Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Salford Compiler and DOS Extender

Ver. 2.66 of FTN77/486, which dates to 1991, finally has met a FORTRAN subroutine that is too big to compile. This was the compiled TACS code associated with disk file IMMOD.DAT from Prof. Humberto Henao (see mention elsewhere in this issue). The error message was: *"*** Compiler stack overflow - routine is too complex ...."* Is this believable? Unfortunately, yes. Executable FORTRAN produced by CTM totaled 32863 lines, of which 31366 were non-comment lines. Does any Salford FTN77 user know how the stack space might be expanded? Your Editor looked in a printed FTN77 Reference Manual dated 1990, but noted nothing obvious. He also carried the code to that shared, 90-MHz Pentium at BPA, and tried its ver. 3.5 compiler, which dates to 1996. Unfortunately, results were identical.

Execution that might hang on the DBOS error screen was the problem of Tim Howes, doctoral student at the University of Manchester in England. His E-mail from the Fargo list server observed the following on June 2nd: *"I run many cases without user intervention - occasionally some will cause a DBOS level error. When this occurs the user has to press Shift F1 to exit the DBOS-Debug environment. Question: Is there any way that I can remove this feature ..."* In response, Orlando Hevia in Santa Fe, Argentina, observed that GNU ATP for djgpp avoided such behavior, and your Editor confirmed the same advantage for Mingw32 ATP. About Salford DBOS, your Editor explained that SET_TRAP@ already is used to handle **Ctrl-Break**, but this seemed to offer little hope for the problem at hand. So, program developers requested the advice of any reader who knows of a promising alternative using FTN77/x86.

News from Outside USA and Canada

A summary of ATP licensing by EEUG was made available to others no later than April 28th. Prof. Mustafa Kizilcay, the EEUG Chairman, ended his E-mail of this date as follows: *"I attached for you the list of ATP users licensed by the EEUG through 22 April 1999 as a PDF file: EULIC499.ZIP I have sent the same list as an HTML file to Masahiro Kan in order that it might be added to the Japanese ATP User Group's Web page."* Disk file LICENSE2.PDF, 93 Kbyte in size, is an impressive tabulation that has been reviewed by your Editor. The most important detail to confirm was the impossibility of simple commercial exploitation. This is the case. Missing are telephone numbers, E-mail addresses, and street addresses that would be required for ordinary junk mail and telephone solicitation.

Cost of mail to Mexico was mentioned in the April issue. But this is only half of the problem. The other half involves speed --- or more precisely, lack of it, in both directions. Since conventional air mail is notoriously slow, businesses often use private delivery services as an alternative. But these, too, may be delayed because private companies have limited power to circumvent governmental bottlenecks at international borders. A good illustration was provided by E-mail from Francisco Javier Peñaloza Sánchez of CFE LAPEM Centro Occidente in Morelia, Mich., who wrote as follows on April 22nd: *"The order was sent on April 14. I asked the Mexican private mail company ESTAFETA S. A. what happened, and they told me the piece is still in Reynosa, Mexico! They apologized for the delay and promised to transfer the letter to Airborne Express in the USA as soon as possible. I hope this will be fixed in a few more days."* According to Dr. Kai-Hwa Ger's records, the delayed order was received in West Linn on April 23rd, and ATP materials were shipped the following day. Moral of the story: delays may be substantial, but Dr. Ger usually is not responsible for them.

"The South African User Group's home page has been published under the following URL: ***http://www.ee.wits.ac.za/~atp*** *Many thanks to Ken Nixon for setting up the server and to Wits university for hosting the pages."* Thus began a message from ESKOM's Paul Gruber, who on June 7th notified others of South African progress. Here *Wits* is believed to be short for *Witwatersrand* --- a reference to the University of the Witwatersrand in Johannesburg.

Calabria, Italy, will host the 1999 EEUG meeting on November 8th and 9th, followed by a one-day *"course on efficient use of ATP and modelling of transformers with saturation."* This according to a June 18th announcement from the Fargo list server. About location: *"The local organizer of this meeting is Prof. D. Menniti, Department of Electronic, Computer and System Science, University of Calabria ... Registration form and detailed information on the EEUG Meeting 1999 and the course will be available at the host Web page* ***http://volta.deis.unical.it/eeug99*** *..."*

More about the Internet and E-mail

The term URL has appeared more than once in this newsletter, but never before has been defined. URL stands for *Uniform Resource Locator*, with the resource normally being some disk file. From anywhere on the Internet, the URL provides unique identification.

Rush Limbaugh received more than 9000 E-mail messages on the same subject during the 21 hours following his 3-hour radio talk show on March 15th, when he read a transcript of remarks by movie star Charleton Heston about individual rights --- a speech that Heston recently had delivered at Harvard University. In addition to the E-mail, there were many telephone calls, too --- all asking where a transcript could be obtained. The following day, Limbaugh publicly refused cooperation, advising listeners to develop self reliance by searching the Internet on their own! That is the way he, himself, found the document, he explained.

Amazon.com was mentioned in the January issue. It is not the only big seller of books on the Internet, however. More traditional Barnes and Noble has been advertising on the radio in Portland during March. This mentions Web page **www.barnesandnoble.com** which is loaded with book-related information. In addition to a search engine that uses key words, B&N will refer the user to its closest retail stores. This is based on postal code (it worked for BPA's headquarters building, which is within 97232). B&N claims to offer the most titles, too: more than 8 million. Under the heading *"Go global for books,"* one sees links for France, Germany, and Great Britain. The first of these connects with **www.bol.fr** where the language is French and prices are in francs. *La librairie sur Internet BOL* seems to be another recent creation for the information superhighway. So B&N barters advertising with Bol? Meanwhile, Amazon.com Inc. of Seattle has yet to earn its first dollar, but had a total value in excess of 27 billion dollars on April 2nd. It is among the better known of so-called *Internet stocks*. According to the ABC News Web page, the market value was $27547.587 million. Skeptics liken this to $505/share RCA in 1929. Unreal (literally).

A computer virus might be triggered by execution of an attachment to E-mail. This warning came from Frank DeCesaro of Cooper Power in Franksville, Wisconsin. *"Happy99 virus alert"* was the subject of his E-mail from the Fargo list server dated March 16th. *"Bottom line is, if an executable is attached to an email, be very careful running it. If you do ever receive an email containing an executable called Happy99.exe, please do not execute the program, simply delete it."*

"AOL Volunteers Want to Be Paid" is the strange headline of a story seen April 19th at the ABC News Website. This seems to be yet another indication that government regulation is out of control. Reuters reported from New York that *"At least seven volunteers are*

challenging America Online's practice of relying on volunteers to help maintain its virtual community ... Some of the volunteers, who receive a free account for the service, have asked the Labor Department to investigate whether the use of voluntary labour violates the Federal Fair Labor Standards Act .... Under the Fair Labour Standards Act, a person must be paid for time spent at job-related activities that benefit the employer ...." So, the concept of volunteerism might be illegal in the USA? Should your Editor file a comparable complaint about BPA (which similarly provides him with free access to the Internet, not to mention office space, computer, drinking water, elevator, printer, etc.)? Crazy!

Hotmail is worthy of further explanation following that initial mention in the July and October, 1997, issues. April 5th, your Editor connected to **www.hotmail.com** and was quite amazed by what he found. Most importantly, each page is copyrighted by Microsoft Corporation according to the very small print at the bottom --- detail that is lost if one saves to a file in text mode. On the other hand, MS ownership seems otherwise to be deliberately downplayed. Yes, the MSN logo is conspicuous at the top of each page, as a qualifier to the name Hotmail. But frequently asked questions ignore the obvious issue of ownership. The only other mention of MS that was noted concerns employment: *"If you are a motivated, creative, hard-working individual, then you will want to see the current job openings at Microsoft."* Of course, inside this document, MS is prominently mentioned.

The *GO Network* logo can be found in the upper left corner of **www.abcnews.com** --- the Web page for ABC News. The associated **go.com** must be among the simpler and more valuable of Internet domain names. It offers interesting free Internet services: *"Why Register? *) Get your own GO Network Start Page. *) Get personalized news, sports, stocks and weather. *) Get your own free e-mail account. *) Build your own free Web site with unlimited pages. *) Participate in chats, message boards and clubs."* Who says the free lunch has disappeared? Who other than ABC is involved? It is difficult to be sure. The copyright is by Infoseek Corporation.

"Melissa virus suspect nabbed" is the title of a news summary that was noted April 2nd in the *Market Summary* section of Vanguard's Web page. According to an AP story, *"a central New Jersey man as been arrested and charged with originating the virus known as Melissa."* Viruses can be expensive, particularly for the author: *"... altogether, the charges carry a maximum penalty of 40 years in prison and a $480,000 fine."* According to radio accounts that day, AOL cooperated in the apprehension.

Repetition of a message that asked an inappropriate question via the Fargo list server prompted a public response from Laszlo Prikler of T.U. Budapest in Hungary. On March 2nd, he wrote: *"From time to time you re-send this message to this list. Since you refer to 'Workbook IV', many of us (including me) have good reason to assume that you refer to an EPRI Workbook. I note however that this list is dedicated to users of ATP-EMTP, so if you have any trouble with using DCG/EPRI EMTP, you should contact the EMTP96 Support Center at ..."* Later that same day, your Editor privately thanked Prof. Prikler, noting that yet another reason for supervision of an ATP-related list server had been discovered. The reasons continue to accumulate (about non-English language, see comment in the April and July, 1996, issues).

A real signature on a real piece of paper continues to be a requirement for a free license to use ATP. Meanwhile, bit-mapped approximations continue to be received via the Internet. One of the more creative of these attempts requested the following on April 9th: *"Please find attached my registration form to become a member of the EMTP Group. I have attached the document as an Acrobat Read file, I hope you find this acceptable, if not please advise me and I can fax it to you."* If PDF format is not acceptable, FAX will be used? Your Editor responded: *"Sorry, only a real, original signature on a real piece of paper is accepted. If you do not understand why, try using an Acrobat Read file or FAX for a bank check, or a will. See what your bank, or your local court, thinks! To summarize, monochrome bit maps such as you propose have no legal significance. This has already been explained in a newsletter. If and when you or anyone else provides any documentation to the contrary, I will publish it, and we will rethink our policy. Until then, use snail mail."*

"Where do you want to go tomorrow?" is a slogan that has been protested by Microsoft. The claim is that this is too similar to MS's own *"Where do you want to go today?"* It seems that various Linux sites use *tomorrow* as satire, to make fun of MS. According to a news story by John Lettice, posted at The Register on April 11th, MS *"has demanded that German Linux site linux.de remove"* the slogan *"from its front page."* But is the demand sustainable in court? According to the article, the slogan *"is registered at the US Patent and Trademark Office to Cybernet Systems of Ann Arbor, Michigan."* No matter what happens, or who prevails, it looks like more bad publicity for Bill G. Mr. Lettice concludes: *"Isn't it amazing how little MS learns about presentation and PR as the years roll by?"* As for *The Register*, Web site **www.theregister.co.uk** seems to be one of Walter Powell's favorites. He is the one who provided this trademark news to your Editor. Anyone who has not visited *The Register* is advised to take a look. *"Biting the hand that feeds IT"* is the slogan, to the right of the outline of a buzzard. This looks like an interesting place to read things that manufacturers do not want consumers to see.

Foreign Languages and E-mail

Spanish-language E-mail was discussed with Francisco Javier Peñaloza Sánchez of CFE LAPEM Centro Occidente in Morelia, Mich., Mexico, around the middle

of March. Of course, concern centered on accented characters. For example, of this gentleman's four names, each of the final two contain one accented letter. Although these appear correct inside MS Outlook 98 at BPA, subsequent saving of the E-mail to disk results in a file that will look correct in MS Notepad, but which will be distorted when viewed using either MS Word 7 or Vernon Buerg's freeware LIST. Answers to your Editor's questions about E-mail use are interesting. The following is extracted from a message dated March 15th:

WSM: By the way, do you exchange Spanish-language E-mail with others in Latin America?

FJPS: Yes, but sometimes we have problems with the extended ASCII characters. It seems to be related to Outlook 97, from which I switched to Eudora recently.

WSM: ... what does your keyboard look like? I was reading the newsletter account of my demonstration at the 1990 LEC meeting in Leuven. Then, I had trouble because of the Belgian keyboard, which would have been designed to handle accented characters of Dutch (the official language in Leuven). A few keys were different. Is that the case with your keyboard? Do you have trouble keying English because the keys you must press are not the same as the ones we would press up here?

FJPS: I have a Compaq Armada 1700 laptop and my keyboard has a *Latin American* layout of keys : N with a mustache is included but there is no bearded C. I have no problem keying English. I have all letters and numbers; the only strange thing occurs when I type an equal sign: two other characters are added, example: I = Y . E

French seems to be handled as well or better. This was explained a month later by Gérard Capolino, Vice Dean of engineering at the University of Picardie in Amiens, France (see the July, 1995, issue). April 19th, Prof. Capolino wrote: *"J'espère que mon … Dr. Hénao (je garde les accents et Gérard est l'orthographe correcte …"* This looked perfect within MS Outlook 98, and text was pasted from there into this .DOC file via an intermediate file on a floppy disk (created using the **Save As** entry of the **File** menu). The French looks perfect here, too, and it is hoped that subsequent conversion to PDF will not change the appearance. To conclude, we have come a long way since trouble using DOS software of CompuServe to receive messages from Dr. Guy Clerc in Lyon, France (see the January 1993 issue).

More than one mysteriously-encoded message from Korea has been seen in E-mail of the Fargo list server during the past year. What is happening is not known. As an example, consider the March 28th contribution from AHN Sang-Pil [popeyes@ipsl1.skku.ac.kr]. This had an English-language "Subject: NEGLECT MY MAIL", but the body of the mail seemed randomly encoded. For example, the first line was: "SEkuIEFMTCBBVFAgV VNFUlMNCg0KU09SulkgRk9SIFVOU1VCSkVDVEVEI E1BSUwuIElUJ1MgTVkg". Is this a case of inadvertent use of Korean Language, as seen on a computer without it? Unlike messages that use MIME or UUENCODE, there was no obvious explanation of language.

Two more messages from Korea were received via the Fargo list server on May 20th. At BPA, the first was mysteriously encoded whereas the second was perfectly legible using MS Outlook 98 on Dr. Tsu-huei Liu's PC at BPA. But to another subscriber (Prof. Srete Nikolovski in Croatia), nothing was readable, and he responded to this effect. It was this semi-public complaint that led to a surprisingly simple solution. Adrian Gomez of Comision Federal de Electricidad in Hermosillo; Sonora, Mexico, suggested a free utility to do the job: *"You can encode/ decode messages like the ones coming from Korea using UDDeview. This is a shareware program that will help you to transmit and receive binary files over the Net. It includes both an encoder and a decoder. The decoder automatically detects the type of encoding used, offering MIME Base64 and BinHex as well as the popular uuencoding and the less frequently used xxencoding methods. The encoder runs the other way around and encodes a binary file for transmission by e-mail or over the newsgroups. You can download the progran from the following site: http://www.miken.com/uud/"*

Three testimonials followed this advice. In response to your Editor's explicit question (did it really work for the messages from Korea?), Hernandez Claudio A, writing from BKK Regionalnett AS in Norway, first stated: *"The answer is Yes! I did manage to decode the original E-mail from CWPaek using UUDeview."* Next, Robert Wheat, writing from Los Alamos National Laboratory in New Mexico, observed: *"I too downloaded and installed the program UUDeview as suggested by Adrian Gomez. After decoding with this program I **am** able to read the messages sent from Korea .... Other decoders I have, however, were not able to decode these two messages. Thanks to Adrian Gomez."* Finally, Orlando Hevia in Santa Fe, Argentina, reported compatibility with an older MS operating system: *"I downloaded UUDeview for Windows 3.1 (sorry, I am a troglodyte), and decoded correctly the file in question."* To conclude, without any advice from any Korean, Internet-savvy ATP users seem to have solved the problem of Korean encoding. Congratulations to all who participated in the cooperative exercise.

Watcom ATP for MS Windows

Overflow of LU6VRT = 32768 prior to the heading that begins normal output was a new potential problem of large data cases. The trouble first was observed in output produced by Govind Gopakumar of Michigan Tech in Houghton. Recall each $INCLUDE file generates one line of output (see the start of DC-17). Well, such output accumulates in the buffer of size LU6VRT bytes. If normal output has not begun by the time this fills for the first time, there was trouble. Prior to a program change in Watcom TFLUS4 on March 22nd, simple avoidance was recommended. On March 15th, your Editor recommended use of LU6VRT = 0 to avoid accumulation. This is less than satisfactory, however, because documentation of the

$INCLUDE files then will be missing in the .LIS file (although seen on the screen).

OUTPUT.LIS is a possible default name for the .LIS file, it should be mentioned. This, together with a .TMP file, are possible output file names. Normally, they will not be produced, and will not be seen. But in exceptional cases, they may be used instead of the regular names. This is in the event of some early, abnormal termination. If the normal file name is not yet in use, an alternative must be provided. In the case of the .LIS file, the problem occurs if there is an error termination, or if the internal ATP buffer of size LU6VRT > 0 fills, prior to installation-dependent opening of the output file in Watcom SYSDEP. To avoid an undefined file name (apparently fatal for Watcom ATP), the default name OUTPUT.LIS is being used. This is not a new feature, however; operation has been this way for years, although apparently never noted in a newsletter. Operation was experienced using disk file GOVIND.DAT (data that demonstrated trouble of the preceding paragraph).

"Age of the program being used" is the way a paragraph of the preceding issue began. But that was for Salford EMTP, not for other versions. The translator used for Watcom and GNU was modified March 25th after Robert Meredith of the New York City area reported 18 null characters in the .LIS file where the date and time of translation were supposed to be. The problem was not observed in Portland because use of KOMPAR = 4 resulted in blanking of the date.

QUARTER PLOT has had minor labeling problems for years, it is believed. This was discovered during GNU Mingw32 graphic testing of DC-35 without the PEN PLOT option (not supported for either Watcom or GNU). Y-axis numbers of the two plots on the right half of the screen were missing. Rather than being painted just to the right of the center of the screen, there was an attempt to paint them to the right of the right edge. This resulted in DISLIN error messages --- one for each number of the Y-axis. It would seem that no one ever looked closely at the resulting Watcom plot. If anyone ever does, and has interest in a Watcom correction, he is referred to the 12 consecutive comment lines below S.N. 2222 of GNU AXISXX. These bear identification WSM99MAY (the correction was made May 16th).

A detailed summary of the demands of Watcom linking on the paging file has been received from Robert Meredith. But it will be delayed until next issue.

News About TACS and MODELS

A supplemental variable with non-blank column 80 was mentioned in the July, 1998, issue. There was an error, as first reported by Dr. Yuan Bin, then working at Mitsubishi Electric in Japan. A new 7th subcase of DC-68 provided confirmation of the correction. However, this did not involve a closed parenthesis in column 80. As first pointed out March 17th in public E-mail from Carlos Mata of the University of Florida in Gainesville, a ")" in column 80 continued to be mishandled. This continued through March 18th, when improved treatment of column 80 was implemented. One day later, that 7th subcase was modified by the addition of new supplemental variable CARLOS --- this one having a closed parenthesis in column 80, of course. The values of variables YUAN and CARLOS are equal.

Foreign MODELS provides another possible way to speed painfully slow MODELS simulation. This was summarized well by Cornel Brozio, a doctoral student at the University of Stellenbosch in South Africa, in semi-public E-mail dated May 2nd. The remainder of this story was written by Mr. Brozio as a slight modification of his semi-public E-mail:

Foreign code refers to separately compiled subroutines and/or functions that are linked to tpbig. Via subroutines FGNMOD and FGNFUN such foreign code can then be accessed from any MODELS data case. The result is code that runs faster. Much faster.

Using djgpp ATP and the djgpp DOS-ports of the GNU compilers, foreign Fortran (g77), C (gcc) and Pascal (gpc) code was successfully compiled and linked to tpbig. Four data cases were prepared: A standard MODELS case and three cases respectively calling the equivalent Fortran, C and Pascal code. The foreign Fortran code ran 50 times faster than the standard MODELS case, but initially the C and Pascal cases only ran about 18 times faster. Why? The g77 Fortran compiler is smarter than gcc or gpc, at least when it comes to optimal coding of one mathematical operation. The experimental data cases involved a lot of exponentiation (x**n). At compile time, g77 figures out that n is an integer and writes some nifty code to multiply x by itself n times. GNU C and Pascal both support exponentiation, but call a library routine to take care of the math, which probably uses x**n = EXP(n*LOG(x)). This takes much longer. By improving the handling of x**n in C and Pascal, simulation times comparable to the Fortran case were obtained.

Masahiro Kan proved that the Fortran and C foreign code is compatible with the Mingw32 GNU compilers and Mingw32 ATP, as expected. Both Mr Kan and Dr Meyer created compiled TACS cases for further speed comparisons. The compiled TACS cases ran about twice as fast as the foreign MODELS cases, i.e. 100 times faster than the standard MODELS case. On my P166, Mr Kan's compiled TACS case was slightly slower than Dr Meyer's. Different implementations of a DO loop were responsible for the difference. Mr Kan called a foreign subroutine from within compiled TACS, while Dr Meyer coded the DO loop directly into codetacs.inc before compiling the case.

The following table summarizes the time-step loop times of the various cases, which all perform the same calculations …. Further details on how to create and use foreign code with the GNU compilers should be available soon (there are some peculiarities and pitfalls). As I mentioned earlier, a zip file including instructions, example make-files and the experimental cases is under construction.

Note that although most of the testing described above was done with djgpp, mingw32 is recommended for Win9x/NT users wanting to experiment with foreign code and/or compiled TACS (also see an earlier mail on mingw32 ATP developments from Dr Meyer).

Line and Cable Constants

Unbelievable capacitance from CABLE CONSTANTS and/or CABLE PARAMETERS was demonstrated by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina in E-mail dated April 1st. His disk file name is CCRARE.DAT for data that results in negative capacitance if a radius is just a little too big (while remaining believable physically). *"The case has 3 cores in a finite duct. For a radius of 0.04 m, the mutual capacity is negative. For a radius of 0.05 m, the mutual capacity is positive. .... How can this be?"* Good question, for which BPA's Dr. Tsu-huei Liu had no good answer. She studied the data and agrees that there is no obvious error in the data. Mr. Hevia added: *"A second question: I tried to convert the case to CABLE PARAMETERS, but without success."* Dr. Liu agrees with this, too (data CPRARE.DAT). It appears that study by some cable theorist will be required.

Variable-dimensioning of CABLE PARAMETERS (see the July, 1997, newsletter) led to many warning messages from the GNU Mingw32 compiler (see separate story in this same issue). Specifically, REAL*8 and COMPLEX*16 arguments of the CALL NEWCBL statement did not match the variable types that were used within SUBROUTINE NEWCBL. While the interface executed properly, it was not up to the same high programming standards as CABLE CONSTANTS prior to improvement on April 12th.

The METRIC option of LINE CONSTANTS requires reactance X at 1 meter spacing if XTYPE of columns 17-18 is given value unity. Such use was reported to be in error by Dr. Gary Thomann of Power Technologies (PTI) in Schenectady, New York. His E-mail dated May 25th explained the context: *"As part of our software, we designed a line property calculator, and to test it I have been comparing output between our software and the same circuit in EMTP LINE CONSTANTS. In the course of the testing I appear to have found an error in EMTP ...."* Attached were two illustrative examples that served as the starting point of investigation by BPA's Dr. Tsu-huei Liu. Correction was made May 28th, with a new 12th subcase of DC-59 documenting the improved operation.

Concurrent Plotting of ATP

Concurrent plotting of ATP simulation began with the interactive plotting program PLOTXY from Massimo Ceraolo of the University of Pisa in Italy. For background, see the two preceding issues. The story about concurrent plotting continues, and has been broadened to include another plotting program, operating system, and file type.

Linux **cat** has access to ATP output while it still is being written by GNU ATP. This important detail was confirmed by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. In E-mail dated March 18th, he wrote: *"I ran tpbig using Linux with that big Hitachi data case, which requires about 10 minutes to simulate. I tried* ***cat hit6-3.lis*** *The file was shown on the screen through the last line written to it. Each time I sent the command, I saw additional lines."*

GTPPLOT seems able to read a .PL4 file as it is being created. Author Hevia explained in that same message dated March 18th: *"I tried to run gtpplot with the hit6-3 file. There was no trouble connecting the file, although gtpplot later stopped because the file was incomplete. But there was no Linux error; this was a gtpplot error!"*

READER.F and WRITER.F are small test programs that were used to demonstrate the technique of remote, concurrent LUNIT6 display on May 24th. Note that *remote* is automatic since a separate program is being used. For the test, WRITER mimicked ATP by slowly writing text output to disk. Then READER was executed to display the text as it accumulated on disk. The two programs were run simultaneously, using two different DOS windows of NT, following compilation and linking of free GNU Mingw32 software.

Higher - Order Pi Circuits

RENUMBER BYPASS (RB) was a request available in BPA's EMTP at the time ATP branched off from it during early 1984. Long-time users may remember this feature, which bore some similarity to RENUMBER WITHOUT COUPLING (RWC) of the January issue. The motivation was the same: avoidance of the burden of transient renumbering. But details differed. The old RB avoided renumbering entirely, using instead the order in which nodes were defined by input data. This had some advantages, since it provided a knowledgeable user with complete control over order. If it still were available today, it would have been used. But RB was removed during the early years of ATP, and some 14 years of data have accumulated without the benefit of such control. When the concept was resurrected recently, it seemed simpler and better just to omit the coupling of mutually-coupled

branches. No longer was there any desire to avoid use of the renumbering code itself (a separate overlay on non-virtual computers such as CDC). Only the case of high-order Pi-circuits was of concern, and it was easy enough to handle this by ignoring coupling. So, RWC is yet another way ATP data shall be distinguished from DCG/EPRI EMTP data. Your Editor does not shrink from such differences, if and when there is a legitimate reason.

Brain - Damaged MS Windows

Wrapped-around lines in MS Mail were the subject of a complaint in the January issue. Recall how lines of more than 72 bytes are broken on the right. Well, that was using old MS Mail. New MS Outlook 98 seems no better, however, as your Editor informed others in list server mail dated March 17th. Help was requested, and a good explanation was received from Robert Wheat (next time).

The UNDELETE command of PC Tools by Central Point Software does not work under Windows NT. This was learned from BPA's Dr. Tsu-huei Liu on April 6th, based on the advice of respected local computer expert Mike Harris. Dr. Liu had need to recover a file that accidentally had been deleted, of course. For years, use of UNDELETE had been standard practice. It was an obvious advantage of MS-DOS use as opposed to DEC VMS use. But no longer, Dr. Liu learned, thanks to the switch to NT. Not good, this loss of such a basic function.

Mohan Assembles ATP Data

An MS Windows-based ATP data assembler --- this one using menus, but no schematic diagram --- is being developed at the University of Minnesota in Minneapolis. Prof. Ned Mohan provided program developers in Portland with their first look by means of an envelope dated April 20th. Look for observations in the following issue, where space is more plentiful.

GNU ATP for djgpp and Cygnus

Slow starting of GNU ATP using djgpp ended at BPA with the upgrade to a PC having substantially more RAM. As reported in the April issue, RAM was quadrupled from 32 Mbytes to 128. Now, djgpp ATP is very quick. As reported to Masahiro Kan of Toshiba Corporation in a message dated March 17th: *"Execution is nearly as fast as Watcom. The single batch file RUN.BAT will try all test cases. Timing is built into the top and bottom of this ... I observe: 1) Watcom: 3:10 and 2) GNU djgpp: 3:54"* Clearly, the paging to disk has ended. Paging to RAM does not represent much overhead, as this clearly shows. ATP is being started and stopped 95 times (once for each disk file). Part of the remaining difference of 44 seconds might be explained by Watcom compiler optimization.

To conclude about djgpp, starting is quick enough (although not instantaneous) provided available RAM exceeds the virtual image size of ATP. But this is indeterminate because program tables can be made arbitrarily large. Also, there remains the problem of confusion about I/O units --- a phenomenon that required the splitting of DC-29, 40, N3, N5, N6, and N17.

Cygnus Solutions offers one GNU alternative to djgpp as noted in the July, 1997, newsletter. Unfortunately, as Mr. Kan has noted from the beginning, the free use of Cygnus software represents a problem for ATP because it requires adherence to the GPU GPL (General Public License). I.e., source code of ATP would need to be published. At the Cygnus Web site **www.cygnus.com**, your Editor observed the following on April 10th: *"To cover the GNU GPL 'restrictions', the basic rule is if you give out any binaries, you must also make the source available."* Yet, that would be for free use. Instead, might your Editor not purchase Cygnus software the same way he purchased Salford or Watcom or Lahey compilers, and thereby avoid the GNU GPL license? This question was posed in E-mail that was sent through the Cygnus Web site that same day. Your Editor asked: *"Does Cygnus possibly sell its Cygwin package for non-GNU GPL use? If so, what is the price?"* Substantial information was received 3 days later from Kathy Powers. The problem with ATP seemed to be understood, and Cygnus did offer circumvention of GNU GPL: *"By purchasing a copy of the GNUPro Toolkit for Win32 Native, the customer is given a commercial-use license for the library and therefore the ability to include, copy and use the cygwin library in their application without requiring that they provide the source code with their application."* On the other hand, no specific price was quoted. This was considered to be a bad sign, and a clear indication that the third alternative used by Mr. Kan (Mingw32) had better be investigated seriously.

Experimentation with the Cygnus ATP began at BPA on April 6th when Dr. Tsu-huei Liu showed her first successful linking to your Editor. Curiously, inspiration was separate from Masahiro Kan in Japan. It should not have been, but it was. BPA's Walter Powell had recommended Cygnus use after Dietmar Hohenstein of Alstom Energietechnik GmbH in Frankfurt am Main, Germany, had reported successful application to the BPA load flow and transient stability programs. This was in E-mail to Mr. Powell on March 15th. Anyway, differences from the starting point of djgpp were noted to be: 1) File names for OPEN use required termination. 2) The compiler warned of mismatched arguments of CALL statements (just as Salford would). 3) If a directory name was used as part of the input data file name, then the disk was required, too. For example, d:\data\dc5. was accepted whereas just \data\dc6. was rejected (strange). Yet, the text did remain case insensitive, as one would expect. 4) There was trouble using mv or copy or cp to rename the debug file in SYSDEP if the input was remote. But Mr. Kan quickly sent new mv to solve this (*"I will attach a win32 version of mv.exe which is included in the GNU ATP*

package (mingw32 version)." 5) Forward slashes were used in RUN.BAT. E.g., //d/data/dc6. for DC-6. 6) Data cases no longer require splitting (see 2 paragraphs above). This seems to prove that the problem was in djgpp. 7) Starting seems instantaneous, even for huge tables (more than 38 million 4-byte words). 8) The C-language compilation of NODA.C failed, but Mr. Kan immediately understood this problem (lack of definition of PI), and sent a patch the following day: *"math.h of mingw32 lacks a definition of PI. I am adding the following lines to the math.h file. These were copied from the djgpp package."*

The case (upper or lower) of file names has been fundamentally altered for the first time in more than a decade. Beginning May 3rd, .LIS, .PL4, .BIN, and .PCH files that are created by ATP always will have lower-case names, no matter what the user specifies. I.e., although written here using capital letters for visual distinction, in fact the file types mentioned, and all preceding letters of the file name, will involve no upper-case letters. This new rule probably will apply to every Unix version, although initial experimentation involves only Linux. For reasons of uniformity, the new logic also is being applied to djgpp and Mingw32 versions (see separate story about the latter). It seems easiest to have a simple rule about case, and this is it. Since the middle-to-late '80s, common practice has been to use lower case for file names that are needed by Unix versions of ATP. The user would key lower-case file names everywhere, and then would be required to mark such names with exclamation points in order to avoid conversion to upper case during program input (recall that KINSIN = 1 has this effect). What if the user forgets one of those exclamation points? The result can be painful, as discovered by Masahiro Kan and your Editor while working with that famous data from Cornel Brozio (see separate story that mentions foreign MODELS). Mr. Kan discovered that the GNU ATP $OPEN code required lower-case file type .bin whereas lack of the exclamation point resulted in .BIN being attached. In theory, ATP should have trapped the data error, but in practice it is difficult. Furthermore, even if ATP had noted the error (lack of a required disk file) and halted, this would have inconvenienced the user, who would have been forced to modify his data by hand, and then restart his execution. There seemed to be too much flexibility of file naming. The distinction between upper and lower case provided too much flexibility for the average user's (and this ATP programmer's) own good, it was concluded. Some of this flexibility now is being taken back, by the new rule. ATP always will create lower-case file names, and an attempt to connect one of these files using $OPEN always will involve lower case --- regardless of whether or not the user keys an exclamation point following his file name. Beginning May 3rd, Cornel Brozio's famous forgotten exclamation point no longer represents an error.

The vertical bar "|" is used to separate input data cards on the right from interpretation on the left (columns 1-50) in the .LIS file. For years, GNU ATP produced correct numbers for Noda frequency dependence of DCNEW-14, but the vertical bar was distorted. Every time the simulation was repeated, a different character seemed to appear. But why? No such problem occurred using Salford DBOS ver. 3.5 or Watcom ATP. BPA's Dr. Tsu-huei Liu documented repair in a note dated May 4th: *"Correction of NODA.C ... was made with Walt's help. NODA.DIF documents the two changes needed."* The *Walt* mentioned here is BPA's Walter Powell, a man of considerable programming talent. About the problem, he advised Dr. Liu, who wrote: *"Bob Schultz (of the New York City area) used another option for passing argument reference between Fortran and C. He used a descriptor. However, this works for the Watcom compiler/linker but not the gnu compiler/linker."* Really nice, the complexity and installation-dependence of this mixed-language programming (sarcasm)! The incentive to stick with Fortran remains stronger than ever.

GNU ATP for Mingw32

The switch from Cygnus to Mingw32 began April 10th, after Masahiro Kan of Toshiba Corporation in Japan reminded Dr. Liu and your Editor of the Cygnus licensing problem. A complete set of test cases for Mingw32 was declared acceptable the following day. As with djgpp, the backslash is used. As with Cygnus, the disk must be included if a directory is specified along with the data file name. Unlike djgpp (i.e., like Cygnus), there no longer is a need to split data cases, and starting seems instantaneous. Those 38 million words (more precisely, 38715 Kwords) result from LISTSIZE.HUG which begins (first five list sizes) as follows:

```
 60000   99000  910000    9340  920000  …
```

I.e., 60K nodes, 99K branches, etc. Yet, not only is starting instantaneous, there is no detectable hesitation anywhere when LISTSIZE.DAT is removed (to switch to limiting table sizes) and the output of DC-6 is sent to the screen.

DISLIN is used to provide screen graphics as explained in three separate stories. Although only Mingw32 is being used for this at BPA, the graphics also should be usable by the alternative djgpp and Linux versions of GNU ATP. Quality use of vector SPY PLOT requires windows, however.

NEW OUTPUT FILE is a new declaration that first was used April 13th. As a result, two or more output files are allowed for non-Salford installation-dependent code, with warning messages of the Mingw32 compiler providing motivation. Those Salford DBOS-like library functions from Masahiro Kan (see the January newsletter) are being used in different ways in different places. For example, Turbo Table Dumping (and restoring) of Robert Schultz requires the handling of integer, floating-point, and character vectors. The same is true of the new Pisa-format .PL4 files (see preceding issue). If all such uses are in the same disk file, an intelligent compiler will warn many

times that arguments of subroutines are being used inconsistently. The simplest way to avoid many such complaints is segmentation of the installation-dependent code into different disk files, with the NEW OUTPUT FILE declaration ordering the discontinuity in a .RUM file (installation-dependent translator input). For GNU, three continuations are being used: GNUMODS1.F, 2.F, and 3.F, respectively. This was not all that was required to eliminate all warning messages of the Mingw32 compiler, but it was a large part. The only obvious disadvantage is the need to reorder installation - dependent input accordingly. Position in a .RUM file might no longer be arbitrary, programmers are reminded or warned.

Size of Mingw32 TPBIG.EXE depends greatly on qualifiers of the compilation, it was found. First, without realizing that Walter Powell's -g ordered the symbolic debugger, the result was huge: 7161 Kbytes. But removal of the -g reduced this considerably, to 5086 Kbytes. Finally, adding -O2 (optimization at level two) as recommended by Masahiro Kan reduced size to a more normal 3262 Kbytes. As a point of reference, that fully-optimized Watcom compilation (following Robert Meredith as explained in the January newsletter), produced a TPBIG.EXE of size 3598 Kbytes. Also, unoptimized Salford ver. 2.67 compilation has size 3449 Kbytes. But these two include program text, which for GNU ATP is stored separately as disk file BLOCKD51.BIN --- 640 Kbytes when created on June 10th. To conclude, file size of TPBIG for Mingw32 is bigger than for Watcom or Salford DBOS, but believable.

Speed of linking Mingw32 ATP is no problem. Following the now-standard compilation using -O2, 3.66 seconds were reported by DOS DATE using Dr. Liu's 200-MHz Pentium Pro. This is for those huge dimensions (more than 38 million words of table space), which seem to have no effect on speed of either compiling or linking. This is as it should be, of course (Watcom linking was a holdover from the stone age).

Faster starting and stopping is an advantage of Mingw32 ATP. A separate story documents the time for all test cases using djgpp. Well, Mingw32 ATP that results from compilation with -O2 beats this easily. It also beats fully-optimized Watcom ATP. Total wall-clock times using Dr. Liu's 200-MHz Pentium Pro are, in minutes and seconds: 1) djgpp 3:54, 2) Watcom 3:10, and 3) Mingw32 2:51

Translator output has been split into substantially more disk files, as now will be explained. Originally, the number of segments had been minimized while keeping each accessible to MS-DOS EDIT. But that was before Salford DBOS, which restricted the availability of DOS memory. It also was before concern for global optimization of a compiler. Those warning messages that prompted the splitting of GNUMODS suggest record-keeping that spans subroutine boundaries. It is reminiscent of messages produced by that crummy old Sun Unix compiler, as used at BPA with Motorola 68020-based Sun 2 around 1988. Larger segments of code made the compiler page hard within the available 4 Mbytes of RAM, with optimized compilation requiring about 24 hours. Yet, such operation is neither needed nor wanted, so why pay for it? Under the best of circumstances, GNU compilation is slow by Salford standards. Also, if there might be a compilation error, substantial recompilation is required following correction. It is more efficient to deal with smaller chunks of code, as has been the case for Salford since day one (late 1989). So, boundaries of segmentation were switched to those used by Salford. Included was a change from segment name ROOT20 to name MAIN20, etc. Following this change, the largest output disk file had size 233 Kbytes.

Huge TACS data case IMMOD.DAT from Prof. Humberto Henao is mentioned elsewhere in this issue. Whereas the Salford FTN77/486 compilers overflowed during attempted compilation of the 32863-line file of compiled TACS, free, non-commercial GNU g77 succeeded! Using Dr. Liu's 200-MHz Pentium Pro at BPA, compilation required 14:00 using -O0 (level zero optimization). The result was an object file of 881 Kbytes. The level-2 optimization that is used for the rest of the program failed, however. After 18:17, *"virtual memory exhausted"* was the error message.

The Linux compiler, as used by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina, provided an estimate of required resources for the compilation of the preceding paragraph. Initially, there was failure: *".... 18430: virtual memory exhausted"* was the error message on April 26th. This was while using *"DPMI memory available: 56283 Kb; DPMI swap space available: 130393 Kb."* Yet, note that RAM is only half of the 128 Mbytes available at BPA (might this have an influence?). Mr. Hevia seems to have had the same idea, since he reported success later that same day. After adding a second swap file of 128 Mbytes, he reported: *"with -O0, the process completes normally."* About the version of Linux, being used, Mr. Hevia explained: *"Some weeks ago, I reinstalled Linux from the CD that a friend loaned me. This version is newer (RedHat 5.2). The time to upgrade was 35 minutes: 700 MBytes of software."*

The Mingw32 compiler failed to notice anything wrong with the following statement, which has an extra, unwanted THEN immediately prior to the D38 definition:

```
      IF ( TSTALL .GT. 0.0 ) THEN
     1 D38 = DELAYZ ( TSTALL )
```

Either with or without this THEN in TFLUS2, compilation and linking are uneventful. What g77 might be doing, and why, is not known. It is a little frightening.

Recall TSTALL of a preceding paragraph is the added, artificial time delay in seconds for each line of program output. Support for this and other artificial time delays (e.g., SPY, D4FACT, etc.) was added April 25th using code that was copied from Orlando Hevia's ARTIFF.FOR (a demonstration program).

Crippled and unusable LUNT10 = 10 was a problem that first was observed April 23rd. Suddenly, ATP became unusable. An error window with title *Dr. Watson for Windows NT* would open near the start of execution, and this was traced to the unsuccessful connection of I/O unit LUNT10. Closing the DOS window did not help, and neither did restarting NT. But switching from 10 to 20 worked for a while --- until 20, too, became broken. So, a third value, 32, is being used as this summary is being written April 28th. Conclusion: the problem persisted until a coding change on May 18th. BPA's Dr. Tsu-huei Liu was the first to notice that trouble was associated with an abnormal termination of ATP. Not only was the trouble observed several more times in Portland, it also was observed by Bernd Stein of FGH in Mannheim, Germany – another user of NT. Although never understood, the trouble eventually was avoided by means that remain secret.

Symbol GNUDIR replaced ATPDIR on May 9th in response to the suggestion of Prof. Mustafa Kizilcay of FH Osnabruck in Germany. Recall WATDIR for use with Watcom ATP was explained in the January, 1998, issue. The same reasoning that applied to the Watcom version applies to GNU versions. A distinct environment variable allows separation of the different program versions. Two or more program versions then can be used at the same time without confusion as to which is using the common name.

Text file BLOCKD51.BIN is referenced toward the bottom of the STARTUP file. However, prior to May 9th, environment variable ATPDIR (or the newer GNUDIR) was not involved in locating this file. Prof. Kizilcay first suggested that the text file would be a logical application, and your Editor agreed. Not only can the path of the .BIN file be specified this way (assuming the file really is located along with STARTUP and other such files), the file name itself can be assumed, if this has not been changed. If no file name is seen in STARTUP, this is the reason: the default name is being assumed.

The location of **mv.exe** and **graphics.aux** using GNUDIR were an excellent idea first suggested by Bernd Stein. Writing from FGH in Mannheim, Germany, he wondered on May 11th why the same logic that applied to other files (see preceding paragraphs) did not also apply to these two. So, the change was made later that same day. Once the inconsistency was pointed out, the need for change was obvious.

Scrollable MS-DOS Windows

The MS-DOS window in which Mingw32 ATP is executed on Dr. Liu's Pentium with WinNT is not as good as the scrollable windows of Apollo or Sun workstations from a decade or more ago (almost two decades, in the case of Apollo!). But the DOS window of NT **is** better than the full-screen window used with Salford EMTP under Win95 on your Editor's home computer. Consider why. First, there is lack of wrap-around at column 80. Using the DOS window of NT at BPA, longer (e.g., 132-column) lines are clipped rather than wrapped, making the result easier to read. Second, window width can be expanded from the default 80 columns to 132. Robert Meredith of the New York City area wrote about this many months ago, and Dr. Liu recently demonstrated operation for your Editor. Third, the number of lines of history can be expanded substantially. When your Editor arrived April 28th, he found a short, full-width window that displayed nearly 132 columns, with 400 lines of history that is scrollable using the scroll bar on the right edge. Before leaving that morning, a test had been performed with 5000 lines of history. Readers who have never configured an MS-DOS window this way are advised to begin with the *Start* menu. On Dr. Liu's computer, one begins by selecting *Control Panel* within the submenu of *Settings.* Then one clicks on the MS-DOS icon --- nowhere to be seen on your Editor's Win95 computer at home. Finally, a significant advantage for NT users who execute ATP?

PFE seems not to provide a practical alternative to a scrollable DOS window. The reason for this is worth documenting. But first, recall that free PFE (Programmer's File Editor, written by Alan Phillips of Lancaster University in England) was described in the October, 1997, issue. For at least that long, PFE has been used creatively with ATP by Prof. Mustafa Kizilcay of FH Osnabruck in Germany. For example, ATP can be run from inside PFE, and ATP output to the screen can be captured by PFE. Your Editor had inquired on May 1st, and Prof. Kizilcay rapidly responded with a detailed description later that same day. Unfortunately, PFE operation seems to be batch-mode. Yes, program output can be captured by PFE, but this becomes available only at the **end** of ATP execution. This does not help the user who wants to see program output as it is being generated (i.e., for interactive use of SPY). This is unfortunate, since a PFE window would have offered some obvious advantages over an MS-DOS window. PFE would have freed screen output from the limits of *Control Panel* --- limits that now must be set before the output is generated. Most importantly, the limit on the number of lines that are stored would be removed. PFE has no known limit, and can edit very large files. This is the most frustrating aspect of Bill G's scrollable windows: the need to anticipate file length ahead of time. Apollo had no such limit 20 years ago, and Sun had no such limit 10 years ago. Why does Bill G's top-of-the-line OS impose such a limit today? Is it obvious that MS programmers really are trying to make the best product possible?

A limit of 9999 lines exists for those scrollable DOS windows of NT, unfortunately. This bad news was revealed to your Editor by Dr. Liu on April 7th. Subsequent experimentation served to clarify what resource is involved. As *Screen buffer size* passed through about 4000 lines of 132 bytes each (the number of lines was being increased by holding mouse button 1 down on top of the up arrow), a

warning suddenly appeared: *"Screen buffer size will require 1 Megs of memory per window."* Why 1 Mbyte rather than half a megabyte? Even more important, might this be real memory rather than virtual memory (the paging file)? If real memory, this represents an enormous waste. Meanwhile, your Editor is considering movement of this paragraph to the *brain-damaged MS Windows* story. June 11th, Dr. Liu left a note that observed: *"When I set console window buffer size to width = 125 and height = 9999, I received a message warning that the screen buffer size will require 2 Megs of memory per window."*

Compiled TACS & Assembly Language

Numerous warning messages about subscripts being out of range were annoying output of the GNU compiler. This was prior to reliance upon TACSAR.BIG which began March 21st. Following this introduction of real maximum dimensions (corresponding to LISTSIZE.BPA), GNU compilation of COMTAC now produces no output at all.

One thousand or more supplemental variables overflowed the comment card labeling of DECKTAC1 prior to expansion by an order of magnitude on April 21st. There also was overflow of subscripts for the Type-56 device (an exception, somehow). Both of these uses involved an I3 integer prior to expansion to I4. What data had the distinction of being the first to require the modification? It was IMMOD.DAT from Prof. Humberto Henao as mentioned in the July, 1998, newsletter. When COMPILED TACS MAKE (CTM) first was tried on this data, there were plenty of bad subscripts. In addition to this, however, only two of the resulting 32863 lines were objected to by the FORTRAN compiler. Data was nearly compatible, with the two errors easily removed by simple AA and BB use (see the April, 1997, issue). However, as explained in the lead story, the Salford DBOS-era compilers were unable to cope with the volume. That was a more fundamental problem. But the free GNU compilers for Mingw32 and Linux succeeded (see separate mention).

Recall Prof. Gérard-André Capolino is at the same school in Amiens, France. In E-mail dated April 20th, he explained that the next publication of this work will be at *"the IEEE Symposium on Diagnostics for Electrical Machines Power Electronics and Drives (IEEE - SDEMPED'99) in Gijon, Spain, September 1-3, 1999. We have two papers already published in the same symposium in France during September of 1997, but that was only the beginning of the work."* The most recent of existing publications mentioned by Prof. Capolino was: K. Konan, H. Hénao, G. A. Capolino, M. Fernandez-Cabanas, *"A new stator model to study induction machine winding short-circuits"*, Proceedings of the International Conference on Electrical Machines (ICEM'98), Istambul (Turkey), September 1998, vol. III, pp. 1516-1521.

Superposition of Phasor Solutions

The automatic creation of sources that were used during previous phasor solutions became available December 15th, with operation illustrated by the 14th subcase of DCNEW-26. Comment cards explain when this labor-saving feature is used, and when it is not. The 14th subcase, of 16 total, ended the illustrations of superposition with an example involving three harmonics: 50 Hz, 75Hz, and 100 Hz for a series connection of constant parameter, Jmarti, and Semlyen modeling of distributed lines. The smooth result of period 40 msec (25 Hz), illustrates coexistence of all distributed line models except Dr. Taku Noda's.

ATP Licensing Problems

"Proposed ATP pardon for CEPEL in Rio de Janeiro, Brazil" was the title of E-mail from the Fargo list server on March 31st. Authored by the Can/Am Co-Chairmen, this began open discussion of the problem as follows (next six paragraphs):

This message constitutes the beginning of public discussion that might lead to ATP licensing of CEPEL in Rio de Janeiro, Brazil. ATP licensing of CEPEL is exceptional because of past association with EPRI for purposes of development of the commercial EMTP of DCG and EPRI. In exchange for access to this commercial program, CEPEL **did** promise to contribute significant manpower and/or money to the endeavor between 1991 and 1995. By means of this association, CEPEL disqualified itself from free access to ATP as explained in the form letter that is used by the Can/Am EMTP User Group. … An ATP pardon remains a possibility, however. … The most thorough explanation can be found in the July, 1995, issue, following inquiries from AEP and IREQ. But the concept predates the July, 1991, issue, which had a story entitled *"ATP pardon for GE Schenectady."* … The appropriate key word to search for would be *pardon* in this case.

Note that a pardon is an exception to the written agreement, however. So, in theory, it would require the unanimous approval of all important contributors --- the owners of the work that is to be used in an unintended way. Practically, an ATP pardon for CEPEL might be proposed publicly using the Fargo list server, and an interval of time then would be allowed for public discussion. Such public discussion using E-mail was proposed as far back as the July, 1995, story, it is to be noted. … Note that any subscriber may contribute to the discussion, although it is only the owners of the work (generally the authors or their employers) who have voting rights.

A declaration of intention never again to participate in EMTP commerce is believed to be important. This was required of CEPEL by the Can/Am user group as a condition for support of the proposed pardon. The statement from CEPEL, which was attached to E-mail

from Marco Polo Pereira dated March 29th, ended as follows: *"... the official position of CEPEL is to exclusively use the ATP for the future. It is not our intention to have any involvement with DCG."* This seems satisfactory to the Can/Am user group. Based on what now is known, the Can/Am user group **does** favor approval. I.e., it supports the proposal for an ATP pardon for CEPEL.

ATPDEC.DOC is the disk file containing the statement from CEPEL. A copy has been sent to various Internet sites, in order that it be made available to anyone who is curious about CEPEL's involvement with DCG and EPRI. Yes, CEPEL probably **was** misled by salesmen of DCG and/or EPRI back in 1986. This is not the first report of DCG/EPRI deception that has reached Can/Am ears. Yet, this seems to be a peripheral detail, as far as the Can/Am user group is concerned. … Although no organization has a right to a pardon, an application will be considered favorably if: 1) the organization is important; 2) those making the application seem sincere; and 3) commercial competition should be weakened as a result.

A consequence of the final condition 3 might be explained. If and when the badly-damaged DCG ship finally sinks, there probably will be little interest in rescuing those DCG members and friends who remained aboard as long as possible. ATP pardons are designed to encourage defections while they might still make a difference. By the time the EMTP war might effectively have been won, it is expected that all interest in pardoning former combatants will have ended. Like the policy of reciprocity itself, the offer of ATP pardons is pragmatic rather than altruistic, and clearly is time-limited.

CEPEL states that its interest in DCG/EPRI began during 1986, when BPA was a DCG member. It should be explained that no EMTP developer at BPA ever recommended that CEPEL cooperate with either DCG or EPRI. Was any EMTP developer ever consulted? The authors have no recollection of any such contact. In any case, the date of CEPEL's association (1991) was years after expiration of the DCG Agreement. BPA involvement ended with expiration of the one-year extension that DCG had accorded itself. This was on the final day of 1987. Readers who are interested in more details of BPA's disaffection with DCG are advised to consult the March, 1988, issue of LEC's *EMTP News*. Some 11 or 12 pages document DCG/EPRI hype, misinformation, and trickery of the period. How CEPEL could have missed such vital information between 1987 and 1991 is neither understood nor appreciated. …

End of quotation from the semi-public E-mail of your Editor and Dr. Liu. The only meaningful non-private response came from Dr. Jose Roberto Camacho of Univ. Fed. de Uberlandia. His March 31st contribution included the following recommendation: *"I would like to write this letter to the whole ATP-EMTP community as the representative of the association of our university with CLAUE (EMTP Latin American Users Committee). Considering the enormous amount of research done by CEPEL along many years for the Brazilian Power Electricity Industry via the National Committee for Technological Research and Scientific Development I would like to advocate the support of ATP Pardon for CEPEL. The amount of possible contributions to ATP with CEPEL back to the community certainly will be expressive. To some developers that probably don't know about CEPEL, just few words: CEPEL was the technical background for studies of the whole Brazilian Electric Power System, including in that the interaction of the Itaipu Hydro-Power Generation and Transmission Scheme (AC-DC) with the Brazilian Grid."*

Ontario Hydro (OH, a DCG member) was mentioned in the preceding issue. Recall that Peter Dick had telephoned to learn whether free access to ATP might be possible for his piece of OH that would emerge from corporate segmentation. Little did the Can/Am Co-Chairmen realize, however, how quickly the potential problem would become actual. On April 14th, semi-public E-mail of the Fargo list server was received from Arun Narang at address **arun.narang@oht.hydro.on.ca** The following day, an inquiry about ATP licensing was made. This was similar to the form letters that were sent to UBC, EDF, and WAPA addresses nearly 3 years ago (see a summary in the January, 1997, issue). Rapidly, there was a response from Toronto with the following explanation: *"I had not realized that one had to be a license holder to subscribe. .... Peter Dick is indeed a colleague of mine, and I am aware that he had contacted you in connection with licensing for OPT (which is in the process of being separated from Ontario Hydro, and is already operating at arm's length from OH)."* Mr. Narang also explained that his *"interest in subscribing was not for eavesdropping on ATP developments."* On April 16th, your Editor responded: *"Right. ... Your violation was too obvious to be anything other than an honest mistake."* Mr. Narang continued: *"Rather I thought it might be stimulating to interact on technical questions involving how one might model certain mechanisms."* To this, your Editor responded: *"Indeed. I agree. So why does OH not reconsider its commercial policy? As a result of its EMTP commerce, you have been painted into a corner. You now are isolated from most EMTP users of the world. This is by reciprocity. Because your company refuses to share with others who do not pay, the ATP user community refuses to share with OH. Here 'share' means 'free of charge', of course."*

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. This information was received from JAUG in E-mail dated May 3rd. More information next time.

Comings and Goings

Akihiro Ametani, most recently Dean of the Library and Computer Information Center of Doshisha University in

Kyoto, Japan, has retired as Chairman of the Japanese EMTP Committee (JEC). This follows more than two decades at the head of the oldest EMTP user organization in the world. The 1999 annual meeting of JEC was held May 14th at Ohsaki-Kaikan of Meidensha Co. According to an English-language translation of the minutes: *"**3. Election of New Chairman.** Prof. Ametani resigned from the chairman. The new chairman for the years of 1999 to 2001 has to be elected. No one stood for the chairman in the meeting, and the past chairman recommended Prof. Y. Kawaguchi of Kokushikan University as the new chairman. All the members agreed, and Prof. Y. Kawaguchi was elected. **4. Secretaries and Honorary Chairman.** (1) The chairman appointed the same secretaries as those in 1998. (2) The chairman proposed to elect Prof. Ametani as the Honorary chairman for his outstanding contribution to the Japanese EMTP Committee and the EMTP itself. The proposal was agreed by all the members."* For the historical record, JEC was founded by Prof. Ametani during October of 1976. At last count, it had 79 industrial members and 62 members from public organizations. The minutes document important support for JAUG, too: *"(2) Financial support of 500,000 Japanese Yen to the Japanese ATP Users Group in the year of 1999 was proposed by the chairman, and was agreed by all the members."*

BPA's Walter Powell has been mentioned in many past issues of this newsletter. To see some of his more normal work this past decade, consider the paper on page 43 of the April issue (vol. 12, no. 2) of IEEE *Computer Applications in Power*. The paper is entitled *"Public domain tools clarify power flow studies*," and is written by Gordon Comegys, Walter Powell, and Lawrence Stadler -- all with BPA. Although transient stability is mentioned at the end, basic considerations involve only the steady state. The *public domain* comes from still-applicable FOIA, of course. *"These programs ... are available via ftp on the Web at URL **ftp://ftp.bpa.gov/downloads/software**"*

TEPCO Improves S.M. Model

Dr. Hiroshi Okamoto of Tokyo Electric Power Company (TEPCO) in Japan issued his formal explanation of recent improvements to Type-58 S.M. modeling. Having subject *"Type-58 S.M. model has been improved in ATP,"* this message of the Fargo list server was dated March 24th. The following ¾ of a page is copied from Dr. Okamoto's announcement. It provides continuation of the story that began in the preceding issue:

I am pleased to inform you that TEPCO and TSI (Toden Software Inc.) have improved the type-58 S.M. model in ATP-EMTP. According to Masahiro Kan's recent message to this Fargo list server, the improved version of ATP has been available since March 15. The improvements made in the newly released type-58 S.M. are summarized as follows:

(1) Correction of the saturation representation

As Dr. Haginomori and others mentioned, type-58 and 59 S.M. models compute different solutions from type-19 U.M. when studying short circuit current of saturable machines (see Can/Am EMTP News Vol. 97-4 October 1997). This difference was caused by erroneous representation of the saturation.

Mr. Cao, the author of the type-58 S.M., has been working on the modification of the saturation representation. After considerable tests, we concluded that much more exact solutions can be obtained by using the modified representation.

In addition, the improved type-58 S.M utilizes a smooth saturation curve instead of a piecewise-linear representation. Since the type-58 S.M. requires re-triangularization of the network [Y] matrix at each time step, anyway, this change does not significantly affect the computation time. We believe that this modification can improve the numerical stability, however.

(2) Improvement of initial load flow solution ..

The load flow computation of FIX SOURCE assumes that the terminal voltages of the synchronous machine are balanced even though connected transmission lines are not balanced. Of course, this is only an approximation. The terminal voltage of the synchronous machine really is unbalanced if the connected network is. This means that the steady state obtained by FIX SOURCE is inconsistent with the dynamic simulation model, for unbalanced operation of synchronous machines. Therefore, the user can observe transients in an unbalanced system that has no disturbance. There will be a discontinuity at the first time step.

The load flow computation of NEW LOAD FLOW can compute the initial steady state solution consistent with the dynamic simulation. The modified load flow assumes that the internal machine voltages are balanced. To simplify the implementation of the modified solution, the load flow is solved by a classical Gauss-Seidel method. However, in tests using a single-machine with an infinite bus system, and a more complicated three-machine system, NEW LOAD FLOW has shown improved convergence compared with FIX SOURCE.

In order to use the modified power flow computation, all you need to do is replace FIX SOURCE by NEW LOAD FLOW. It should be noted, however, that only type 58 sources will be adjusted during the iteration. Constraints involving power or voltage magnitude are not yet observed for type 14 or 59 sources, for example.

In addition, the name of special request NEW LOAD FLOW will be replaced by CAO LOAD FLOW at the next release.

(3) Bug fix for S.M.s in 50 and 60 Hz systems

Mr. Kurita and Dr. Nakajima of TEPCO realized that EMTP computed a wrong steady state for a system that included both 50 and 60 Hz synchronous machines. Of course, one or more frequency converter stations separate the networks having different frequencies. (As you may know, we have both 50 and 60 Hz systems in Japan, and these are interconnected by two frequency converter stations). This error was removed last October.

We hope that our new S.M. model will improve your transient analysis of systems with synchronous machines. Bug reports and comments about the type-58 model are welcome.

End quotation from Dr. Okamoto's announcement.

CAO LOAD FLOW is the way a user requests the new load flow modeling of TEPCO beginning March 21st. As just explained by Dr. Okamoto, this is in honor of the author, Xiang-lin Cao. The old NEW LOAD FLOW will continue to be honored for a while, probably, although it no longer should be seen in standard test cases.

That slower convergence of the load flow of DC-26c (see the preceding issue) was traced to unwanted and unneeded modification of convergence control KTAPER. Following removal of one line of FXSOUR on March 23rd, 164 iterations once again sufficed for solution.

A practical application of the improved Type-58 S.M. modeling was provided by Dr. Eiichi Haginomori of Kyushu Institute of Technology in Kita-Kyushu, Japan. Attached to a message dated March 29th was data to simulate the *"world biggest class generator ... modeled in three ways: 19UM, 58SM and 59SM. The HV sides of the step-up transformers are suddenly short-circuited. Significant differences in the short circuit currents are observed between 58SM and 59SM. Slight differences between 19UM and 58SM are thought to be due to modeling manners."*

Power Company Politics and Religion

"Northwest Legislators talk of buying Bonneville" is the headline of an article that is being passed around BPA as a disk file. Reported by Jeff Stanfield, the story is said to have appeared in *"the 4/13 and 4/14 issues of MegawattDaily."* Any reader wanting details is referred to **www.mwdaily.com** which is a Web site owned by Financial Times Energy of suburban Washington, D.C. Of course, selling BPA is an old idea among conservatives. It dates to the early '50s (the Eisenhower administration). But that was when BPA had real value. Recent mention can be found in newsletters dated April, 1995 (*"Congressional pressure to sell BPA"*) and April, 1998 (*"negative net worth"*). The latter of these quotations seems to be the more relevant to the latest news, since state governments of the region are always short of money. Anyway, what is the latest twist? *"A group of Northwest legislators led by the majority leader of the Oregon Senate is making plans to buy the Bonneville Power Administration (BPA) from the federal government. ... a plan to buy and operate the agency ... He said the bill to deregulate Oregon's electrical industry, passed by committee last week, was the first step in his plan to acquire BPA. S.B. 1149 would open the state's electric market to competition beginning Oct. 1, 2001 (MWD 4/7). Their goal is to keep the low-cost energy in the Pacific Northwest, rather than let it be captured by neighboring states -- specifically California. Northwest energy, mainly hydro generated, is produced for about 2 cents/kWh. California's, mainly thermally generated, is several times higher. .... Some U.S. legislators have pursued either a takeover or dissolution of BPA, but this is the first regional proposal. Derfler said the acquisition could be paid for out of earnings ...."* This seems to be the current argument, which makes more sense than preceding ones: The region already is paying for the stupidity of BPA management (failed nuclear plants of WPPSS; $400 million/year for fish), without enjoying any control. It would be better to pay the same amount while at the same time improving protection from power-hungry and politically-influential (in the nation's capitol) Californians.

Turmoil within the American and Canadian electric power industries is ongoing. The preceding issue mentioned the splitting of BPA and Ontario Hydro, and what happened to a Vice President of Iowa Power. The story seems to be repeating itself across the continent --- north of Mexico, anyway. Locally, Pacific Power & Light, owned by PacifiCorp, has seen its share of change. This determination followed an inquiry from Paul Harris, who, on April 15th, wrote from a regional office in Yakima, Washington: *"I'm a field engineer for PacifiCorp in Yakima. Last year you sent me the password …. Or is there someone at PacifiCorp that is our official point of contact?"* Dr. Liu checked locally, and then responded: *"The original point of contact for ATP at PacifiCorp was Jamie Austin. She is no longer at her earlier job with the system planning group, however. I just telephoned Yu Wang, who had used ATP at PP&L for a few years. Yu told me that there is no one in your company's Portland office who uses ATP now. He said that recently he had received several inquiries on ATP from field offices of your company. If you don't mind, I will ask that you be the point of contact for PacifiCorp regarding ATP. Here is the updated password information .... I will put your name in our 'password update list'."* Recall Yu Wang was mentioned in the January, 1996, newsletter. Earlier, Dr. Liu and your Editor had spent a week with him at the March, 1994, short course in Florida. But corporate priorities and faces change --- at an alarming rate, recently. So, Paul Harris took over the ATP duties: *"So as long as I stay in my job I'll be glad to be the contact."* Does any reader know of an American power company that is not undergoing disruptive change?

DISLIN from Lindau , Germany

DISLIN is the graphic library that is used by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. It supports graphics of his GTPPLOT program as explained in the July, 1998, issue. More recently, it has provided screen graphics for GNU Mingw32 ATP (see separate story in this issue). Now that DISLIN has taken on added importance for ATP users, some context and background seem appropriate.

"The name DISLIN is an abbreviation for Device-Independent Software LINdau ... The library contains subroutines and functions for displaying data graphically as curves, bar graphs, pie charts, 3-D colour plots, surfaces, contours and maps." Thus begins the explanation by Helmut Michels of the Max Planck Institut fuer Aeronomie in Katlenburg-Lindau, Germany. Since this great software is free for users of the GNU FORTRAN and C compilers (g77 and gcc, respectively), it seems only fair that credit be given in detail: *"Although nearly all the routines and utilities of the software package are written by myself, DISLIN would not have been possible without the help of many people. I would like to thank several people at the Max-Planck-Institut in Lindau. First, Dr. W. Degenhardt, Dr. H. J. Mueller and Dr. I. Pardowitz who gave their friendly assistance. To all the users of DISLIN, I am grateful for your helpful suggestions and comments. I would especially like to thank the members of the computer center, Friederich Both, Terry Ho, Godehard Monecke and Michael Bruns, for their co-operation. Finally, I am grateful to Linda See and Erika Eschebach who corrected the English and German manuals with great carefulness. To all of them, my sincere thanks."* This by H. Michels on date 15.01.1999, from disk file KAP0.TXT of the DISLIN package as installed April 21st by Dr. Tsu-huei Liu on her 200-MHz Pentium Pro PC at BPA.

Like GNUPLOT (see the January and April, 1997, issues), DISLIN contains a lot more sophistication and power than are required for the initial ATP use. For example, in disk file DISLIN.INF, your Editor notes that *"axes can be linearly or logarithmically scaled and labeled with linear, logarithmic, time, map and user-defined formats."* Other features include *"business graphics, 3-D colour graphics, geographical projections and plotting of maps, contouring."* If commercial purchase had been required, the answer probably would have been no. DISLIN provides much more than ATP can use (as now foreseen). On the other hand, the price for GNU ATP is right. Compilers other than GNU are not so blessed, for either MS-DOS or MS Windows use. For MS-DOS use, Lahey, Salford, and Microsoft FORTRAN compilers are seen in a chart, but use with them is **not** free. There is no asterisk. Similar details apply to MS Windows compilers. DISLIN clearly increases the advantage of the GNU compilers for ATP use. Because the GNU compiler g77 is free, some thought might be given to user-defined plotting. We will see. User-defined alternatives in ATP are growing, and graphics might be yet another aspect that is promising for exploitation, thanks to free g77.

DEC Alpha running OpenVMS 6.2, for both FOR and F90, is among non-free alternatives for DISLIN use. If any VMS ATP user wanted screen graphics for ATP, it appears that DISLIN might provide an easy path --- copying what already has been perfected for MS Windows. The same should be true for various non-Linux Unix platforms: IBM RS-6000, HP 9000/7xx, Silicon Graphics, and Sun SPARC. For more information about the commercial alternatives of DISLIN, consult Garching Innovation at **http://www.garching-innovation.mpg.de** However, prices seem high enough to discourage most ATP interest. A table shows an IBM PC license priced at $150, and a Workstation license priced at $450. In this day and age of free graphics, any price above zero represents a difficult sale, in your Editor's opinion. Remember $75 GEOGRAF use in 1989? This did not survive the introduction of free Salford graphics during 1990 .

About Internet location, the DISLIN author uses address **michels@linmpi.mpg.de** and the DISLIN home page is said to be **http://www.linmpi.mpg.de/dislin** Many thanks to Helmut Michels, from the rapidly-growing group of Mingw32 ATP users around the world.

Common names are a problem of the DISLIN library. While easy to remember and use, they increase the likelihood of conflict. There is obvious similarity to CalComp names such as PLOT, SYMBOL, etc. Name WINDOW posed a serious conflict as first recognized by Mr. Hevia. It seemed easiest to change the ATP name, which became WINDOX on April 28th. Four days earlier, Mr. Hevia had discovered that ANGLE did not work properly --- because this routine was a part of CABLE PARAMETERS. Yet, this second conflict was resolved easily enough. Further study revealed that SUBROUTINE ANGLE never was CALLed, so the module simply was removed from the SUBR27 segment.

Mingw32 ATP CALCOMP PLOT

Vector graphics for GNU Mingw32 ATP are provided by DISLIN (introduced in a separate story). For ATP use, batch-mode plotting of CALCOMP PLOT came first.

The top 60% of the monitor is reserved for graphics, and this is approximately two thirds of available vertical space. This is as used at BPA during early May on Dr. Liu's 200-MHz Pentium Pro PC that runs NT. Note that the total is **not** available to ATP because the bottom row is reserved by Windows for the *Start* button on the left and the tabulation of various icon symbols and names to the right of it. This space can not be covered by the LUNIT6 window below the graphics, unfortunately.

Background color is naturally black, and nothing has been done to change this. Yet, both Salford DBOS and Watcom WAT4GW (the DOS extender) graphics allowed initialization of the entire screen with any color, and this capability has been applied for DISLIN use, too. Color number KOLBAK provides this control, with value zero meaning none (a change from value 16 of Watcom use; 16 was found to give bright blue). Gray corresponds to value 8, and some user might possibly be interested in this. As for other colors, the effect using high resolution is awful. Salford graphics typically were low-resolution VGA, so were bold. But DISLIN graphics for 768 x 1024-pixel NT are fine, so appear weak. Any background color other than black looks like a mistake. It tends to dominate the plot, making everything else difficult to observe.

HP-GL, PostScript, TIFF, and several other alternative forms of graphical output are possible. This is a strength of reliance upon a powerful graphical library such as DISLIN, it should be explained. On the other hand, such alternative output forms are not the reason for using DISLIN. Screen graphics are the reason for adding DISLIN, and alternative outputs are not yet being tested and exploited. Remember, HP-GL and PS output of ATP have been available for years (variables NOHPGL and NOPOST control this), so there is no need to rely on DISLIN for such output. As for TIFF files, these color bitmaps are large enough (520 Kbytes for the 768 x 1024 resolution at BPA) to make your Editor wonder whether use is practical. How much work might be done with alternatives is unclear at this early stage of the work. In any case, different LASERJ values will produce alternative outputs as explained on comments.

Double-length CALCOMP PLOTs are easily produced on the screen as illustrated by several later Noda frequency-dependent simulations of DCNEW-14. For execution, it is assumed that GRAPHICS.AUX is being used, and that this file produces a full-width graphic window as designed for SPY PLOT. If plot data is unchanged, batch-mode screen plots then will appear in the left half of the window. But if the [units/inch] specification of columns 5 through 7 (variable HPI) of a plot card is halved, a former 10-inch plot will be converted into a 20-inch plot that covers the full width of the screen. It is that simple, although a change of data is required. An alternative technique leaves the data unchanged, and instead doubles NXINCH (the number of pixels per horizontal inch). The curves then will be the same as using the first method, but vertical grid lines will be spaced twice as far apart. Instead of squares, the grid then consists of rectangles that are twice as wide as they are high. Also, the number of horizontal-axis numbers will be unchanged, so these, too, will be spaced twice as far apart. The effect seems a little unnatural (the first alternative generally is preferred).

NODISK is a new binary flag of GRAPHICS.AUX that controls whether or not screen graphics will be seen during execution that involves the DISK option. I.e., when text output is to go to disk, not to the screen, what happens to DISLIN (screen) graphics? Should there be any on the screen? The user can control this. Value zero will allow graphical output whereas value one will suppress it. Note the difference from NOCALC, which has broader power, but only for CALCOMP PLOT output (not for SPY PLOT). In addition to screen output, NOCALC will suppress HP-GL, PostScript, and GNUPLOT output , if the value is set to unity. NODISK allows suppression of only the screen plotting while allowing the other types of CALCOMP PLOT output. About the variable name, it is read as "no DISLIN graphics during DISK use."

MULFNT is a new parameter of GRAPHICS.AUX with the name indicating *multiplier for the fonts*. The user is forewarned that there is no right answer. The ideal value is largely a question of aesthetics. Value 350 as distributed by the user group results in relatively larger text than Salford EMTP would use. But Salford DBOS graphics necessarily are full-screen. To make text more easily readable as part of a reduced-height (if not width) plot, the text has been enlarged relative to the grid.

QUARTER PLOT is illustrated by the installation-dependent batch-mode plotting of otherwise-universal test case DC-35. About DISLIN use for Mingw32 ATP, it will be noted that double-width plots are used within the quarters. With this change, available plot space is effectively used. Without this change (i.e., if the 10 inches of Salford EMTP had been retained), half the available space would have been wasted. Note that the two preceding plots illustrate both 10- and 20-inch time axes. This is prior to the switch to the simultaneous display of four plots of quarter size.

If a **<CR>** is required to end each CALCOMP PLOT (see GRAPHICS for details), one mouse click will be required on the DOS window of execution. Only one click is required, any time after the graphical window has been opened. This is a peculiarity of the initial DISLIN use. When the graphical window is opened --- just once per ATP execution, prior to the first vector plot --- selection of the DOS window of execution is lost. So, prior to pressing **<CR>** following the first plot, the user must point and click his mouse once, unfortunately.

Thousandths of an inch have replaced pixels as the measure of distance for several of the GRAPHICS.AUX parameters beginning May 8th. Of course, inches are not real screen inches, but rather CALCOMP PLOT inches, of which the vertical axis consists of 8, and the time axis typically will involve either 10 or 20 (with the latter corresponding to a new double-width plot). The reason for the change is freedom from resolution. Previously, the horizontal offset NXOFF would change as one switched resolution (e.g., from EGA to VGA). Now, using thousandths of an inches, such measurements can remain fixed. Also, a thousandth of an inch far exceeds the resolution of any monitor, so there is no loss of resolution due to the use of integers. This is progress. The level of control has been raised.

GNU Mingw32 ATP SPY PLOT

A ROLL-ing SPY PLOT is illustrated by DC-57, which became installation-dependent on April 30th during the first demonstration of correct vector (ROLLV as opposed to ROLLC) operation. There is considerable similarity to what was done for Sun Unix workstations ten or eleven years ago. There also are important differences such as lack of reliance upon expensive GKS (the good news). Whereas SPY ideally has three windows, the SPY dialogue window used by Apollo was not easily provided by Sun. So, the separation of SPY I/O from LUNIT6 I/O was ignored. In its place, the half-width graphical window was made full width. This occupied the top two thirds (about) of the screen. Rather than ten units ("inches") of time axis, twenty were used. This differs by a factor of two from Apollo or Salford, and it is the reason for the installation-dependence of data, which is minor. The size of the graphical window is specified by four new parameters in GRAPHICS.AUX (see mention in the April, 1993, issue). The original 12 parameters have been expanded by these four (JXDISL, JYDISL, NXDISL, and NYDISL) plus possible added artificial time delay JSLOW. For details, read comments within the disk file. Of course, remember that NYMAX = -7777 in GRAPHICS is the request for use of the GRAPHICS.AUX file. About data, 3 node voltages have been added to the one original branch voltage for the ROLLing SPY PLOT. While this makes the plot artificially crowded, it serves to illustrate the handling of additional signals. Another change involved conversion of the original batch-mode PRINTER PLOT to CALCOMP PLOT, which will appear in the same graphical window.

JSLOW > 0 produces one line of output to the screen each time an artificial delay is begun following the extension of a ROLLing SPY PLOT. It was found that such output is necessary if **Ctrl-s** is to hibernate the simulation while execution uses DISK to minimize other output to the screen.

GET_KEY1@ is the Salford DBOS utility that takes a quick look at the keyboard. In E-mail dated May 30th, Masahiro Kan of Toshiba Corporation in Japan explained addition of this function to his growing DBOS-like library: *"Please find attached getkey1.zip which includes the C function get_key1() and it's test program. Please note the Linux version is not yet tested."* The road to interactive SPY use has been opened. Expect details in the next issue.

Publishing Programs and Viewers

Spelling error: colunbian.com can be found on page 4 of the preceding issue. This should be columbian.com, of course. This illustrates yet another weakness of spelling checkers: spelling only applies to words, and these require spaces or other punctuation for identification. Curiously, Bill G's finest stopped on the second word of the paragraph, *Columbian*, which **was** correctly spelled (for up here beside the Columbia River if not for down there in Colombia of South America). That was the only entry of the paragraph to which Word objected. Presumably it recognizes the **www.** and ignores everything following it.

The searching of a family of .PDF files has become an increasing concern now that Vernon Buerg's freeware LIST no longer can be employed for the task by the average newsletter reader. It is important that readers appreciate the problem that has been created during recent years. Let's trace the evolution. Operation began with WP 5.1 files, which could be read easily using LIST. These files date to September of 1988. Yes, font changes produced garbage characters, but these represented a minor inconvenience. Most normal text appeared normal, as an English-language column. Then, beginning with the January, 1997, issue, only MS Word files were made available. These still could be read with LIST, although more pain was involved due to lack of carriage returns within paragraphs. I.e., each paragraph was stored as a single line. Finally, beginning with the July, 1998, issue, only Adobe .PDF files were made available to the general public. Since these involve compression, they are not readable at all using LIST. So, as newsletters accumulate, how is the average reader to search his growing family of disk files? BPA's Dr. Tsu-huei Liu reminded your Editor of Robert Meredith's important demonstration for the Theory Book, as reported in the October, 1998, newsletter. Recall Mr. Meredith unified all of Dr. Liu's chapters, allowing Adobe Acrobat searches of the entire book. It would appear that this is what is needed for newsletters, if no reader can suggest a better alternative.

Frequency Scans and Harmonics

The widexx output produced by HARMONIC FREQUENCY SCAN (HFS) data was corrected May 13th in response to a report of trouble by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. The previous day, he had explained: *"I send to you a case that aborts ATP if widenn is used. The case runs correctly with formatted, C-like (old and Pisa), and unformatted .pl4 output format. This is an example from Gabor Furst's course in Prague, and his program HFSPLOT requires wide10 format."* Investigation revealed that 4 lines of initialization, added to TSHEAD during February for time simulation, also were needed in FSHEAD for F-scan use. An uninitialized subscript had ended execution during creation of the first line of the plot file header.

ATPDraw from Hans Hoidalen

Author Hans Kristian Hoidalen of SINTEF Energy Research in Trondheim, Norway, issued news of ATPDraw in E-mail of the Fargo list server dated March 29th. He wrote: *"ATPDraw version 1.4 is now available at … Version 1.4 runs only under Windows 95/98/NT. New in*

this version are: 1) Problem with decimal symbol fixed. Both '.' and ',' allowed dependent on Windows regional settings. 2) Error with exponents of -10 and +10 (e.g. 1.2E-10 and 2E10) fixed. The last zero is not removed. 3) New module for universal machines. a) New input menu; b) More flexible control of number of rotor windings and saturation. c) Several UM allowed. d) Global UM data under the main menu ATP|Settings/UM. e) Type 1, 3, 4 ,6 and 8 supported. (Type 6 and 8 are not properly tested due to lack of test cases.) 4) One new coupling option for the general transformer object supported (called D11). The next step in ATPDraw development is to include line and cable modelling."

Year 2000 Compliance of ATP ?

IEEE handling of Y2K for COMTRADE is not much appreciated. Recall why the Y2K problem exists today. It was during the '50s and '60s that two bytes were saved by mainframe programmers for two reasons: 1) memory was expensive, and 2) year 2000 was a long way away (hence, someone else's problem). So, what is IEEE's excuse for originally allowing only 2 digits? Those geniuses on the committee could not imagine the end of the decade when the COMTRADE standard first was established during the early '90s?!

Possible overflow of the date/time counter within DOS or MS Windows was imagined by Robert Meredith (see mention in the January issue). This was discussed in the Y2K context, although it had nothing to do with the end of any year. Rather, it concerned overflow of internal storage. Little did a reader realize how quickly this might occur, either. The following ironic humor entitled *"Microsoft's right"* (i.e., MS is right) was received from Mr. Meredith on March 15th: *"Thirty years ago, programmers figured two digits were enough for the year. No way in heck would the software run long enough for this to be a problem! The Unix guys were wrong. Another operating system used a 32 bit counter to count time in milliseconds from when it's turned on. No way in heck would the system run long enough for this to cause a problem when it rolled over! It rolls over in 49 days. It's in Win 95 and Win 98. Microsoft was right."* About attribution, the reader is referred to *"http://support.microsoft.com/support/kb/articles/q216/6/41.asp ... This joke's link : http://www.netfunny.com/rhf/jokes/99/Mar/msright.html"*

Gold and non-perishable food are commodities that are being sold to Y2K-gullible listeners of American talk radio. Advertising has been heard for many months on several different stations, so there must be a sufficient number of receptive listeners. The basic idea seems simple enough: encourage fear of disruption that will begin New Year's Day (more precisely, the first business day following this holiday). Of course, deprived of computers, industry would suffer, and the stock markets would crash quickly. This is the rationale behind a move from currently-overpriced equities to gold. As for food, distribution to local stores is from computer-controlled warehouses, so this, too, might be disrupted, resulting in panic that rapidly would empty supermarket shelves. This is the rationale for buying special food now --- at exorbitant prices. Might 1% of the population take such speculation seriously, and act on the suggestions? The number, and potential effect, is large enough to worry governments. That much is clear. Like the fear of fire in a crowded theater, fear of Y2K might itself be enough to cause significant trouble --- even if all computers might make the transition perfectly. There is a growing realization that the Y2K problem may depend more on the human mind than it depends on either hardware or software of computers.

"Many IT chiefs will spend New Year's Day at work" is the title of a story on the front page of the April 26th issue of *Government Computer News* Magazine. The concept should be obvious, so need not be summarized. The most interesting quotation relates to the international dateline in the middle of the Pacific. Your Editor has been saying for months that Japanese would be our early warning system. We here on the West Coast of North America will have more than half a day of warning. But Japanese will not be first, it seems: *"The clocks in Australia will be the first to turn, and the experiences on that continent might provide some insight as to what can go wrong ..."* Still, it would be nice to have the heads of all airlines in the sky at the time of the transition. This would be more reassuring than any amount of pronouncements by media relations specialists.

Some politicians seem to encourage the frenzy, although in dignified and caring tones (of course). Consider, for example, the 2-page summary in the April 16th issue of *Science* magazine. Entitled *"The Y2K Problem,"* this story covering pages 437 and 438 is written by Robert Bennett, Chairman of the U.S. Senate Special Committee on the Year 2000 Technology Problem. The Conclusions section recommends: *"Employers, local elected officials, and utility providers should be contacted. Investors should obtain compliance information before making investment decisions, and those with pension funds should contact fund managers about Y2K vulnerabilities."* Oh, yeah? What would happen if every user of BPA's electricity tried to communicate personally with BPA about the subject? There would be no way to answer personally the flood of mail. On the other hand, the Senator's recommendation could have been worse; the guy could have recommended stockpiling a year's supply of food!

Branch Data Input Restructured

A Semlyen transmission line required initialization prior to March 26th when BPA's Dr. Tsu-huei Liu made a small change to OVER13. Of course, the average user requests a phasor solution, so initialization is automatic. The only standard Semlyen test cases that did not were the 5th and 7th subcases of DCNEW-27. But manually-specified initial

conditions provided alternative initialization of these two. There was no illustration without any initialization prior to SIMSM.DAT (data supplied the preceding day by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina). The first time step was wrong, and symptoms of trouble were not at all inconspicuous. By step 4, some voltages had exploded to 1.E20 (the limit of optimally-encoded output).

The existing CASCADE LINE model might profitably be generalized by the addition of damping resistance. In an E-mail message dated March 9th, Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina wrote: *"To model using multi-phase Pi-circuits, it may be convenient to add resistors in parallel with the R-L branches of the Pi in order to reduce oscillations."* This was the inspiration. The extension finally was provided, and was made available to others on April 5th. For documentation, see a new 23rd subcase of DC-9 --- an insertion that increased the number of each following subcase by one. The new illustration involves only a slight modification of the basic simulation of DC-3 that is illustrated in more modern form by the 22nd subcase. As explained on comment cards, one extra data card is required to define the optional damping resistance. Since branches are defined only internally, it is important that the user be aware of other ways (besides interpreted data cards) to note the change. One is connectivity output: Each phase of each R-L section will be duplicated in the table. Also, the figure of List 2 usage will be increased appropriately -- first where IBR is noted as part of interpretation of the STOP CASCADE card. About the voltages at the end of the line, there is not much change to the initial ringing, although later noise disappears much quicker (shown by the screen plot if using Salford EMTP) .

IPST in Budapest June 20 - 24

The following report was received from the 1999 IPST conference organizer, Prof. Laszlo Prikler, on June 30th:

The 3rd International Conference on Power Systems Transients (IPST '99) was hosted by the Technical University of Budapest on June 20-24, 1999 at the Thermal Hotel Helia. This conference was attended by 130 participants from 33 different countries of the world.

The IPST '99 Technical Committee had accepted 119 high quality papers for presentation at the 27 paper sessions. Studies included, but were not limited to, computer simulations, transient network analyzer studies, and field measurements. Papers have been published in a soft-cover, 700-page book of which the table of contents can be seen online at **http://www.vmt.bme.hu/ipst99** A form for ordering a copy of the proceedings also is available there.

The EEUG Association offered a special informal meeting during the evening of the 22nd that was attended by 35 participants. Presentation of the latest program developments (ATPDraw, PCPlot, PlotXY, ATP Control Center) were the key issues of this meeting.

The next IPST Conference will be held in Rio de Janeiro, Brazil. The date will be June 24-28, 2001.

Miscellaneous Intel PC Information

No Windows 2000? Who is surprised? The January, 1995, issue documented Bill G's FUDding in the days of Windows 95, and we now have another example, for a newer MS product. As noted by BPA's Walter Powell, Aviva L. Brandt of The Associated Press filed a story at 23:11 New York time on April 7th. Available from **www.oregonlive.com** (the Web page of *The Oregonian*), this explained that MS *"has postponed indefinitely its plans to merge its consumer-oriented Windows 95/98 operating system with the business-oriented Windows NT platform ... Instead, the company plans to release a new version based on the Windows 95 / 98"* kernel. MS President Steve Ballmer is quoted as follows: *"There will be a new version of Windows next year targeted for the consumer market. It will continue to be built in the year 2000 on the Windows 98 code base as opposed to the Windows 2000 code base."*

"Streaming SIMD extensions" summarize the main difference between Intel's older Pentium II and its now-available III (see preceding issue). This according to the cover story of the April issue of *Computer Shopper*, which begins on page 160. Yes, SIMD has the same meaning as it did a quarter of a century ago: *Single Instruction, Multiple Data*. P3 was designed for *"more sophisticated software computations and a broader range of multimedia operations, including imaging and 3-D."* I.e., there is no obvious advantage for ATP users. In fact, CS states: *"On most legacy benchmarks, the Pentium III performs roughly on a par with a Pentium II of the same clock speed."* So, why pay the premium price?

IBM will supply the star witness against Microsoft as the government's antitrust trial resumes at the start of June following a 13-week recess. An AP story on page C2 of *The Columbian* dated June 1st summarized as follows: *"The government's most important witness will be Garry Norris, an IBM Corp. manager who will describe pressure Microsoft allegedly exerted on IBM to sacrifice its rival OS/2 operating system software during the early 1990s."* Below a picture is further explanation: *"Norris told lawyers that weeks before the rollout of an important new version of Windows in 1995, Microsoft threatened not to sell IBM the operating system that it needed for its line of personal computers."*

"Government likely to emerge victorious from landmark antitrust suit" is the subtitle of a CNN story dated June 24th. The story marked the conclusion of the trial phase of the proceeding on that date. There is both good news and

bad news from CNN author John Frederick Moore. First, the good news: *"Legal scholars believe the government ... has outmaneuvered Microsoft's high-priced legal team practically every step of the way, and that the software firm had better brace itself for what is sure to be a government victory handed down from U.S. District Judge Thomas Penfield Jackson."* But this does not mean that MS will be split into pieces as AT&T was a decade or two ago. Also, there is the element of time: MS might be able to delay the application of penalties for years by means of appeals. Meanwhile, there will be more negotiations between the two sides. The most memorable quotation of the opinionated story involves a reference to the opening day of the trial, *"when ... Microsoft Chief Executive Bill Gates came off as duplicitous as Bill Clinton and about as personable as a wet sponge."*

Miscellaneous Small Items

Remember Lubarsky's Law? Program errors are the rule rather than the exception; and you can count on them. *"Inadequate quality is becoming a software standard"* according to the headline that continues a story on page 49 of the March 8th issue of *Government Computer News*. Why? *"Organizational neglect of software processes exceeds the poor workmanship of individual programmers as a source of errors"* according to one expert. Several are quoted as part of hype surrounding a recent conference on software quality. Another memorable observation from this gathering outside the nation's capitol: *"Ranum said the nation operates atop a pyramid of beta software."* So (i.e., is anyone surprised?)? In other words, there is hasty coding and inadequate testing --- just as for ATP itself! That is the point : ATP **is** typical. The idea that ATP or any other comparably-large program should be free of errors is preposterous. Realistically, one can always plan and hope for fewer errors, but not for no errors. This point was made by your Editor at the 1990 annual LEC meeting in Leuven, Belgium: all big programs except EPRI's (joke; see the October, 1994, issue) have bugs. This was in response to the assertion of one member that ATP should not be released by developers until all errors had been removed. Your Editor argued that such an absolute standard was absurd. Now, more than 8 years later, it is a pleasure to read confirmation from experts.

Non-convergence of a load flow (FIX SOURCE) is illustrated by the second subcase of DC-26. Prior to improvement on April 15th, the largest correction of the final iteration was being outputted as a roundoff (i.e., a near) zero. Specifically, Salford EMTP showed value .E-15 --- all that could be displayed in the available 5 columns. Other versions of the program may have shown different near-zero values (a discrepancy first was noted by BPA's Dr. Tsu-huei Liu while comparing GNU Mingw32 solutions with Salford solutions). Normally, corrections are non-zero, but tapering (positive parameter KTAPER) forces these to zero on the final iteration, except for roundoff differences. So, the small numerical result has no significance, and has been replaced by a perfectly-predictable exact zero.

The Type-18 source, which represents an ungrounded voltage source and ideal transformer, is treated differently as a result of trouble reported by Goran Djogo of Haefely Trench in Toronto, Ontario, Canada. E-mail dated March 23rd explained: *"I was trying to simulate a transformer with a center tap at the secondary. For that purpose I used two ideal transformers with the primaries connected in parallel and secondaries connected in series, where I put magnetizing inductance and winding leakage inductances and resistances at the appropriate places. However, the ATP was reporting an error."* Yes, it was. Prior to a modification on March 28th, there first was a warning message about a zero diagonal, and then a KILL = 23 error termination. The problem was this: the constraint equation of the transformer was being reordered too early for the phasor solution. True, the circuit was very simple; and more realistic or common applications of DC-25 and DC-55 demonstrated no such trouble. But the Trench data was legal, so an effort was made to accommodate it. Modification was confined to MAIN9.

"That was just for next subcase. Remainder has N22 = xxx cards." is the way a line of ATP output begins. This is near the beginning of execution, following the input data file name. First, there is a line giving the count of input cards for the first subcase. Second comes this line giving the count of remaining lines, for the second and later subcases. But this assumes that the end of the data case can be recognized by a BEGIN NEW DATA CASE (BNDC) card. What if there is none? The message was botched. The value of N22 was bad. So, if BNDC is not found, the message will be suppressed beginning April 22nd.

Newer freeware LIST by Vernon Buerg was the subject of a note from BPA's Dr. Tsu-huei Liu to your Editor. On April 28th, she wrote: *"I downloaded List Plus from **www.buerg.com** and unzipped it ...."* The 134-Kbyte LIST.DOC file is dated 27 January 1995, and it continues to confirm free noncommercial use at the end (as older versions did). Version 9.1 is seen on the opening page. Compatibility with newer hardware or software seems to be the dominant attraction of this newer copy. Unfortunately, as tested on directory c:\atp of Dr. Liu's 486 (which contains 2093 files), the old limit of 1000 files remains in effect. A registered (non-free) copy might circumvent this limit?

Preview of coming attractions: 1) Story about the new DEC VAX translation, which was completed July 3rd. Next, it is the turn of Stephen Boroczky of TransGrid in Sydney, Australia, to test using Open VMS of DEC Alpha. 2) lots more about DISLIN graphics for GNU ATP. 3) Story about a new Macintosh translation for Stu Cook of JUST Services; 4) More about Microsoft's legal problems, including the new jury trial in Salt Lake City. This concerns DR-DOS (passed from Novell to Caldera).