlo Prikler of T.U. Budapest in Hungary had made this observation earlier, but your Editor did not understand, so eventually he decided to see for himself. An illustration is provided by a preceding sentence of this paragraph, which begins *"Operation on the July ...."* Why does Bill G not like such great writing, anyway (joke)?

Acrobat Reader is the name of a freeware document viewer for PDF files that can be obtained from Adobe Systems. Envoy is the name of a comparable but different viewer that can be obtained from Novell, and which is bundled with Corel WP 7. About PDF, Prof. Laszlo Prikler of T.U. Budapest in Hungary provided important observations in private E-mail dated May 8th: *"I also have some experience with Adobe Acrobat and Envoy. PDF seems to be accepted as a 'standard' by IEEE and CIGRE. Lots of IEEE documents are available this way. Reports of the CIGRE 1996 sessions have also been published as .PDF files on CD-ROM. The publisher requested us to submit reports on floppy if the paper was being created by word processor. In my case it was a 2.16 MB Winword 2.0 file (including a large bitmap and ~10 vector graphic pictures). CIGRE staff has converted it into .PDF and it*

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resulted a 254 kB file. (Yes! nearly 1/10th of the original, due to the large embedded bitmap figure created by HKH's ATPDRAW, I guess)   Readability of our paper was comparable to the original WW2 after conversion. Some authors, however, were not able or did not want to submit the paper as an electronic file, so such reports were scanned and converted to .PDF from the original paper copy. These .PDFs are practically useless (as electronic documents and not in the scientific point of view of course). Reading is impossible on the screen and the only way of getting acceptable quality is printing with a laser printer."

About Envoy,   Prof. Prikler wrote: *"I have also received the CABLE PARAMETERS file in Envoy format from Prof. Kizilcay. I like it.   Using Envoy Viewer is simple. .... Zooming is much better in Envoy.   Envoy supports the 'Presentation' feature or linking with other objects, which seems promising (especially for lecturers). Conclusion: Envoy seems better taking the ATP Users' need, I think. Unfortunately, it is not supported (yet?) by Microsoft ...."*

Gayland Bloethe of Sargent and Lundy in Chicago, Illinois, USA, had similar thoughts. Quoting from private E-mail dated May 9th: *"In addition to supporting more platforms, one advantage of Acrobat is that it seems to be more widely used than Envoy. In our industry both the Energy Information Agency of the Department of Energy and the NERC are routinely posting documents in PDF format."* But who cares about other use? How long does it take to learn to use a document viewer? Maybe 5 minutes? What we want is the best,   since the viewer is small compared with ATP-related files (Rule Book, Theory Book, newsletters, etc.) to which it would be applied.

The dependence of document appearance on fonts was confirmed by Robert Meredith of the suburban New York City area. Recall the preceding newsletter ended with an observation that "exactly 20 perfect-looking pages are involved."   In E-mail dated May 16th,   Mr. Meredith observed: *"Or exactly 21 1/2 pages with my default margins! Looks like another reason to lock in the format with PDF!"*   But will either Adobe PDF or Novell Envoy make uniform the appearance on the screen? If so, what about paper copies that might be printed on different printers --- Are these different than what is seen on the screen? If so, is this really progress? What we really want are images that are the same regardless of what device might be used for display.

Corel WordPerfect (WP) 7 does not do a very good job of displaying those WP 5.1 disk files that replicate BPA's EMTP Theory Book (see the July and October, 1995, issues).   There is was summarized in public E-mail dated July 22nd: *"As time passes, and WordPerfect Corporation is passed from one purchaser (Novell) to another (Corel), interest in WP compatibility with the past has been seriously compromised. ... But what is the alternative to WP 7? At this point, this writer sees no practical one. WP*

7 may not be great for WP 5.1 files, but MS Word ver. 6.0, as supplied by BPA, seems hopeless --- at least for use with those WP 5.1 Theory Book files. Selective testing by BPA's Dr. Tsu-huei Liu shows that MS Word on her Pentium frequently will refuse an attempted conversion (there is an error message mentioning possible corruption of the input file). So, she has been experimenting with WP 7, and results are promising."

Details were provided by Dr. Liu the following day. Excerpts convey the flavor: *"Specifically, some of the text below a given equation typically is missing from the screen display. If one were to print such a page, the missing text would show up lying on top of the associated equation. Fortunately, such missing text is visible using **Reveal Codes** of WP7, and I found a way to recover it: 1) Click on **Edit Box** for the equation of interest. The **Wrap text** symbol is **Neither Side**.   2) Click on **Wrap text**, then ... At this point, the missing text or messed-up equation(s) should be recovered correctly .... I also noticed that the space separating stacked equations might be missing in the WP7 display. I managed to recover the missing space by clicking on .... The aforementioned information was explained to WP technical support by telephone last Friday. I was told by the WP expert that he was aware of some problems regarding the conversion of equations between WP5.x and WP7, but not exactly the symptoms we have seen using the EMTP Theory Book files.   To conclude, there was no promise of improvement anytime soon, and no suggestion of a better procedure than the one just outlined. So, correction of the Theory Book files is proceeding slowly as outlined."*

Miscellaneous Intel PC Information

Digital cameras were reviewed in the May issue of Computer Shopper.   As the story begins on page 186: *"Digital cameras let you point, shoot, and transfer your images directly to your PC, making it easy to add photographs to a variety of applications. .... This month, we examined digital cameras available by mail for less than $600 --- from the $186 Eastman Kodak DC20 to the $593 Casio QV-100 ...."*

WebTV is the latest product to compete with PCs for Internet access by the masses. Recall . Destination PC-TV by Gateway, which was explained one year ago. That was the high-end solution: an Intel-based PC that offered adequate bandwidth of display to handle television, too. At the other end of the spectrum is WebTV by Sony, which was being offered by SonyOnly for $329 in full-page advertising on page 7 of the July 30th issue of Willamette Week, a weekly Portland newspaper.   *"Requires any television and telephone line"* is the explanation. Why pay for a real PC when one is not needed to surf the Internet? That seems to be the sales pitch, and it may well be successful with many viewers who do not now own a PC.

Miscellaneous Small Items

DATA BASE MODULE is the request for transfer to a supporting program that will produce $INCLUDE files with arguments. An illustration is provided by DC-36, and a limit of 200 argument uses (not arguments) was in effect until July 5th when expansion was prompted by Paolo Mattavelli of the University of Padova in Italy. Using public E-mail of the Fargo list server, he reported the following error message on July 2nd: "Overflow argument limit of 200 at card number N16 = 521. Halt immediately!" Well, the scale of $INCLUDE use with arguments seems to be growing, so it was decided that drastic action would be appropriate. Rather than any fixed limit, a variable limit now is applicable. For simplicity, existing LBRNCH of List 2 was chosen as the new limit. Since this has value 3000 within the limiting sizes of the .BPA file as distributed to others, it seems likely that users should be satisfied for a long time.

LISTSIZE.DAT is used to dimension ATP tables at the start of execution as first explained in the October, 1993, newsletter. If this disk file does not exist, ATP is supposed to resort of maximum dimensions. It does, generally --- but not for the working space of supporting programs. This was prior to July 7th when correction was made following a complaint by Masahiro Kan in Japan. Testing a new GNU translation (see separate story), Mr. Kan observed that plot data points were flushed to disk more often than they should be for several cases such as DCN-20 (illustration of the new Type-58 S.M. model from TEPCO). Instead of the usual 240K cells of working space for such storage, a mere 40K were being used when LISTSIZE.DAT was absent. This was a universal error, too --- easily duplicated using Salford.

A Type-4 induction motor (3-phase U.M. modeling with wound rotor) can be initialized automatically only if the subnetwork to which the armature coils are connected has at least one source present during the phasor solution. This was learned from Jules Esztergalyos of BPA, who inadvertently omitted the values -1.0 in columns 61-70 for T-start of his Type-14 sources. Data bore considerable similarity to DCNEW-12, except for the missing requests of columns 61-70. The result was an operating system error in UMRNU3 after two phasor solutions already had been completed (there was a line of network loss for each, of course). Salford DBOS complained about division by zero. August 8th, UMRNU3 was modified to allow execution to continue. The resulting solution will be quite different than the user intended, of course, and this should notify him of his data error. For the data of Mr. Esztergalyos, the phasor solution showed zero voltages and currents for branches connected to the armature, and armature voltages at time zero were zero. This should be enough to alert the user to big trouble. It seems better than death at the hands of DBOS prior to output of the phasor branch flows.

"Ginsberg's Theorem: 1) You can't win; 2) you can't break even; 3) you can't even quit the game. Freeman's commentary on Ginsberg's Theorem: 1) Capitalism is based on the assumption that you can win; 2) socialism is based on the assumption that you can break even; 3) mysticism is based on the assumption that you can quit the game." This is another of Walter Powell's contributions to Dr. Liu's white board.

VAX/VMS is the original operating system of DEC VAX computers, and Open VMS is the corresponding operating system for DEC Alpha, the high-speed RISC workstations. Users Goldsworthy, Randall, and Hasibar at BPA continue to use ATP via VMS workstations at a different site, so ATP translations for DEC VMS continue to be produced and tested from time to time. Most recently, this was June 30th, when the passing of files from Dr. Liu's Pentium to one of BPA's main VAXs (yes, they still exist) proved to be the problem. This was explained as follows in E-mail to Robert Meredith of the New York City area: "Yesterday, we found that the old file transfer program that worked under old NT no longer works under NT 4.0. That was *Reflections*, or some such product. So, there was a switch to another (*Hummingbird*), but that could not be made to work for disk files created by a translator (in this case, for VAX). Tsu-huei even had the experts in here this morning. No one knows what the trouble is. The files eventually were transferred to the VAX, but via a Unix computer!" To conclude, the support of VMS is a ever-changing burden. Yet, it is manageable because graphics can be ignored (Randy Suhrbier's plotting program continues to satisfy user needs admirably, it would seem).

Apple Macintosh time trials were performed by Stu Cook of the suburban Montreal, Quebec, Canada, area. Having just returned from the MacWorld computer show in Boston, he reported the following in E-mail dated August 8th: *"I was able to test the latest PPC version of ATP on two of the latest machines on the floor. …. The first machine tested was a Motorola StarMax 6000/233 which contains a 233-MHz 750 PPC. The time-step loop timing for this test was 6.317 (for DC-1). The second machine was an Apple PowerMac 9600/350 which has a 350-MHz 604e PPC. The time-step loop timing for this test was 5.583 …. neither of these tests were under ideal conditions as the computer systems were fully loaded for show demo purposes."* To conclude, these Macs simulate very fast by Intel PC standards. There is some similarity to DEC Alpha as reported by Stephen Boroczky of TransGrid in Sydney, Australia (see January issue). That is, very fast but not considering the clock speed. Multiplied by clock speeds, these PPC (Motorola PowerPC) times are longer than comparably-normalized Intel Pentium results. The following day, Mr. Cook added a final thought: *"In both cases the program was run from a Zip drive and not from the internal hard disk of these machines. What penalty there was for this, I have no idea; but it must have been slower."*