
Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Salford Compiler and DOS Extender

Interactive use of DISK or BOTH no longer terminates program execution as it once did prior to June 3rd. Batch-mode use (e.g., RUNTP.BAT of the GIVE2 disk) continues to terminate execution, but interactive (through the keyboard) use does not. Just as for use without DISK or BOTH, interactive use now ends back at the opening prompt ("EMTP begins ...") when the processing of one disk file is complete. There now is uniformity of interactive use, with only **Esc** or **STOP** ending execution in response to the opening prompt. Modern motivation for this work came from Bernd Stein of FGH in Mannheim, Germany. His E-mail dated May 19th and 20th described repeated execution from PFE.

The location of parallel output files was unified on June 3rd. Recall $KTRPL4 < 0$ represents a request for parallel file naming, and this generally has been the preferred choice for years. However, operation was inconsistent if the .LIS file for printout (assuming use of DISK or BOTH) was located remotely from the data file. Whereas the PostScript output .PS was created in parallel with the .LIS file, other files such as .DBG and .PL4 were created in parallel with the .DAT file. For improved uniformity, all parallel outputs were made parallel to the .LIS file. This seemed more consistent and less confusing.

The PostScript output file properly paralleled the .LIS file for $LU6VRT > 0$, but not for $LU6VRT = 0$. This was prior to recognition of the problem, and correction within installation-dependent SYSDEP, on June 21st. Correction was made for Watcom and GNU versions the following day.

Attempted use of GLITZ.LIS resulted in damage to screen content prior to changes within WGLITZ on June 3rd. First, the screen was not saved immediately before attempted opening of the HELP window, as it should have been. As a result, even if the window opened and closed properly, the screen was not properly returned to its original state upon conclusion of the HELP display. On the other hand, if GLITZ.LIS could not be connected, the screen was simply altered improperly without any glitzy information at all being seen.

Positive LUNTEX represents a request for external program text. Of course, to use this, one needs a copy of BLOCKD51.BIN (the disk file of program text). Since the .BIN file was not distributed to others, it is no surprise that a recent problem went unnoticed. Your Editor made a correction to RFUNL1 following an unsuccessful test that was inspired by Prof. Mustafa Kizilcay of FH Osnabruck in Germany. Prof. Kizilcay had noticed that GNU ATP uses external text, and had wondered why Salford did not. Well, it can, although operation became unusable following the expansion to 132-byte file names (variables SPY132 and CIM132). A correction was made July 12th, and all test cases then were verified using external text. About speed, there is not much difference for all standard test cases, using Dr. Liu's 486 DX/2 at BPA. The elapsed times in mm:ss are: 1) 45:02 with text internal and 2) 47:18 with text external. These were measured using real MS-DOS (no MS Windows), and no networking, so should be reliable.

KTRPL4 = -6666 was described in the April issue. Although use should be acceptable with Salford DBOS, a special danger existed prior to correction on July 20th. Trouble first was reported a day earlier by Prof. Kizilcay. With inadequate real memory, the DIR command will fail, and bad things might follow. When tested using Dr. Liu's 486 DX/2, execution hanged, and it was necessary to press the hardware reset button. But after modification, a clean exit occurred after the following error message: *"DBOS error executing DIR for KTRPL4 = -6666. Most likely, real memory available to DBOS is too small."*

A second weakness of the KTRPL4 = -6666 logic was removed the following day, when an error stop was added to handle situations where DIR output was not of the form assumed. If an end-of-file is encountered instead of the expected leading line, the following error message now can be expected: *"DIR to honor KTRPL4 = -6666 has unexpected heading. Switch to -3, etc. before retrying. Halt."*

News from Outside USA and Canada

Increased price of mail to Mexico was mentioned in the April issue, for materials ordered from Dr. Kai-Hwa Ger in West Linn. Since then, price of mail to Canada has been raised, although not as much. As updated July 13th, the

order form mentions that *"Canada is \$55, not \$50"* for a printed copy of the 850-page ATP Rule Book.

The U.S. Postal Service (USPS) finally can be described more favorably. Not because mail is being delivered faster or better, unfortunately. Rather, because of its speedy bicyclists. On July 25th, Lance Armstrong of the USPS team won the 20-day *Tour de France* bicycle race.

"A new issue of the EMTP News in Spanish and Portuguese (only in Portuguese and Spanish!) is already available at the following web site <http://iitree.ing.unlp.edu.ar/estudios/caue/revista.htm> As in the previous issue, the new one includes four papers in PDF format, dealing with different ATP applications. As usual." This explanation by Prof. Juan Martinez Velasco of the Polytechnic University of Catalunya in Barcelona, Spain, was received from the Fargo list server on June 15th.

More about the Internet and E-mail

Four days of trouble with Internet use at BPA ended Tuesday morning, June 15th, shortly after an 08:26 AM message of explanation from Sherri Buel of BPA's computer establishment: *"The Internet going to the outside is still down. I will let you know when it is back up. US West is the problem at this point."* Of course, US West is the regional telephone company (one of the Baby Bells). The following hour, more than 9 messages were received. To summarize, service is good when everything works normally, but reliability remains a problem.

The Fargo list server refuses to disseminate a message that includes *"a Sender, From, or Reply-To that points to the listserver itself ..."* This according to E-mail from the manager of the ATP-EMTP list, which is Prof. Bruce Mork of Michigan Tech in Houghton. His explanation dated June 8th followed unsuccessful attempts by Orlando Hevia in Argentina and Dr. Tsu-huei Liu in Portland. Your Editor subsequently failed, although this was after adding "<" to the left of E-mail header lines. Such perturbation of the lines did not help, however. But Mr. Hevia's removal of addresses finally (this was the 4th attempt) succeeded. About rejection of your Editor's attempt, Prof. Mork wrote: *"I cannot recall this happening before, however, since I created this listserver in 1992!"* Your Editor agreed. Many other persons must have tried to include list server mail long before Mr. Hevia's recent attempt. Your Editor offered the opinion that the latest protection must represent a recent change.

Broken long lines (wraparound at or near column 73) were a problem of older MS Mail as explained in the January issue. This continued to be a problem with newer MS Outlook 98 (see April issue), as explained in E-mail of the Fargo list server dated March 17th. Your Editor had asked: *"How about Bill G's later and greater Outlook 98? Is there a switch that can be set to prevent such damage to*

lines? Otherwise, to be considered here in Portland, the data had better be PKZIP-ped before it is attached." Robert Wheat of Los Alamos National Laboratories (LANL) performed some experiments and reported what seems to be happening. This was in E-mail dated March 23rd. He wrote: "I have a couple of computers setup with Windows NT4.0 and MS Outlook 98 V. 8.5.5104.6. After sending e-mail messages with Eudora (V 4.1), Netscape Mail (V 4.07), and MS Outlook, and receiving them with each, it seems that word wrap is determined by two things. There is an 'on screen' word wrap which is controlled by the size of the window viewing the text. If the width of the window is increased, the line lengths will be increased to fit the window up to a carriage return and/or line feed. In other words, there is no cr/lf inserted into the text itself for this type of word wrap. The second thing that determines the word wrap column is the e-mail client used to send the e-mail. All of the aforementioned e-mail clients have a setting for 'automatically wrap lines at XXX characters when sending mail'. If word wrap is disabled (or XXX set to a very large number) on the e-mail client doing the sending, the line length in the received e-mail is unlimited or as long as XXX. If the line of text in the received e-mail will not fit in the display window, MS Outlook will wrap the text on the screen for viewing purposes, as will the other e-mail clients. One can verify that no carriage return or line feed has been added to the text by either increasing the displaying window width or copying the text into Notepad and turning the word wrap option off (under the EDIT menu). There should be a scroll bar at the bottom of the Notepad window if the line of text exceeds the window width. Word wrap can be completely disabled using Eudora, but apparently not on Netscape and MS Outlook. In these cases, I merely set the 'wrap at XXX characters' number to an arbitrarily large number. All three e-mail clients successfully sent, received, and displayed lines longer than 80 characters, meaning that ATP data files would be sent, received and displayed without broken lines. This was actually verified. Each e-mail client sent and received an ATP data file without the lines being broken. Conclusion: The sending e-mail client is wrapping lines at about 76 characters which causes lines in ATP data cases to be broken. When I say 'sending' e-mail client, am I referring to the client on the ATP users computer, or the e-mail server listserv.nodak.edu? It was my observation that on all three e-mail clients I tested, 'wrap at XXX characters' was defaulted to 76. The following is from Marty Hoag in response to the line wrap question sent to postmaster@listserv.nodak.edu: 'No, as far as I know we do no wrapping at all on the body of the mail; at least normal list mail (mail distributed by an e-mail list).' So, the source of the broken line problem appears to be with the configuration of the sending e-mail clients, unless I've just completely missed the boat. The following two lines are 80 columns wide."

Conventional (expensive) stock and bond traders continue to lose business to lower-priced competitors who communicate with their customers using the Internet.

Morningstar, Inc. of www.morningstar.net marked the accelerating trend by posting a Reuters story about Merrill Lynch. Dated June 2nd, this article is entitled "Merrill's online move spurs Wall Street to action." It provides a good summary of the Internet-inspired revolution: "Wall Street's full-service brokers long opposed online trading for fear it would eat into commissions. But as the largest U.S. broker swallows its pride to offer cyber-trading, other brokers will fall into step like dominoes ... Margins might narrow and revenues could dip in the process, some analysts say, but Wall Street appears to have little choice but to embrace the Internet given the awe-inspiring growth of online discount brokers like Charles Schwab Corp. ... The worry on Wall Street is that broker commissions, a chunk of which go to the firm, will dwindle as customers race online and profits could be hurt. Other full-service and online brokers might also be forced to cut prices to compete as the cost of trading securities tumbles. ... Merrill took out a three-page ad in the New York Times (NYT) business section on Wednesday to advertise its new plan."

Mississippi State University was the location from which the July newsletter first became available on the Internet. This was July 10th, when Russell W. Patterson of TVA (Tennessee Valley Authority) in Chattanooga, Tennessee answered your Editor's call for help. What was the problem? Your Editor's semi-public E-mail of the Fargo list server explained: "Nearly 48 hours ago, .PDF copies of the July newsletter were sent to 4 persons who were believed able to make a copy available to others One day later (one day ago), after receiving no announcement of availability from Fargo, a secondary mailing was made" to 6 more contacts. "Still no announcement from Fargo." So, your Editor asked for a volunteer, and Mr. Patterson responded. It was that simple. The announcement later that same morning read as follows: "Subject: July Can/Am Newsletter available. Y'all: You can get the July 1999 newsletter at the following url: <http://www2.msstate.edu/~rwp1/atp.htm> This url is a link from my school home page: <http://www2.msstate.edu/~rwp1> As long as disk space holds out I'd be glad to maintain these pdf's on my account." About y'all, this is short for you all in the Southeastern USA. In this message, it is used as a salutation such as Hello world or Greetings!

"Counter by Rapid Access" was the explanation of the digital counter of usage at the bottom of Mr. Patterson's home page. Your Editor had asked about this, and the following week he received a message with subject "Traffic Report From Rapid Access." Dated July 17th, this began: "Here is the traffic report on how many hits the page I set up (for newsletter archival) has had. The total now is 32 hits since I added the counter." The following was interesting. It includes tables entitled "Daily Report," "Hourly Report," and "Where your Visitors Came From." Of course, the .COM and .NET addresses defy geographical classification. In place of a country name, one sees "US Commercial" and "Network," respectively.

"Evening stock trading -- it's just a question of when" is the title of a Morningstar story by David Kathman dated the 28th of May. Once again, the Internet seems to be the driving force. After a summary of how and why numerous previous attempts to extend hours of various markets have been less than successful, there is explanation of the latest move. But first, what is the news? "On Thursday, the National Association of Securities Dealers, the parent of the Nasdaq and American Stock Exchanges, voted to begin preparing for an extended evening trading session for the 100 largest non-financial stocks on Nasdaq. This session would last from 5:30 PM Eastern time, an hour after the markets currently close, until 9 or 10 PM Eastern." About the motivation: "This new push toward evening stock trading is different ... this time it's individual investors who are the driving force. ... Many of these investors trade over the Internet, and would like to be able to make trades immediately when they're home in the evening, rather than placing an order to be executed the following morning. ... The New York Stock Exchange and Nasdaq are being prodded to act because smaller players are already moving in to cater to increased demand for after-hours trading. Most of these are alternative trading systems, or ATSs, which bring buyers and sellers together outside the formalized stock markets and thus aren't regulated by the SEC. In April, a tiny Florida company called NexTrade ECN announced the first 24-hour-a-day, 7-days-a-week trading system."

Gambling via the Internet was introduced in the January, 1998, issue. Now, there is a continuation. *"Web sites liable under law of country where accessed"* is the title of a story in *The Register* dated July 28th. *"A ... judge in New York may have changed the landscape for Internet companies who base their services in out of the way countries. ... Ramos has ruled that an Antiguan gambling site is covered by the laws of New York state simply because the service can be accessed from there. ... These rulings contain a number of implications for Web-based companies and the likelihood of them being sued."* But don't forget financing: defendants should be able to afford plenty of appeals. This is just the first word, not the last word.

Instant messaging programs were the subject of a dispute that separated AOL (the innovator) from Microsoft and Yahoo (the envious have-nots). According to a July 24th story by Michael J. Martinez, found at the ABC News Web site: *"On Thursday, Microsoft proudly announced that it was going head-to-head with AOL in instant messaging: small programs that give users the ability to type real-time messages to each other without using e-mail or Web browsers."* But AOL was angry. *"Instant messaging programs from the Microsoft Network and Yahoo! were accessing their database of nearly 40 million AOL Instant Messenger users" without permission, creating "a bridge to AOL's servers, linking users of MSN and Yahoo! to every AOL Instant Messenger (AIM) user. AOL was able to shut down the connection Thursday night."* Someone who has used E-mail for years finds it hard to become excited about

instant messaging. But there is the interactive aspect, which might be important for trivial things. *"Last month at the PC Expo computer show in New York City, AOL chief technology officer Marc Andreessen said instant messaging would be the next 'killer app' on the Internet -- a program that would be used just as much as e-mail and Web browsers are today."* AOL's numbers already are huge: *"... AIM's 40 million registered users and another 35 million coming in through ICQ Inc., which AOL purchased last year."*

Thousands of domain names are for sale, although there are few buyers. Most names seem to involve simple, clever, or offensive combinations of common English words. According to Lindsey Arent, who wrote a July 9th story on the subject for *Wired News*, *"EBay alone hosts nearly 1,000 domain auctions every day. Problem is, there aren't any takers. ... Still, there are those who believe that today's worthless domain names, such as the as-yet-unsold Sleaziest.com, at \$269, could be worth millions in the years to come."* The story describes one guy who claims to have spent nearly \$1 million to acquire more than 3,000 names. He is quoted as saying: *"It'll be worth hundreds of millions in about 10 years."* Like Internet stocks (preceding issue) or tulip mania of 17th-century Holland, investment in domain names seems to involve more faith and luck than it does intelligence.

The AOL mailbox of EEUG Chairman Kizilcay was found to be inadequate for large attachments around the end of June when new copies of Salford, Watcom, and Mingw32 ATP were needed for European distribution. BPA's Dr. Tsu-huei Liu and your Editor would send TPBIG.ZIP attached to ordinary E-mail, and it would be received by Prof. Kizilcay, but could not be used. Why? Typically Prof. Kizilcay would experience errors during use of PKUNZIP to decompress the archive. Not always, but regularly (nearly always). Whereas a year ago there was no known problem, this summer the service became unusable. Of course, Prof. Kizilcay inquired of AOL, but the advice he received was less than satisfying. Initially, there was an attempt to blame the problem on file size. From E-mail dated August 2nd: *"I consulted with AOL technical service about this problem. The answer is there is no guarantee to transfer files > 1 MByte correctly as an attachment of Email. AOL does not limit the size, but they warn that any mail server between source and destination may corrupt the file."* So, TPBIG.ZIP was split into pieces no larger than 500 Kbytes using HJSPLIT, but this worked no better. AOL experts then seemed to blame BPA. From E-mail one day later: *"AOL hot-line suggests that the trouble should be with BPA's Email system. I told them about our tests with HJSPLIT.ZIP/SPLIT.ZIP. They claim that in our 1st test with HJSPLIT.ZIP, the file would have been modified as it left BPA."* But this seemed unlikely because the same file was received without difficulty by Prof. Laszlo Prikler of T.U. Budapest in Hungary. Finally, Prof. Prikler suggested that secure FTP transfers to his computer be used as an alternative. This was July 3rd, and it worked --- both

flawlessly and rapidly. Your Editor reported later that same day: *"The transmission took 35.37 sec, for an average speed of 39.23 Kbytes/sec. As you write, very fast."*

m@kizilcay.de is the new E-mail address used by Prof. Mustafa Kizilcay of FH Osnabruck in Germany. This was learned on September 14th when E-mail explained: *"I am sending this Email from my new Email adress ... As you see, I have my own domain name kizilcay.de I am testing a new Internet provider 1&1 from Germany. I have a free space of 10 MB for Web page and 2 Email addresses. Important, the size of an Email can be max. 10 MBytes!"*

AOL was used by Prof. Kizilcay during months past, and it remains the world's largest provider of Internet access. However, it also has problems, just as CompuServe before it did. The industry is changing rapidly, and the value of AOL stock is nowhere near its peak. Investors now realize that future profit is less than guaranteed as various huge corporations wage *Internet Wars*. Specifically, in various countries, AOL profit has recently been threatened by competitors who offer free access. Prof. Kizilcay obviously sees signs of trouble for AOL in Germany. His insight on September 16th is interesting: *"This new provider 1&1 has an international roaming contract in 90 countries including for example Turkey. I think, sending an Email from foreign countries is not a problem as you wrote. The main problem is to get access to Internet (telephone number to dial in that country). ... From 1 October 1999 onward, AOL announced Internet access for unlimited time for 9.90 DM/month. Until now, maximum 3 hours Internet were free at the same fee. My arguments for switching to the provider 1&1 were: 1) I intend to set up my own Web page for professional purposes. For this, **www.kizilcay.de** is certainly more attractive than **members.aol.com/kizilcay** Also, the space for Web/FTP is not password-protected at AOL. 2) I do not like Email handling of AOL software. You cannot define mail filters to sort incoming Email. You cannot even sort Emails stored in folders with regard to date. Address book is integrated to the huge 'organizer' file. So, you cannot export the address book to use it on your notebook PC. AOL does not allow use of external programs for Email, such as MS Outlook and Netscape Messenger. For Email, I now use Netscape Messenger, which is part of Netscape Communicator. This software satisfies fully my needs."*

"IBM workers start trade union" is the title of a story dated July 17th. Published by *The Register*, this explains how some once-envied IBM workers seem less than grateful in these modern, competitive times. *"Workers at Big Blue are in revolt over a proposed change in pension plans and are trying to organise a union. And the workers are using the Internet to coordinate their efforts."* The Web site mentioned is **www.ibmunion.com** Later addition: faced with bad press and an uprising of older workers, IBM seems to have compromised. Look for more in the next issue.

European EMTP User Group (EEUG)

"CD-ROM distribution of ATP materials" was the history-making subject of private E-mail dated July 18th. In this, EEUG Chairman Mustafa Kizilcay explained: *"CD-ROM for annual distribution of 1999 is almost complete. Following are the contents ..."* For those who have CD readers, this represents enormous progress due to the expanded volume (about 650 Mbytes). No longer must compromises be made. EEUG can now send everything it has, including 3 executable versions of ATP for Intel-based PCs (Salford, Watcom, and GNU-Mingw32 versions).

The University of Calabria in southern Italy is to host the annual meeting of EEUG November 8-10 as briefly mentioned in the IPST story. EEUG Deputy Chairman Prikler issued a semi-public announcement using the Fargo list server on August 22nd. This explained: *"The place of the meeting is Hotel Caposuveto at Gizzeria Lido, close to the airport Lamezia Terme S. Eufemia. Immediately after the meeting, a one day ATP course is offered for participants and interested ATP users with the title of 'Efficient use of ATP & modeling of transformers with saturation'. Announcement and call for papers, brochures for the meeting and the course, as well as the registration and hotel booking form for both events, are available on the EEUG web site at <http://www.vmt.bme.hu/eeug> in PDF format. Local Organizer of the meeting and the course: Prof. Daniele Menniti ..."* Your Editor's observation: great location for a November meeting.

Watcom ATP for MS Windows

COMP6.BAT was mentioned in the January issue. Beginning June 21st, a COMP7 is being used. Yet another change to Watcom ATP compilation was required for the chunk of FORTRAN that supports SPY HELP. It should be mentioned that the previous solution involved the addition of /d2 to turn on the debugger. But, with movement of the boundaries of segmentation, this piece ceased to operate properly for DC-56. Fortunately, it was found that removal of /ox solved the problem, with or without /d2 (so, for simplicity, /d2 was removed). To conclude, usage of compiler optimization remains in semi-stable equilibrium. The balance is precarious.

The Watcom compiler is soon to become an orphan, if one can believe an announcement found on the Internet by Masahiro Kan of Toshiba Corporation in Japan. This was communicated to a handful of privileged contacts as an attachment to E-mail dated August 12th: *"... Sybase has announced that it is no longer developing Watcom Fortran. ... 1) Copies of Watcom Fortran 11.0b will be available until August 31st 1999. 2) Technical support will be available until June 30th 2000. ... There is a dialog going on with Sybase on whether it could open source Watcom C/C++, Watcom Fortran and Power++"*

as all are scheduled for end-of-life." The author can be documented by 4 lines from the message header:

From: "Stephen Howe" <sjhowe@dial.pipex.com>
Newsgroups: comp.lang.fortran
Subject: END of Watcom FORTRAN - Read ...
Date: Tue, 10 Aug 1999 14:06:46 +0100

On the other hand, will this affect thinking in Portland or New York? Most likely not. Lack of updating by the New York Bobs has long been interpreted as a sign of displeasure with what was (or was not) happening at Watcom (or Sybase, following the acquisition mentioned in the July, 1997, issue).

Newer 64-bit hardware from Intel provides possible motivation for Watcom to abandon existing compilers. This was learned in the most interesting of responses to Mr. Kan's news. Later that same day, Robert Schultz of the New York City area observed: *"... it presages the imminent changes in the mainstream microprocessor world: 64bit VLIW (very long instruction word), superscalar processors from Intel (IA-64) . These processors demand new compilers since ... Any serious production code has to be fully optimized. So, change seems inevitable. The change to 64bit processors in general will have an added benefit: the year 2038 Unix time bomb will disappear with the 64-bit versions of the o/s, and 30+ years should be sufficient to correct legacy problems. ... The upcoming processors will require careful analysis and testing of a new class of 64 bit Fortran compilers."*

C-like .PL4 files are tricky due to the use of two possible different values of RECL= in the OPEN statement of the file. Trouble was discovered when three details occurred simultaneously: 1) the .PL4 file is not being saved (ICAT = 0); 2) plot points are being cached in memory during the simulation (negative LUNIT4); and 3) storage for these points (usually sized at 240K by the 4th line of LISTSIZE data) fills prior to the final time step. A Watcom error message then was seen on the screen during the first attempt to flush RAM to disk: *"*ERR* IO-23 record size exceeded during unformatted input/output."* The trouble could be corrected, but will not be because of the uncertain future of Watcom ATP. Instead, Watcom users merely are warned of the potential problem, and are reminded of easy avoidance that is implied by points 1 and 2 above.

A 250-Mbyte paging file was needed for Watcom ATP linking at BPA, as mentioned in the April issue. Let's summarize an intelligent investigation and explanation by Robert Meredith of the New York City area. There will not be room for all of this, but we can begin in the half column that remains as the October issue is being closed. First, recall the 32 Mbytes of RAM that then were used at BPA. In E-mail dated March 30th, Mr. Meredith documented the demands of NT. Your Editor had suggested: *"Yet, the real test would be to reduce your RAM to 16 Mbytes. My guess is that you would run into trouble."* Meredith responded: *"Anyone who would try to*

run WNT with 16 MB would be a total idiot. It takes about 50 MB committed to run WNT, whether networked or not. I have similar numbers (45-55 MB) at home and at work. Here at work I am networked, running Outlook (lookout!) and have a 172 page spec open in Word at this time. It takes 52 MB Total under 'Commit Charge'. The Peak today has been 55 MB. The need for this amount of memory mandates 64 MB of real memory in round numbers for WNT. Use of 32 is just incompetence. The cost of 64 MB of memory is only about \$83.00 plus shipping (www.intel.com for one). ... The recommended minimum swap file size is between 2 and 2.5 times the memory size for a CISC processor. (RISC would be more like four times.) I normally use 200 MB. It should be set up with the same min and max sizes, so it does not grow and contract, fragmenting the drive. With 8000 MB drives going for about \$150 on sale, the 200 MB swap file costs \$3.75 – not even lunch money." Continued next time: Meredith's observations about really big ATP tables.

Line and Cable Constants

METRIC WITH X AT 1 FOOT SPACING is a new alternative that was inspired by Dr. Thomann's E-mail dated May 25th (see preceding issue). Normal metric units for X are [ohms/km] at 1 meter spacing. But it seems that some metric data is impure. Dr. Thomann explained: *"Actually, according to some of the line conductor experts here at PTI, even if you had a table with metric values, the reference spacing would be 1 ft, the same as for the English tables."* The new request responds to this need, with a lot of text deliberately required in order that the user not accidentally and inadvertently use the new alternative. That same 12th subcase of DC-59 documents operation (see the second subcase within the LINE CONSTANTS data).

The stratified-earth model of CABLE CONSTANTS is named after Nakagawa. Such modeling **can** be used within a JMARTI SETUP data case, although special care is required because of two extra data cards that are expected to follow each frequency card. As explained by BPA's Dr. Tsu-huei Liu in semi-public E-mail of the Fargo list server on June 16th, ATPDraw would seem to require modification if this special case is to be handled without manual intervention. At this time, program developers have no plan to modify ATP itself in order to remove the present need for redundant data (three copies) to describe the stratification.

DEC ATP for VAX / Open VMS

Testing of a DEC VMS translation began June 24th following modifications that included the first support for environment variable ATPDIR (see the January newsletter for mention of contributions by Stephen Boroczky of TransGrid in Sydney, Australia).

For the first time, there was general reconciliation with newer procedures for PCs (the Salford, Watcom, and GNU versions). For example, file names were expanded from 80 to 132 characters (see story in the October, 1998, issue), and the diagnostic file was made to parallel the .LIS file if KTRPL4 is negative. About this latter detail, it should be mentioned that file deletion has been omitted, however. This is possible because of VMS version numbers (an obvious superiority, although non-standard). Renaming is performed by LIB\$RENAME_FILE as explained by Mr. Boroczky in E-mail dated June 24th, and this produces a separate, new disk file for each input data file. The user should be aware of this, and should manage accumulation accordingly.

Use of installation-dependent memory-location function LOC was found in SUBROUTINE POCKET. While no problem for Salford or Watcom or GNU compilers and linkers, this resulted in an unsatisfied external for DEC VMS. Aside from satisfaction of need by TransGrid, value of VMS ATP testing is demonstrated by this detail. The general rule holds, even for VMS: there never has been a different compiler, linker, and operating system that has failed to reveal some meaningful weakness of supposedly-universal code. Something of consequence always seems to be learned from software that has not been used for a while.

The end of DEC VAX for ATP testing at BPA is in sight. As Dr. Liu's PC was connected to a remote VAX by clicking on her DECterm icon, the following notice was seen June 26th: *"There is a tentative plan to retire BPA8 and BPA9 around September 1, 1999. Please start using HAL if you can. Call Mike Harris ... for migration questions or concerns."* To conclude, next time (assuming there will be a next time for VMS ATP), there probably will be need to transfer testing from real DEC VAX to Open VMS on some DEC workstation.

Dummy CalComp (actually, Versatec) plotting routines were used prior to June 30th, when local computer expert Mike Harris found and restored old disk files. This detail is important because it proved that CALCOMP PLOT can be used without real graphics. Resulting *.PS, *.GNU, and ATPHPGL.* files are believed to be unaffected. They seem to be correct whether real externals or dummy externals are used.

Column 132 of .LIS files was missing prior to correction on June 30th using the new windowed symbolic debugger from DEC. Most noticeable was the heading of phasor branch flows, with that "P" on the right missing the closing quotation mark. Although only cosmetic in nature, the problem is believed to be old, dating to the earliest VAX version of ATP in the mid-1980s. Curiously, the correction was in universal OVER1, although it involved installation-dependent JCOLU1 (the carriage-control character, which is ignored by commonly-used PC versions of the program). About the VAX debugger, operation for this first usage seemed normal. For many years, all the PC user saw was

the current line of source code in a window that was a dumb terminal to the VAX. This was comparable to use of a line editor via a VT-100 terminal, as opposed to a screen editor. Now, there is an extra window having two panes, with the larger showing source code as a screen editor would. While not great (e.g., color is not used effectively, and scrolling of the source code is much too slow using up and down elevator buttons), and perhaps short of what the user of a DEC workstation is offered, the new display for PC users does represent enormous progress. Better than the display of the old (1992) Salford debugger, the new VAX display shows the content of INCLUDE files. Also, if content of an INCLUDE file might be executable, the new debugger would allow the stepping of execution through it, too.

The first byte of some messages --- those sent to the screen only --- was found to be missing. There was no problem with normal output of the .LIS file, however, it is important to note. The messages in question are exceptional, with a good example being the progress reports of JMARTI SETUP, which begin: *"Top of nested fitting loops. IMODE, ICURVE ="*. Prior to the beginning of July, such messages were not handled in the proper installation-dependent fashion for VMS, which requires the addition of an extra carriage-control character. That is why the first byte was missing: in the window of the terminal emulator on Dr. Liu's PC screen, the 1st byte was being used as a carriage-control character.

The 3rd subcase of DC-41 has become installation-dependent for VMS because FMTPL4 is non-blank (meaning that formatted .PL4 files are being created). This was found to conflict with LINE CONSTANTS, so \$CLOSE and \$OPEN have been added to restore the FORMATTED nature of unit LUNIT4 once use of the supporting program is complete. This seemed preferable to erasing FMTPL4 --- the UNFORMATTED alternative, which **was** demonstrated to work properly.

Need for right-adjusted numerical input data led to the addition of BN to FORMAT statements as suggested by Stephen Boroczky. Recall this was explained in the January, 1997, issue. But that consideration was for input data only. What about internal data, such as assembly language that is generated by the compiler for your Editor's pocket calculator? Standard test cases DC-51 and DCNEW-19 at first were wrong using VAX because of bad subscripts. Salford, Watcom, and GNU compilers were not bothered by the programming error, but the VAX compiler certainly was. More precisely, the executable program produced by the VAX linker certainly was. Three places were found in POCKET where subscript N9 was one byte too large. The result was erroneous decoding using FORMAT E26.0 or I26 due to an extra, extraneous blank on the right. The three subscripts were corrected at the end of June and early July, for all versions (the code should be universal). For now, BN is **not** being added to protect against such internal misalignments. About the VAX compiler, strange behavior can be reported, however.

Before correcting the first of the three bad subscripts, BN was added. But a mistake was made: in place of the desired BN, it was nearby BX that was keyed. It turns out BX is a local vector. Yet, amazingly, the result executed correctly. The only sign of the mistake was an associated compiler and linker warning. It is as though only the 1st letter of BN actually was required, and this was used correctly at execution time.

Environment variable RESISTOR is illustrated by DCNEW-25, with VAX data different from Salford, Watcom, or GNU data. At first, the standard data was used, and the VAX solution was demonstrated to be correct. For example, prior to the simulation of DCNEW-25, the assignment of RESISTOR:=ONEHALF was made within RUNALLDC. This is equivalent to SET RESISTOR=ONEHALF of MS-DOS (as used for Salford, Watcom, or Mingw32). Then, once the simulation is complete, symbol content is erased (actually, zeroed?) using DELETE/SYMBOL RESISTOR --- a new form of definition that was supplied by Walter Powell after your Editor's attempt to blank the variable failed. The DELETE/SYMBOL does work. But the := definition is not necessary. This is the great news about VAX/VMS: the symbol can be defined from within data of DCNEW-25 itself. What failed using the other compilers (see SET VARIABLE in the April issue) has succeeded using the more powerful VAX compiler and operating system.

The RAM TABLES declaration of LISTSIZE.BPA has been removed in order to save virtual address space. This is comparable to what has been done for PC versions of the program during the past year. Minor modification of the data of DC-40 was required as a result, as a DIFF comparison of old and new will document. From a user's point of view, either alternative should be equally good. As table sizes continue to grow beyond all reason, saving virtual address space seems to be a good idea for VAX just as it was for GNU djgpp (see JARRAY in the April issue).

Higher - Order Pi Circuits

Bernd Stein of FGH in Mannheim, Germany, has been a guinea pig for high-order Pi-circuits. The reader can find brief mentions in the January and April issues. Now, a formal report is available. In E-mail dated July 22nd, he submitted this for publication in the European newsletter: *"... I prepared a contribution for EEUG-News about the HF-modelling of transformers. ... Even if the contribution will not be accepted for printing, Scott has information why I bothered him so much during the last year."* Yes, that FGH data stressed ATP greatly, and resulted in the larger dimensions LISTSIZE.FGH (requested by VARDIFGH) as used for the first Mingw32 ATP version that was distributed by EEUG on CD-ROM during mid-summer. The European newsletter (actually, a journal) editor Laszlo Prikler at T.U. Budapest accepted the article later that same

day as follows: *"Thanks for this interesting contribution ... very little formatting is needed for publication in the next issue of the News."*

Brain - Damaged MS Windows

Painfully slow execution of DISPLAYNT from Robert Meredith and Robert Schultz of the New York City area was described in the January, 1998, issue. A year and a half later, the source of the trouble is less clear. This follows testing on a shared 133-MHz FEI Pentium PC across the hall, which is connected to a new color optical scanner. The monitor certainly is cheap enough. It looks like the minimum 14 inches, and is being used for Windows NT 4.0 in 600 x 800-pixel mode. The PC runs DISPLAYN painfully slowly whether or not the DOS window is full-screen (the **Alt-Enter** toggle), and whether or not execution is begun in a DOS window (use of *Run* in the *Start* menu also was tried). All 3 ways, the command DISPLAYN POSTPLOT.PS takes about 5 minutes to display the 14 batch-mode plots of DCNEW-15.

ATP is not the only big program that time-shares poorly on powerful PCs (see the January, 1997, issue for a report about Watcom ATP time-sharing). The following is about GE (General Electric) load flow and transient stability programs, as selected by WSCC. A draft report by D. E. McNulty of BPA observed the following on July 12th: *"... the GE program turns into both a memory and processor hog. Gary K has found that on a dual-processor PC, interactive work with other programs is only slightly slowed down, but on a single-processor PC, interactive work comes to an almost complete stop."*

A breakup of MS has not been ruled out, if one can believe a report in *The Register* dated July 30th: *"Against expectations, the DoJ has been asking investment bankers how Microsoft could be split up. It had been thought that only the states, co-plaintiffs in the case, wanted this solution."* Of course, DoJ is the U.S. Department of Justice. For background on this anti-trust case in the nation's capitol, see the preceding issue.

"Crippled and unusable LUNT10 = 10 ..." was the way a paragraph of the July newsletter began. As with *memory leaks* (see the April issue), this trouble of GNU ATP seems to be the fault of the operating system itself. Dr. Ali Moshref of Powertech Labs in Surrey (suburban Vancouver), B.C., Canada, first provided the diagnosis in semi-public E-mail of the Fargo list server. On August 17th, in response to a report of trouble by Ralph Folkers of Schweitzer Engineering Laboratories (SEL), he wrote: *"I had experienced the same problem in the past on several occasions. ... The second problem is with the temporary files created by TPBIG in the Windows/temp directory or any other temporary directory which is assigned to Windows. Delete all the temporary files and you should be*

OK." Your Editor had explained how a change of the LUNT10 value provided avoidance, and a newer TPBIG should be protected. But Dr. Moshref's medicine is better. The following day, Mr. Folkers confirmed the relevance as follows: *"The suggestion from Dr. Moshref to delete files in the \Windows\Temp directory immediately fixed the problem. ... Thinking back, I have seen this happen to other programs when that directory became too full, or a program ends abnormally. There seems to be some magic number of files in Windows\Temp that brings W95\98 to its knees. Or possibly, a temp file that a program needs is left in a state that is inaccessible to the main program. I don't think this is an ATPMING problem as much as an operating system difficulty."*

Variable Dimensioning of ATP

Case summary statistics will include program limits if the output is wide (132 columns as opposed to 80) and if KOMPAR has value zero. This has been true since year one (1984). However, an important change was made July 11th in response to a suggestion of Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. As his E-mail two days earlier had noted, there was no way of knowing the program limits just by looking at the .LIS file. This was because the numbers shown corresponded to the user's LISTSIZE.DAT rather than the program limits (determined by the LISTSIZE.BPA file). Since the user's choices of LISTSIZE.DAT were documented at the start of execution, anyway, a second display of these same numbers at the end was redundant. Recall dynamic dimensioning began in the fall of 1993, and this introduced a different set of limits. Mr. Hevia had the great idea of displaying program limits at the end. Although he had proposed addition to the user-declared limits, your Editor decided that replacement was good enough, and simpler. On the other hand, if some user insists on continuing with the old output, he can request this by absolute value 65456 for variable IZGR1 in STARTUP. About SPY PLOT, the outer grid will be suppressed if and only if a negative value exists, so there is no conflict. Both uses can coexist. List 28, which is the numeric working space for MODELS, deserves special explanation, however. Recall the case summary statistics have two components: first the floating-point, and then the integer. But there really is only one storage vector, which is floating-point. The user's data controls what fraction of this is to be used for integers. There is no second independent limit. The total floating-point space will be shown as the limit for the first row and zero will be shown as the limit for the second (the integer) row. To compute List 28 use, the user should add half the integers being used to the floating point variables being used, and compare this with the List 28 limit.

List-8 limit LPAST required special attention to correct a minor error that dates to October of last year. Recall removal of the drift of List-8 storage (see the April issue).

Well, this affected the limit that is shown in the verbose form of case-summary statistics (variable KOMPAR equal to zero). This was until correction of OVER13 and SUBR29 during mid-July.

Non - Graphic GNU ATP Details

Output buffering of the .LIS file is requested by LU6VRT > 0. But this was ignored by GNU ATP prior to experimentation that began May 26th. Once again (this is the third separate application), that flexible C-language coding from Masahiro Kan of Toshiba Corporation has provided a solution that was not available directly using GNU FORTRAN (g77). For background of Mr. Kan's coding, see the discussion of C-like .PL4 files in the January issue. Implementation was completed the following day, with testing responsible for recognition of the OVER13 error that affected DCNEW-27 and the SUBR10 error that affected DCNEW-20 (see separate mentions).

LICENSE.WP5 is the form letter used by the user group, in WordPerfect 5.1 format. This was updated again on June 22nd. More prominent mention of GNU included availability of GNU Mingw32 ATP from Dr. Ger as an alternative to Salford EMTP.

Use of \test* or .* instead of just * for the .LIS file parameter of RUNTP execution was explained in the October, 1998, issue. But that was for Salford EMTP. The extension came to GNU ATP for DOS or MS Windows on August 2nd. Just remember that the star has been replaced by "S" (remembered as *same*).

GNU LEN_TRIM is used to find the right-most nonblank byte of a character string beginning August 7th. This good idea came from Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. His E-mail explained that the library function *"is common to DOS, Mingw32 and Linux versions ..."* As your Editor responded, Salford and Watcom versions use their own installation-dependent functions, so why not level the playing field for GNU? Of course, the gain is not great, but it is measurable for cases involving significant output, such as DC-1. Mr. Hevia showed a representative comparison in which the time for data input of overlays 1-5 decreased to 2.033 sec from 2.143 sec.

A .LIS file name that ends in a lower-case "s" was observed to be a problem by Prof. Mustafa Kizilcay of FH Osnabruck in Germany. This was prior to correction in CIMKEY during the morning of August 13th. Apparently no one ever before noticed this idiosyncrasy. Most commonly RUNTP will be used, and either just "S" or "s" (either case) will be used in place of a real .LIS file name, or a .LIS file name will end in a period. For example:

```
runtp disk \data\dc32. s -r or
runtp disk \data\dc32. dc32. -r
```

These were acceptable. What was **not** acceptable was use

of the form (note ending in a lower-case s):

```
runtp disk \data\dc32. dc32.lis -r
```

Symptoms were not at all subtle, with execution dying after a failed attempt to rename the .DBG file using MV.

GNU ATP for Mingw32

Use of DISK or BOTH did not terminate interactive execution of GNU ATP beginning June 14th. Also, the .DBG, .PL4, etc. files now parallel the .LIS file rather than the .DAT file, if these two are not to be located in the same directory. This extends to GNU ATP the progress that began with Salford EMTP (see lead story). For use at BPA, the unification of location of output files is important progress. For most data cases, just a single copy exists, and is universal. Remote directory \DATA is used to store all standard Salford data cases. Both Watcom and GNU versions share this storage. Although there was an attempt to separate Watcom and GNU output using separate directories \WATNT and \GNUNT, both versions would create some output files in the common \DATA. No long. Beginning June 14th, no output of GNU ATP should be created in \DATA.

Exposure of GNU ATP graphics to DOS first was reported on June 23rd. E-mail from Orlando Hevia documented three important problems: 1) conio.h as used for Masahiro Kan's C-language GETKEY1 has one conflicting name (window); 2) the font Times New Roman is not available; and 3) the full-screen console window 'CONS' was not available as advertised. Yet, Mr. Hevia adapted quickly (as usual), and seemed pleased. The following day, he reported: "I tried the data cases. Nice plots!" Coming from the man who began DISLIN use for ATP, this is an appreciated compliment.

Faster simulation has resulted from a newer GNU compiler. In E-mail dated August 3rd, Masahiro Kan of Toshiba Corporation wrote: "Recently the latest GNU compiler V2.95 has been available. This is the first release of the newly merged egcs and gcc projects. The mingw32 version is available from Dr. Mumit Khan's site. I tested it and found that TPBIG can be a little (10-15%) faster." Although the appropriate 6937-Kbyte archive was downloaded immediately, installation by Dr. Liu was delayed until August 23rd. Then, the favorable effect on DC-1 simulation speed was rapidly noted, and reported in E-mail to Mr. Kan. For Dr. Liu's 200-MHz Pentium Pro, with DISLIN present, seconds reported in case-summary statistics were found to be:

	Data in	Phasor	pre-dT	dT loop	Total
Old:	1.091	.351	.370	7.161	9.063
New:	.751	.090	.091	6.029	6.980

This was the initial realization that something important had happened. It was the precursor of BENCH*.DAT tests of the following paragraph.

TIMESIX is the name of a program that has automated testing such as the preceding. This was attached to E-mail from Orlando Hevia dated August 27th: "I send the source of a simple program (in FORTRAN) and the .BAT file to run TPBIG six times using the same case, and collect the times. The FORTRAN program reads the six times of case-summary statistics, discards the biggest for each phase of execution, and finally calculates the average of the 5 remaining times. Is this procedure correct?" It certainly is. For the record, RUNSIX.BAT is the batch file that must be executed once for each data set that is to be timed. Use KOMPAR = 1 to produce the 80-column version of times. As an illustration, consider author Hevia's output for a "Pentium 150 MHz, model 2, step 12 (as DBOS reports) 64 MB, NCACHE2 8 MHz, djgpp version Times for BENCH1.DAT" are as follows after deletion of interior columns numbered 2 through 5:

		1		6	Average
Overlays	1-5	1.923	....	1.813	1.868
Overlays	6-11	0.220	....	0.165	0.165
Overlays	12-15	0.165	....	0.165	0.165
Time-step loop		65.714	....	65.714	65.703
After dT loop		0.055	....	0.000	0.011
Totals		68.077	....	67.857	67.923

SPEEDUP is a program written to process the *.TIM files that are produced by Orlando Hevia's RUNSIX (see preceding paragraph). For each data case of interest, there is one file for each of the two versions being compared. Execution of SPEEDUP then compares the two families. E-mail to Messrs. Hevia and Kan on August 29th illustrates speed of the dT loop in which Mingw32 ATP beat Watcom ATP 4 out of 4 times using Dr. Liu's 200-MHz Pentium Pro PC with 128 Mbytes of RAM and WinNT:

#	File name	Watcom sec	GNU sec	% Gain
1.	BENCH1.dat	25.555	25.062	1.97
2.	BENCH22e.dat	24.773	18.863	31.33
3.	BENCH47.dat	18.685	16.346	14.31
4.	BENCHN18.dat	15.667	15.198	3.09

Batch file RUNBENCH in \WATNT will produce the family of 4 files *.TIM for Watcom. This proceeds in order (first, there will be six solutions for BENCH1 followed by the execution of TIMESIX to produce BENCH1.TIM; etc.). Within \GNUNT, execution of RUNBENCH will produce a similar result for Mingw32 ATP followed by execution of SPEEDUP to produce the tabular comparison of the two families as just shown.

Dr. Mumit Khan in Madison, Wisconsin, seemed to be the individual most responsible for the recently-improved efficiency of the Mingw32 compiler g77. As a sign of its appreciation for this largely-voluntary effort, the Can/Am user group made a substantial gift to him on August 30th.

Superposition of Phasor Solutions

Interpretation of a manually-specified initial condition card for the 2nd or later phase of a distributed line was corrected in OVER13 on May 27th. Recall work on initial

conditions was reported in the January newsletter. Without affecting the resulting simulation, explanation to the user was incorrect for the following 2 data cards of DCNEW-27:

```

3SENDB RECB  -.3833667890536-.284398922355 ...
3SENDC RECC  -.0448322672439.0363219653719 ...

```

The correct interpretation is:

```

Line. -3.834E-01 -2.844E-01  4.395E-01  2.098E-01
Line. -4.483E-02  3.632E-02  3.514E-02 -3.528E-02

```

How wrong was the previous interpretation? It involved repetition of values for the first phase.

ATP Licensing Problems

Denryoku Computing Center Ltd. of Tokyo, Japan, seems to be involved in EMTP commerce in Japan much as Electrotek Concepts was in the USA beginning around 1989. Thus began a brief mention in the preceding issue. There now is room to explain how and why Denryoku Computing lost its license to use ATP free of charge. According to E-mail from JAUG dated May 31st, the association between Denryoku and DCG was revealed by the modern (current) DCG Agreement. Masahiro Kan wrote: *"... the following can be read on page 1 of 'Agreement concerning the continuation of Japan EMTP-DCG committee and participation in the EMTP-DCG restructuring phase II': ... the Parties hereby conclude this Agreement renewing the Previous Agreement and adding Denryoku Computing Center Ltd. to one of the Parties, in order to continue the Japan EMTP-DCG Committee and to participate in the EMTP-DCG Restructuring Phase II Project."* To summarize, DCC was to be CRIEPI's agent as Electrotek Concepts was EPRI's agent more than a decade ago (see summary in the October, 1996, newsletter). JAUG Chairman Arita had inquired, and Isao Masumo of Denryoku Computing had responded in a written message dated June 10th: *"Based on a request of Central Research Institute of Power Industries (CRIEPI), we have been doing the DCG related work. ... If this leads to a problem, we will ask cancellation of ATP license. For your reference, we have no ATP programs although we have the ATP license."* Of course, no need to request cancellation of the former ATP license since this ended automatically with the first voluntary and substantial participation in EMTP commerce. This is exactly what happened to Electrotek Concepts, recall.

The DCG EMTP user group charges a membership fee? This information was received on June 16th from someone who preferred anonymity. He explained: *"... we are perturbed at some issues we have had with EPRI along the lines of EMTP support & cost (yes, you still have to pay \$2500 to get into the user group for help support even if your company pays in millions to the development project)."*

Siemens Power Transmission & Distribution in Roswell (suburban Atlanta), Georgia, no longer is licensed to use ATP free of charge. This is the surprising conclusion to an apparent accident using E-mail of the Fargo list server.

First, there was a semi-public inquiry from NES about how to learn to use EMTP (see separate mention elsewhere in this issue). The first of several responses, later in the morning of August 11th, came from Sasan Jalali of the aforementioned Siemens office. He wrote: *"we are a small consulting company of Siemens, in Atlanta. we use NETOMAC for generation torsional studies and TRV. If you want to consider using a NETOMAC, let me know and i send you info on it. it was developed in germany for the past 10-20 years sort of like EMTP and we are marketing it in the USA. ...call me if you want go to our web page and you see a picture and a short bio. click on north american resources. ... www.siemens.com/prods/PST/pst.html ..."* Yes, Siemens Netomac is understood to be EMTP-like, so involvement with its commerce seems to be prohibited by free ATP licensing of the user group. This does not seem to be a point of contention in the ATP user community. Your Editor received no support from collaborating ATP developers for the idea that Siemens in Atlanta might be allowed to continue using ATP free of charge. More about Siemens in the next issue.

Power Company Politics and Religion

"British purchases of U.S. utilities approved" is the headline of a Reuters story dated June 17th. A copy was widely circulated within BPA using E-mail. The story begins as follows: *"The U.S. Federal Energy Regulatory Commission Wednesday cleared the first foreign purchases of U.S. utilities, approving two separate deals by British firms worth a total \$12.4 billion. Scottish Power is to buy PacifiCorp of Portland, Ore., for \$9.2 billion."* It seems that American regulators have, after exhaustive study, discovered that no transmission circuit yet crosses the Atlantic: *"FERC commissioners said the foreign purchasers did not raise any special issues during their review, which took about 90 days to complete ... The commission found that the PacifiCorp-Scottish Power merger did not pose any competitive concerns since the merging companies do not share the same geographic markets ...Regulatory approvals from all six states are necessary before the deal is finalized, and the federal Securities and Exchange Commission (SEC) must also complete a review. British authorities have already approved the transaction."*

Turmoil within the American power industry was illustrated in the preceding issue. Let us continue the discussion, with emphasis on quality and cost. What happens when an experienced ATP user is lost? Although difficult to quantify using money, engineering obviously might (probably will) suffer. August 11th, the Fargo list server carried the following good testimonial by Rashed Fakhruddin of Nashville Electric Service (NES) in Tennessee: *"I am newcomer to ATP and EMTP. The person who used to handle this program, who was an expert on these programs, left the company a while back. There are at least 12 EMTP books and one big ATP book."*

I am supposed to learn how to use these programs so I can model an engine generator and also to do a TRV study. Where should I start? Any suggestions?? Am I supposed to read through all these books and learn all the theories, or is there a simpler way to learn how to write the data files and execute them through EMTP and ATP."

TEPCO Improves S.M. Model

The single-line message reporting convergence was missing in the .LIS file prior to May 28th, for those who buffer output. For those who do not, there was no problem for the three program versions (Salford, Watcom and GNU) that were observed. But for LU6VRT > 0 (buffered output), the message of SUBR10 was being sent to the .DBG file. The new line in DCNEW20.LIS follows: *"The power flow loop with PQ and/or PV nodes converges in 62 iterations."*

Parameter Variation Studies by PCVP

TO SUPPORTING PROGRAM (TSP) is a request word that first was described in the April issue. Recall this allows in-line execution of a supporting program as first envisioned by Prof. Juan Martinez Velasco of the University of Catalunya in Barcelona, Spain.

POCKET CALCULATOR VARIES PARAMETERS (PCVP) can be used for various purposes as explained in the newsletter beginning with the October, 1998, issue. One standard use involves FREQUENCY SCAN (FS) as illustrated by the 2nd subcase of DCNEW-26. Note this is normal, old FS; it is not the newer HARMONIC FREQUENCY SCAN (HFS).

The unification of these two established techniques first was suggested by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. His E-mail dated July 29th provided the critical understanding: *"I send to you a case (the data are from DC41.DAT, but modified). I used TO FREQUENCY SCAN + PCVP to calculate the parameters of the line as frequency dependent, here as a Pi-circuit, not distributed. ... the lines can be modeled as frequency dependent accurately. The case sent shows a resonance peak."*

There is similarity to the theoretical half of LINE MODEL FREQUENCY SCAN (LMFS) in that LINE CONSTANTS or CABLE CONSTANTS or CABLE PARAMETERS will be executed for each frequency of interest. As a result, parameters of a transmission circuit involve no error in frequency. There may be other errors (next paragraph), but at least the frequency always is correct. Unlike the simple, fixed configuration that is required by LMFS, an arbitrary network is involved in Mr. Hevia's proposed application.

A single Pi-circuit was used in Mr. Hevia's illustration, and this is acceptable as long as frequency remains low. But the approximation could always be invalidated by raising the frequency excessively --- to lengthen the line electrically. So, as a more general alternative, BPA's Dr. Tsu-huei Liu experimented with the use of constant-parameter distributed (K.C. Lee) modeling of a transmission circuit. Thanks to EXACT PHASOR EQUIVALENT (EPE) as illustrated by the 2nd subcase of DC-11, the error associated with lumped resistance (half in the middle and a quarter at each end) can be avoided. More next time.

Recall frequency-dependent lumped elements within HFS were modeled by Gabor Furst using the Funk-Hantel approximation (see the January issue). Because the same pocket calculator was used, Mr. Furst's technique should be fully compatible with the present extension of FS as opposed to HFS. A distributed, multiphase line can be modeled exactly using TSP and lumped elements can be modeled approximately using Mr. Furst's technique. This is for FS rather than HFS (the distinction is important).

Relationship to JMARTI line representation is worth mentioning. Yes, a JMARTI line is frequency-dependent within the FS loop. However, it generally is inferior to what has been proposed for two reasons. First and obviously, there is the rational-function approximation (fitting error). More importantly, the transformation matrix [T] is calculated at a single frequency. As frequency is varied, this lack of frequency dependence can be the source of significant error. Avoid it by use of the new technique.

DC59J.PCH is produced by the 10th subcase of DC-59 as explained in the January issue. This is for a PCVP loop involving a supporting program (LINE CONSTANTS). The same is true for DC59K.PCH as produced by the 11th subcase. Supposedly the punch file *"will contain the card images for all passes concatenated in a single file. I.e., such output is unified."* Well, not quite, as first observed August 4th. The feature worked when the data was extracted and placed in a separate file --- provided the file name was erased from the \$PUNCH request. Prior to correction later that same day, this was tricky business. It had to do with possible closure of the punch file when \$PUNCH is encountered a second or later time. With a name, the file was closed and reopened in CIMAGE, thereby destroying preceding card images. Without a name, the file was not closed and reopened. That was prior to the addition of logic that makes the operation conditional. Now, there will be closing and reopening if and only if the new file name differs from the old one (for multiple encounters produced by a PCVP loop, there will be no difference, of course).

Output within the supporting program is controlled as described on comments that immediately precede the first TO SUPPORTING PROGRAM (TSP) request of DC-41. However, prior to modification on August 9th, such control of output was not consistent and independent of the status of

output at the time the TSP request was encountered. For example, if \$LISTOFF had been in effect at that point, the control would not have been properly restored following completion of the supporting program.

DISLIN from Lindau , Germany

DISLIN graphics in a window of NT seem to be screen graphics rather than MS window graphics. That is, the operating system seems unaware of the content, and is unable to refresh it if there is later window popping (Apollo DM lingo). So, for example, if the graphic window is completely covered at the time graphics are painted, they never will be seen. Subsequent conversion of all obstructing windows into icons will make the graphic window visible, but that window will be empty. As soon as the mouse cursor is moved on top of a part of the graphic window, it is converted into the familiar hour glass symbol. As a result, the graphic window can not be pulled to the top by clicking on it. If the graphic window is only partially obstructed at the time graphics are painted, then only part of the plot will be missing. Finally, if another window is moved on top of the graphic window, it acts like a blackboard eraser. Whatever it covers, or passes over, it erases. Weird.

A second Mingw32 simulation is not possible if the window of DISLIN graphics remains open from some other simulation. *"The system can not execute the specified program"* is the complaint that will be issued quickly by DOS (i.e., within the DOS window) following any such attempted execution. What the problem is, and how it might be circumvented, has not yet been studied.

The importance of using a scaled (smaller font) DOS window can not be overemphasized. Whether or not the window has a scroll bar on the right is not the issue. Just make sure the window is not full-screen, as initially created using the *Programs* entry of the *Start* menu. Applying **Ctrl-Enter** to it is the quickest way to scale the window, and the result then works well as starting point for ATP simulation that includes screen graphics (either CALCOMP PLOT or SPY PLOT). If ATP is run from a full-screen (unscaled) DOS window, bad things will happen as graphics begin. The DOS window will disappear, having been converted by DISLIN into an icon. There is some similarity to Salford EMTP graphics, which could only appear if the text output of the program was made to disappear. More inconvenienced than the Salford graphics user, the Mingw32 ATP user then has no easy way of sending <CR> to terminate manually his CALCOMP PLOT display (assuming D4FACT is negative). To do this, he must first return to the full-screen DOS window. So, always begin execution in a scaled window.

Window graphics as opposed to screen graphics (see preceding explanation) began May 13th. While SPY PLOT of DC-57 is ROLL-ing, the user can move the scaled

DOS window on top of the graphic window --- and no longer does such motion act as a blackboard eraser. Now, graphics are seen wherever they are not covered (nice). When the dT loop is exited, the final graph will be held on the screen until the user clicks mouse button 2 on the graphic window. This will happen if a special value of D4FACT is used. During the wait, the graphic window behaves like any other WinNT window. The hour glass is gone, the window has a title that advises of the need for a mouse click, and the window can be moved around or resized by means of clicks involving button 1. As for CALCOMP PLOTs, they, too, will behave this way for the right value of D4FACT (see GRAPHICS for details). Alternatively, either a fixed time delay or the old <CR> in the DOS window still can be waited for, if this is what the user wants.

About 159 Kbytes are added to TPBIG.EXE as a result of linking with the DISLIN library for WinNT. This burden, which is surprisingly small by Salford DBOS standards, presumably is due to exploitation of functions that already exist as a part of WinNT. About measurement of the difference on May 20th, the complete program had size 3,464,432 before changes were made. Then, after supplying dummy externals of DISLIN.EXT in place of the DISLIN library, size dropped to 3,305,697 bytes.

DISLIN graphics are fast. The 14 vector plots of Robert Meredith's DCNEW-15 require about 4 seconds using Dr. Liu's 200-MHz Pentium Pro PC. This was measured by adding \$MONITOR cards at the start and finish, and noting on May 20th that 4 full seconds of difference consistently was reported. The window was full width and 60% of full height, and the font was reduced to avoid clipping of text on the right (MULFNT had value 250).

Speed of Mingw32 ATP execution exceeds that of fully-optimized Watcom ATP execution for the Pentium Pro PC used by BPA's Dr. Tsu-huei Liu. This is for Mingw32 ATP that includes, but does not use, DISLIN graphics. Previously, the presence of graphics slowed execution significantly. But concern about such retardation ended with E-mail dated September 13th, when Masahiro Kan of Toshiba Corporation in Japan recommended new DISLIN as follows: *"Today, I noticed that the new DISLIN version 7.2 had been released September 1st. I tried it with Mingw32, and the speed of TPBIG with DISLIN was greatly improved. It now is comparable to the speed without DISLIN."* Later that same day, your Editor and Dr. Liu confirmed this finding, and responded with the following comparison of seconds spent in the dT loop:

File name	Watcom	Mingw32	speed up
BENCH1	25.557	25.096	1.84%
BENCH22e	24.717	19.614	26.02%
BENCH47	18.699	16.758	11.58%
BENCHN18	15.436	15.426	0.06%

Of course, there was careful qualification of the environment: Windows NT supported by a powerful PC (200-MHz Pentium Pro with 128 Mbytes of RAM).

Starting and stopping is even faster for Mingw32. If total job time is used rather than just time spent within the dT loop, the advantage is even greater:

BENCH1	28.912	25.995	11.22%
BENCH22e	26.666	19.930	33.80%
BENCH47	20.918	17.337	20.66%
BENCHN18	16.922	15.701	7.78%

DISLIN Use by GNU Mingw32 ATP

Only 768 x 1024-pixel resolution is supported internally as this option is activated May 8th. Here, *internally* means *not in GRAPHICS.AUX* (where each parameter can be given an arbitrary value). The second resolution to be supported internally was 1024 x 1280 following the advice of Bernd Stein of FGH in Mannheim, Germany. How about lower resolution? Is anyone still using 600 x 800-pixel super VGA for MS Windows? If so, parameters for this resolution, too, are requested. Until such values are received and added to code, any attempt to use NYMAX = 600 in GRAPHICS should result in an error message. As for standard VGA (480 x 640) or EGA (350 x 640), it appears these earlier standards have not survived the transition to MS Windows.

Pen width was put under user control May 12th. The three otherwise-unused LJ2xxx parameters (used by Salford EMTP, of course) have been borrowed for the control of line widths. Line width is specified in terms of DISLIN plot points, which for ATP use always number 8000 in the horizontal direction. The minimum value is unity, which results in weak (faint) lines. The bottom of GRAPHICS explains the 3 controls --- one for the grid, a second for the two axes, and a third for all of the curves.

The difference between screen plotting that began with a batch file (e.g., RUNTP BOTH ...) and screen plotting that follows keyboard input of BOTH, is not understood. Yet, the difference is real, and important. Using RUNTP in a scaled DOS window, the graphic window will be opened **on top of** other possible windows. But if instead TPBIG is started interactively, and if BOTH then is sent from the keyboard in response to the opening prompt, the graphic window later will be opened **behind** any other windows that might be open on the screen. This difference was observed carefully by your Editor and BPA's Dr. Liu May 12th. How and why does RUNTP use possibly make a difference?

LASERJ values that are positive provide alternatives to the normal screen plotting. The preceding issue mentioned this in passing. Initially, such alternative outputs were largely ignored. But as challenges to screen plotting are surmounted, interest in the alternatives increases. The first look at PostScript and HP-GL outputs was made on May 12th with WP 7 being used for the former. Although colors were atrocious, the plot was easily recognizable. As for PS, this was viewed using GhostScript. Again, the plot was recognizable. So, both work. But, there was a huge

difference in file size. For DUM6 (a special version of DC-6 with two vector plots), sizes are as follows:

PostScript:	27,457	45,611
HP-GL	108,307	144,722

Presumably PS is much more compact in this case because of line widths greater than unity. For PS, line width in a part of the language whereas for HP-GL it can only be approximated by repeated pen movement. Comparing the second plot with the first, the first plot has more curves (3 rather than 1) but the second plot is full of labeling whereas the first has minimal labeling.

PS and HP-GL are just two of ten alternative outputs of DISLIN graphics. Different LASERJ values will produce these as summarized in GRAPHICS. Key words include: 1) colored PostScript on a black background; 2) TIFF; 3) GKSLIN metafile; 4) CGM metafile; 5) a Kyocera file; 6) Windows metafile; 7) Java applet; and 8) image file.

\$LOAD NEW .AUX FILE does for GRAPHICS.AUX files what \$STARTUP has done for the STARTUP file for many years. Beginning May 14th, the new \$-card allows a change of the .AUX file during the course of some simulation. Illustrated in GNU DC-37 is a change in the size and location of the graphic window during a simulation. Disk file QUARTER.AUX is used for a half-size and half-width plot window. There are some restrictions on the position of \$LNAF within input data, however, so users are advised to read associated comments carefully. While in theory the function \$LNAF function might be universal, use without real windows is not anticipated. This is one ATP feature that Salford EMTP using DBOS might never support.

HALF.AUX was a variation of GRAPHICS.AUX that first was referenced by DC-37 on May 17th. The result is a graphic window that is full height, but which uses only the left half of the screen. Double MULFNT was required until the following day, when the need was removed with Dr. Liu's assistance. Then, May 19th, the file name was changed to HALFWIDE.AUX when a third alternative window size was introduced: HALFHIGH.AUX which produces a full-width and half-height (30% rather than 60%) window. This new one is about 4 times as wide as it is high, if one thinks of the usual 8 by 10-inch plot as being about square. This may not be well suited for typical CALCOMP PLOT graphics, but it is reasonable for a lower-resolution ROLL-ing SPY PLOT. Data DC-57 was specially modified that same day to illustrate not only HALFHIGH but also the use of \$LNAF at the end of SPY PLOT to restore the usual graphic window prior to an ending CALCOMP PLOT graph. A peculiarity of the 30% window is the need for a halved font (MULFNT = 175 rather than 350).

\$END LAST SCREEN PLOT is a request for an end to screen plotting. There is similarity to \$LOAD NEW .AUX FILE of the preceding paragraph, with this second addition coming later that same day. It, too, is illustrated in

GNU DC-37. Although the disk file contains six subcases, the last of CALCOMP PLOT use can be found at the end of the third. In the absence of \$ELSP, the plot window would remain open, and empty, during execution of the final 3 subcases. This was believed to be a little wasteful of valuable screen space, and might also be confusing or distracting. If the user wants to save the unused space, he now can. Yet, details depend on whether a fixed time delay follows each screen plot. If not (if a click of mouse button 2 instead is required), the graphic window will disappear. But if a fixed time delay is involved, then the window will simply be shrunk to postage stamp size, and will be positioned in the upper-left corner of the screen.

Copying of DISLIN screen plots into MS Word first was reported by Bernd Stein of FGH in Mannheim, Germany. E-mail dated May 18th reported the following about DC-37: *"I appreciated that QUARTER.AUX is even found using GNUDIR and I observe that the first small plot is inside a window which has the usual layout of system windows and can be moved and copied to the clipboard."* A later message explained that **Alt-Print Scrn** did the copying of the selected window. Subsequent **Shift-Insert** then dropped the color picture in an MS Word document.

EIGHTH.AUX is half the width of QUARTER.AUX with usage illustrated in DC-37 beginning May 22nd. Note that the result is nearly square, so has the same proportions as HALFWIDE.AUX. Size now is narrow enough to fit within one column of this newsletter. But due to shortage of space, the picture will again be delayed until next time.

SIXTEEN.AUX is for 1/4 height and 1/4 width, with usage illustrated in DC-37 beginning May 22nd. If disk file QUARTER.AUX is thought of as being 50% magnification of the original, this is 25%. Both preserve the original proportions. On the other hand, 25% copy is so small, it seems like the practical limit of vertical resolution for the 768 x 1280-pixel display that is being used. Note that resolution is 115 x 320 pixels (768 * .60 / 4 and 1280/4) --- less than that of a 132-column PRINTER PLOT.

THIRTY2.AUX is for 1/4 height and 1/8 width, with usage illustrated by DC-37 beginning May 24th. This has the same 115-pixel vertical resolution as SIXTEEN.AUX, but only half the horizontal resolution: 160 pixels. Plots are approximately square, and postage-stamp size.

Taller graphic windows are easily created. The 60% height that is ordered within the .STD file is easily increased, with HIGHER80.AUX and HIGHER93.AUX representing two trials during the morning of May 25th. These are for 80% and 93% height, respectively. The first represents an arbitrary intermediate choice whereas the latter is about the limit imposed by a double row of Windows icons at the bottom of the screen. For larger values, plotting proceeds normally, but the bottom of the plot will be invisible because it is covered by the icons. About proportions, the user will normally want to plot full

width. At 60% height, half-width plotting had some appeal since it resulted in an aspect ratio comparable to that of the screen: landscape. Proportions generally seem pleasing, and commonly are used by publishers for figures. But for 93% height, half-width is portrait-like, and it looks strange.

NODISK = 1 was incompatible with either \$LNAF or \$ELSP prior to May 31st. The problem was with the new \$-cards, which were not properly discarded in the absence of screen graphics. Trouble was illustrated by DC-37. But more work solved this problem. On May 31st, all test cases were verified without a single vector plot being produced on the screen.

GNU Mingw32 ATP SPY PLOT

The final ROLL-ing SPY PLOT can be held on the screen until the user releases it. This is another special control that resulted from an observation of Bernd Stein. As the time-step loop is exited, the user may want a final, careful look at screen graphics before they are erased. At first, a special negative value of D4FACT provided this effect as the bottom of GRAPHICS explained. But then control was unified with CALCOMP PLOT. It seemed both easier and adequate to treat the final SPY PLOT the same way each batch-mode plot is treated. This is just the final one, though. Preceding ROLLing SPY PLOTS are not affected by the new control.

Five or more signals first were plotted by SPY PLOT on May 20th following a report of trouble. Bernd Stein had observed that STARTUP only allowed 4 colors (see KPEN cells 1 through 4), which corresponded to the limit of CALCOMP PLOT use. So, colors were shifted from these 4 to the 20 of GRAPHICS (see vector LCOLSC), and a 5th variable, TACS TIMEX, was added to the plot of DC-57 as an illustration. Scaling also was added (another good illustration).

Text of SPY PLOT graphs was made more like the text of CALCOMP PLOT graphs over the weekend of May 22nd. Many changes were made in order that different window sizes affect SPY PLOT graphics the same way as CALCOMP PLOT graphics. The latter seemed perfectly scaled whereas the former were plagued by a need for different MULFNT (font size). The trouble was removed by changing SPY PLOT procedures. Since year one (1984), the two plots had been essentially independent. Now, they are dependent in the way text is treated, and also in the colors and widths of the pens that are used for drawing. The same HALFHIGH.AUX now can be used for both DC-37 (batch mode use) and DC-57 (interactive SPY PLOT use), with the resulting half-high plots having comparable appearance. For half-high DC-57, new disk file RUN57.BAT is used, and this introduces new GRAPHICS.STD which is assumed to give original, full-size (i.e., 60% high) plots. Users should be able to copy from any of the reduced versions into the .AUX file prior

to the start of execution. But the .STD file should never be changed. It is used to restore the .AUX file following use of a nonstandard request. Study RUN57.BAT usage for further understanding. Beginning May 24th, this file illustrates use of all seven standard graphical windows: 1) GRAPHICS.STD; 2) HALFWIDE; 3) HIGHHIGH; 4) QUARTER; 5) EIGHTH; 6) SIXTEEN; and finally 7) THIRTY2. One after the other, the same simulation is repeated. Plotting begins in full-size graphic windows and ends in 1/32nd-size graphic windows.

Color was used to associate SPY PLOT variable names with curves beginning June 10th. This followed suggestion of the need by Bernd Stein of FGH in Mannheim, Germany, the previous day. Your Editor decided to use for SPY PLOT a variation of the colored identification that can be found in the upper right corner of batch mode (CALCOMP PLOT) plots. This was as a replacement for the "NAMES:" line of the plot legend, which was designed for monochrome Apollo monitors a decade and a half ago. But times have changed: today, everyone has a color monitor. It is long overdue for the curve names line to have changed accordingly.

Interactive SPY execution began June 15th when Masahiro Kan's support for Salford GET_KEY1@ first was used for ATP input. Although it has nothing to do with SPY, the most used detail probably will be the termination of execution by pressing the **Esc** key at the opening prompt (yes, this works). About interactive SPY execution, operation seemed to be basically correct, although there are two problems. First and most importantly, the user can not yet see on the screen what he has keyed. Second, the SPY and LUNIT6 outputs remain mixed together in the DOS window of execution. But the ROLL-ing SPY PLOT of DC-1 looked normal on the very first try (amazing).

Vector plotting of JMARTI SETUP began July 26th when universal TPLOT was modified to satisfy special needs of DISLIN for GNU Mingw32. The basic logic is a dozen or more years old, dating to 3-window Apollo SPY execution. But this had not been used since Apollo was lost at BPA during 1990. Use of DISLIN graphics is the first attempt since then, and at first nothing was seen (the graphic window was empty). But the addition to TPLOT of a statement involving PLOTXX resulted in a nearly-perfect display on the first try. It should be mentioned that SPY is needed, however, and this remains clumsy for interactive use because characters that are keyed are not yet being displayed on the screen. A small improvement made later that same day involved labeling of the vertical axis. It was noticed that the scaling factor was missing if there was no associated text, so this mistake was corrected in VECPLT.

Echoing of keyboard input on the screen followed an August 15th contribution from Mr. Kan. Upon learning of the need from Mr. Hevia earlier that same day, Mr. Kan's E-mail stated: *"I wrote the C functions, COUA and*

SET_CURSOR_POS, for mingw32 and djgpp. Please test them." As it turned out, testing was easy enough because of the included verification program. But obtaining correct results was more complicated, both in Portland and in Santa Fe. Your Editor does not pretend to understand all of the complexities, and can do little more than acknowledge the numerous messages that were passed back and forth between Messrs. Kan and Hevia. Of course, three different operating environments for GNU ATP complicate the matter, as do different keyboards. In between, there was mention of the need to install ANSLSYS --- either that or use a replacement from *PC Magazine*. But your Editor gave up after this disabled DOSKEY on Dr. Liu's Pentium with WinNT. Eventually, exploiting and extending an idea supplied by your Editor, Mr. Hevia was able to eliminate the original reliance of FLAGER on those two C-language routines with which the project began. In retrospect, it is quite amazing how the procedure evolved. As consolidated for re-translation August 22nd, C is not being used at all! Yet, interactive keying of SPY is correctly seen on the screen, the **BackSpace** key is properly honored, the cursor is held after prompts, etc. The only imperfection for an 80-column window occurs *"when column 80 is encountered while keying. It is not perfect because of column 80, but it is pretty good."* This was your Editor's assessment August 19th. Of course, DOS windows wider than 80 columns now are possible using WinNT (see the July newsletter), so any user who is bothered by performance around column 80 can provide his own enhancement. Alternatively, special output cards might be used. Mr. Hevia observed: *"By the way, I have a utility from my video card that allows a 132-column screen. Using this, the double spacing disappears."*

Hoidalen Improves ATPDRAW

New ATPDraw was announced by its author, Dr. Hans Kr. Hoidalen of SINTEF Energy Research in Trondheim, Norway. His semi-public E-mail of the Fargo list server explained as follows on August 11th: *"No User's Manual is yet available for version 2.0. However, the help file system has been updated and should give useful information as a start. ATPDraw version 2.0 includes the following news:*

1) Line/Cable modelling. ATPDraw 2.0 supports line and cable modelling directly. And with this a missing link in power system modelling is removed. The user can specify line and cable geometrical and material data via special input menus and select the type of model. ATPDraw supports Bergeron (KCLee/Clarke), nominal PI, JMarti, Semlyen and Noda models. Switching between the various models is done with just a mouse click. A View window is available where the cross section is displayed with color indication of the grounding condition. Flexible zooming and Windows clipboard copying is supported. A Verify module supports Line Model Frequency Scan and allows comparison between the created line/cable model and the exact PI-equivalent as a function of frequency. ATPDraw

stores the line/cable data on a special alc data file. Hidden in the background; an atp file is created, ATP is executed automatically (if properly set up) and the resultant punch file is transformed to an include file on the Data Base Module format. Only data cases which creates a punch file are supported. The line/cable components are handled as any other components in the electrical circuit. Setup of ATP is done by preferably specifying a batch file under Tools/Options/Preferences. The file runATP_W.bat is included in the ATPDraw installation and it launches the WatCom version distributed by the EEUG.

2) *Project file. The old circuit file is replaced by a project file which consists of a packed circuit file and all user specified support (sup), include (lib), line/cable (alc), and model (mod) files. Thus all files required to reconstruct the circuit is contained in a single file that can be distributed to other users. The total size is much less than the old circuit file. When opening a project file ATPDraw checks if files on disk are newer than those in the project and the user is asked which files to keep. ATPDraw can still read old circuit files and store cir files in the ATPDraw 1.0 format.*

3) *Other updates. a) The speed of the node naming routine has been increased dramatically. A test that used 1 min and 18 sec to create the node names now uses 1.5 seconds!! b) Some bugs were found in the function that returned what the user had clicked on. This could in some cases result in strange behaviours and even access violations. c) Record of type94 Models variable is supported.*

Acknowledgment: Development of ATPDraw is possible thanks to financing by Bonneville Power Administration in Portland, Oregon."

Publishing Programs and Viewers

Inability to use Vernon Buerg's freeware LIST to search a family of newsletters was mentioned in the preceding issue. About the .PDF files of most recent issues, which are available to the average user, the problem was completely stated. But an important complication for developers was not mentioned, and is worth documenting. Program developers (including your Editor) have access to the MS Word *.DOC files, and LIST is used for searches. This works as long as the *.DOC files were produced at home using Word 7 under Windows 95. But what happens if such a file is brought to BPA, and taken into Word on Dr. Liu's PC running NT? According to the Help menu within the product, this is Word 97 SR-2. If a .DOC file from home is viewed, modified, and then saved at BPA, the resulting .DOC file no longer can be searched reliably using LIST. Why? Bill G's genius programmers seem to have changed the format once again. First, content is less intelligible to the human mind because there seems to be much more formatting information that breaks up the

English-language text. Second and more importantly, words sometimes are split in order to create the end of lines. The preceding issue mentioned one line per paragraph, but not for this latest wonder, which seems to break strings randomly. In order that this latest disadvantage of newer MS software not be forgotten, a specific example from the April newsletter will be documented. The following shows the start (left side) of 3 lines that were pasted using LIST from the .DOC file that was modified at work:

```
"I am running Salford FTN95 under Win95. It ..
s. For Win3.1(x), another Salford IDE edit ..
lford compilers (Win32 and/or DBOS based)." ..
```

The first and second of these lines were broken on the right. The first ends with *program* (note that the ending "s." was separated from this and wrapped onto the line below) whereas the second ends with *all of Sa* (note the ending "lford" was split from this and wrapped onto the line below). So, when a search for "windows." was made, this occurrence that spans lines 1 and 2 was missed.

Supporting KTRPL4 of STARTUP

KTRPL4 of STARTUP indicates the disk drive where a .PL4 file (if any) is to be created. Following reception of E-mail from Prof. Mustafa Kizilcay of FH Osnabruck in Germany, the feature was investigated in detail by Dr. Liu and your Editor. All 3 PC versions (Salford, Watcom, and Mingw32) were studied on July 26th, and the conclusion was surprising: each version was wrong, or less than the best it could be, for one reason or another. The result was an overhaul of all 3 versions during the following two days.

Consider Salford EMTP first. This was perfect except for reliance upon English. Strangely, no one (including your Editor) realized the problem until trouble was discussed with Prof. Kizilcay. Recall what was written in the April issue: "Directory of" Well, Prof. Kizilcay showed us the corresponding line of DIR output using his German computer: "Verzeichnis von E:\atp ..." To conclude, the concept was fatally flawed for global use that includes languages other than English.

Watcom ATP was deficient in that execution died for KTRPL4 = 1 (the floppy disk). There was an error message on the screen, and the .DBG file was terminated prematurely, of course. Symptoms were not at all subtle, then. Also, using KOMPAR = 4, the month digit was not properly being used. In place of B for November, a 7 was noted (the 7th month, July, is the current month).

GNU ATP execution did not die, but was deficient in that positive KTRPL4 was being ignored. There was an error of omission rather than commission, then; and the solution was to make the GNU code comparable to the Watcom code (no problem).

KTRPL4 = 0 is a new value about which users should be informed. By definition, this means that date and time

will be used, and the .PL4 file will be placed in the current directory, whatever and wherever that might be.

The only negative KTRPL4 value that ever should be used is -6666 --- for placement in parallel with the .LIS file. Any other negative value should have this same effect. In fact, the value -6666 no longer is looked for; only the sign of KTRPL4 is tested. To conclude, values such as -3 for C: have disappeared from instructions.

KTRPL4 = +6666 became an alternative July 31st following the approval of Prof. Kizilcay. Earlier, your Editor had asked about possibly using ATPDIR to locate a .PL4 file that was named using the date and time. Fortunately, Prof. Kizilcay saw no such need. But location of the .PL4 file along with the .LIS file seemed more reasonable, and this is the effect of value +6666. That was for Salford EMTP, which is almost always the first. Watcom and GNU ATP were correspondingly upgraded two days later.

RUN.BAT is used to verify all test cases, and this continues to be executed using KTRPL4 = -6666. While most data cases do not require this, some might. For example, LINE MODEL FREQUENCY SCAN (LMFS) of DC-51 and DC-52 has a fundamentally-different .PL4 file, so it might. There has been no attempt to be perfectly general for such specialized cases. Readers are warned: deviate from prescribed illustrations at your own peril.

Frequency Scans and Harmonics

LINE MODEL FREQUENCY SCAN (LMFS) can be used with a Semlyen frequency-dependent transmission circuit. Today, there is no serious problem. This was the conclusion of BPA's Dr. Tsu-huei Liu, who wrote to ATPDraw developer Hans Kr. Hoidalén on August 9th following an investigation. Why? Dr. Hoidalén had reported trouble earlier that same day: *"I am implementing line and cable modelling in ATPDraw under a contract with BPA. As a part of this I am adding a Verify feature that sets up a Line Model Frequency Scan (LMFS) data case and reads and displays the resultant .lis file produced by ATP. This seems to work fine for KCLee, PI-equivalents and JMarti models. However, I am having a problem with Semlyen models. ... it seems that the steady state frequency specified in the model is used each time ..."* Your Editor's conclusion is that usage most likely was corrected late last year, even though no explicit mention of the progress for LMFS use was made in a newsletter. ATPDraw author Hoidalén was using a program *"dated 11th April 1998"* whereas Dr. Liu observed: *"This problem has been fixed since December, 1998. I verified this by using a modified DC51.DAT (replacing Jmarti line by Semlyen line), and confirmed that the impedances calculated at different frequencies are different."* The January newsletter does mention Semlyen in conjunction with multiple-frequency initial conditions, so most likely LMFS use was corrected

at the same time.

A Noda frequency-dependent transmission circuit could not be used within a frequency scan --- either ordinary old FREQUENCY SCAN (FS) or newer LINE MODEL FREQUENCY SCAN (LMFS) --- prior to correction on August 11th. This immediately followed the investigation involving a Semlyen line (see the preceding paragraph). With the Semlyen question answered, Dr. Hoidalén had asked about Noda modeling, which Dr. Liu then investigated. She observed that execution terminated abnormally on the second pass of an FS test, with Salford DBOS complaining about disconnected I/O unit LUNIT8 in SUBR10. So, Dr. Liu made a correction to allow use with F-scans. Only Noda branches were affected, and the solution to DCNEW-14 was unchanged --- except for the addition of a simple, new 7th subcase to illustrate FS that includes Noda. The scan is between 160 and 300 Hz, with a resonance for the 180-mile length of 500-kV line shown around 235 Hz of the plot of magnitude and angle.

But is the phasor solution involving a Noda line correct? Doubt is not limited to FS or LMFS use of the preceding paragraph. Consider that 6th subcase of DCNEW-14. As used, there is no phasor solution since this is the 500-kV line energization of DC-3. But it is easy to add the phasor solution and delete closing resistors and switches. The data was appended August 31st as an addition that is not being executed. Comment cards document the negative loss (not good) and the plot documents less-than-perfect sinusoids in the dT loop. Some expert had better investigate further.

Year 2000 Compliance of ATP ?

"Year 2000 litigation and jury selection" is the title of an interesting paper by Rodney Nordstrom. This was featured at www.year2000.com when this Web site was checked June 19th. Sample of the impending disaster: *"According to the Wall Street Journal and Lloyds of London, year 2000 litigation is expected to exceed one point four trillion U.S. dollars (\$1,400, 000,000,000) ..."* On the other hand, it is precisely such ambulance chasing by attorneys --- even before the vehicular crash, in this case --- that has inspired efforts to change laws. Some fear the subsequent litigation more than possible Y2K damage itself. So, efforts are underway to make collection of Y2K-related damages more difficult. Needless to say, lawyers as a group oppose such reform.

"Congress passes Y2K suit bill; White House says Clinton will sign" is the title of an Associated Press story by Jim Abrams, found on the ABC News Website a week and a half later. The story begins: *"Exactly six months before the year 2000, Congress emphatically endorsed compromise legislation today to shield businesses from a potential flood of Y2K computer-related lawsuits. The White House says President Clinton will sign it."* How much protection is involved? *"One of the top legislative*

priorities of the business community this year, the bill would give them 90 days to fix Y2K problems before lawsuits could be filed. It also encourages mediation. It also seeks to limit frivolous lawsuits by capping punitive damages for small businesses, narrowing the sphere of class action lawsuits and ensuring that, in most cases, defendants will be held liable only for the share of the damages they cause." What a radical concept (joke)!

Y2K is claimed to be a registered trademark for purposes of commerce involving financial services. This according to a story by Chris Stamper for *Wired News*. Dated June 15th, the story explains: "An Atlanta-based consultant ... Jeff Buhl insists he is trying to protect his intellectual property, not stop people from discussing the millennium bug." This about warnings not to use the term Y2K for financial business. "Buhl's company, Y2K Investments, ... applied for the service mark in June 1997. When he received his registration from the US Patent and Trademark Office last February, he began sending out dozens of threatening legal letters. ... One of Buhl's company's sites, Y2Ktrademark.com, invites visitors to write in about purchasing a license to use 'Y2K.' Those who wish to keep using phrases like 'Y2K Investing,' 'Y2K Real Estate,' or 'Y2K Hedge Fund' can negotiate a license with Buhl's Y2K Investments and pay fees that could stretch into millions of dollars. Buhl said he is doing what any business would do with its registered name. ... As 2000 looms closer and closer, some companies have decided to file off 'Y2K' rather than fight a lengthy, expensive legal battle. ... Canadian computer consultant Peter de Jager, one of the first millennial spokesmen, doesn't take Buhl's claims very seriously. ... 'Y2K was coined on my mailing list back in 1995. It was coined by one of our subscribers,' de Jager said."

The first ominous sign of Y2K testing came from Stephen Boroczky of TransGrid in Sydney, Australia. His E-mail dated July 26th might explain why packages of VAX ATP materials (see separate story) bounced from his mailbox the preceding Friday (his Saturday): "Sorry about that. Apparently they were doing year 2000 testing of the switches/routers last weekend. I don't know if it is related, but I find it highly coincidental that the internet seemed to lose all knowledge of TransGrid at the same time. I was able to send out, but no messages could find their way back here. Obviously, everything seems to be fine now."

7-Eleven is the giant of American convenience stores, and it seems ready to exploit Y2K hysteria. According to an August 17th story by Stephanie Stoughton of the Washington Post (Page E01): "Sometime in December, 7-Eleven employees plan to remove the promotional signs for Colombian coffee from stores and replace them with banners that go something like this: Y2K Ready -- 4U! Inside, customers will find shelves bulging with extra quantities of bottled water, canned tuna, candles, flashlights, and videos that explain how to prepare for power outages and other emergencies ... Virtually alone

among major retailers, 7-Eleven Inc. is preparing to cash in on consumers' fears." According to James Keyes, COO, "this may be the single biggest opportunity we've ever had. It has gone from a Y2K problem to a Y2K opportunity." Again, mob psychology promises to be more important than the possible computer problem itself. "This is one reason the nation's biggest retail chains are treading carefully, quietly boosting inventories of such items as batteries while telling customers to keep cool. In fact, Wal-Mart Stores Inc., Home Depot Inc. and other large retailers do not want consumers to snap up generators, tents or anything else that might be returned after Jan. 1 ... But 7-Eleven executives say they have little to lose."

Interactive Plotting Programs

An enhanced version of GTPPLOT has been released by author Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. On July 1st, Dr. Tsuyoshi Funaki used E-mail of the Fargo list server to announce availability to others: "The files are available in Osaka University secure FTP site." About changes: "1- The DICE command was added to menu. 2- The delay routine was enhanced." Look for more news about GTTPLOT in the next issue.

IPST in Budapest June 20 - 24

The preceding issue included a report from the 1999 IPST conference by the organizer, Prof. Laszlo Prikler of T.U. Budapest. About the optional evening session, EEUG Chairman Mustafa Kizilcay reported the following July 1st:

"About 30 persons (including Prof. Hermann Dommel) participated in our informative meeting about ATP and EEUG. We started at 17:00 and ended the meeting at 20:00. Tuesday morning, Laszlo Prikler had distributed an invitation sheet with an agenda ... to all participants of IPST'99. Interested persons were asked to put the second half of that sheet in a box, so we knew how many persons would attend ... The course of presentations was as follows: 1) Information about EEUG and EEUG Meeting'99 and one-day course in Italy (M. Kizilcay); 2) General information about ATP, features and built-in models (M. Kizilcay); 3) Short information about JAUG in Japan (H. Arita); 4) Comparison of different versions of ATP (L. Prikler); 5) Demo of ATP Control Center and PCPLOT (M. Kizilcay); *) Break with refreshments and snacks (18:10 - 18:30); 6) Demonstration of ATPDRAW (H.-K. Hoidalén); 7) Interesting demonstration of PLOTXY (M. Cerealo); and finally, 8) Internet services related to ATP and user groups (B. Mork). Also, some printed information was made available to participants: a) General information about EEUG Association; b) Announcement of the EEUG Meeting'99 and one-day course on efficient use of ATP and modelling of transformers with saturation; c) General information

about ATP; d) Information about ATP Control Center and PCPLOT; e) Information about PLOTXY prepared by Massimo Cerealo.” End of report from Prof. Kizilcay.

Miscellaneous Intel PC Information

A box of ten 650-Mbyte Imation (formerly 3M) CD-R disks is priced at \$21.95 in the July/August catalog of dartek.com (Web address www.dartek.com is used). But there is a \$20 manufacturer's rebate, lowering the price to 19 cents per disk. What a deal.

Caldera is suing MS over DR-DOS in U. S. District Court in Salt Lake City, Utah. A good account of the beginning was provided by *The Register* on June 30th: *"The biggest headache for Microsoft is that Caldera has been successful so far in court in showing that DR-DOS could replace MS-DOS in Windows 9x. ... That the actual operating system in Windows 9x (which is of course still DOS) can be replaced by a competitive one exposes the hollowness of Microsoft's claim that Windows 9x is an operating system. Windows (but not NT) is still a GUI shell wrapped around DOS, as was Windows 3.x, whatever Microsoft may try to claim to the contrary. This could prove to be very expensive indeed for Fort Redmond. ... The Caldera trial will start on 17 January next year, with a jury that is very likely to favour the home team"* (i.e., Caldera). Readers who are interested in Caldera are referred to www.caldera.com. This home page begins with the explanation: *"Caldera, Inc. consists of two separate companies."* Proceeding vertically downward, there is a tree with two branches. On the left, one sees *"Linux business solutions."* On the right, one sees *"DOS thin client solutions."* Following this final alternative, one can learn more about Caldera (founded in *"1994 as a start-up venture funded by Ray Noorda, former CEO and Chairman of Novell, Inc."*) and its famous lawsuit.

Miscellaneous Small Items

Batch-mode use of CENTRAL STATISTICS FILE is illustrated by DC-66. Prior to modification of OBSERV on July 30th, however, the batch-mode user was accorded no protection against a bad file name. The first report of such trouble came from Stephen Boroczky of TransGrid in Sydney, Australia, in E-mail earlier that same day. As explained in a separate story, Mr. Boroczky had been testing VMS ATP using Alpha, and had tripped over the name DISK22: that is used at BPA. The result was an infinite loop. Using Salford EMTP, your editor observed similar behavior after changing legal F: to illegal M: at home. This was for batch-mode execution using RUNTP, which henceforth should be protected by the error message: *"Halt in OBSERV. Service ERR= on OPEN. Most likely the disk file name being used is bad."* Why is batch mode mentioned? Because the code was developed for interactive

use, and this allows re-prompting for a corrected file name. But with data read from a disk file rather than the keyboard (Apollo input pane), the concept of interactive correction obviously fails.

DATA BASE MODULE began with fixed limits on both the maximum number of arguments and the maximum number of argument uses. But the latter of these two limits was removed two years ago (see the July, 1997, issue), when List 2 was used as the new variable limit for convenience. Now, it is the turn of arguments themselves. The previously-fixed LIMARG = 85 was replaced by the List 6 (switches) limit on July 5th, completing variable dimensioning of the DBM feature. As distributed by the user group, LSWTCH = 1200, so it should be a while before DBM again is overflowed. For the historical record, work was prompted by semi-public E-mail from Omar Kristoschek of UFRJ in Brazil. Your Editor responded via Fargo the following day, July 2nd. Although he asked how large a limit might be required, no answer was received. So, rather than increase fixed limits, it seemed best to complete the variable dimensioning.

Too much precision for free-format input numbers was not prohibited prior to August 26th. The trouble was discovered while constructing BENCH22E (see mention elsewhere). Halving the 1-degree time step to DELTAT = .00002314814814814815 (note use of one more digit to ensure no loss of accuracy) resulted in the following interpretation by Salford EMTP:

```
Misc. data. 2.315E+15 2.500E-01 6.000E+01 |
```

That was prior to the addition of protection that resulted in the following error message: *"Halt in Bad .00002314814814814815"* Of course, an increase in the maximum width would be better, but is not trivial. Such improvement will not be undertaken in the absence of evidence that more precision has practical engineering consequence. Might it? Any reader who believes this to be the case is asked to initiate public explanation and discussion using Prof. Bruce Mork's Fargo list server.

Lubarsky's Law was mentioned in the July newsletter, along with a dispute at the 1990 annual LEC meeting in Leuven, Belgium. For more detail about this argument, see the July, 1992, issue (*"Removing the last EMTP error"*).

The name of a \$INCLUDE file was limited to just over 50 bytes prior to a universal reform that began September 20th. BPA's Randy Suhrbier suggested the single-line change to OVER1 following his analysis of trouble using data of Dan Goldsworthy. At no cost, 20 characters were gained. Why only 20? For years, the length of the name was limited artificially for no good reason. But now it is limited by the 80-column nature of ATP data. With \$INCLUDE, requiring 9 columns, that leaves about 70 for the file name (minus the prefix and the suffix). Does anyone need more? If so, for this special use, one can imagine special accommodations. But the work will not precede practical need.