Can / Am EMTP News

Voice of the Canadian/American EMTP User Group

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Table of Contents

Salford Compiler and DOS Extender

The mouse can be used to start Salford EMTP execution beginning September 7th. This is a small step forward for TPPLOT users, who are able to do just about everything using the mouse. For Salford EMTP, mouse usage is limited to starting the program. The opening prompt shows a number of choices, and seven of these (SPY, DISK, HELP, GO, KEY, STOP, and BOTH) are ideally suited for a click of the mouse button 1. Unfortunately, **file_name** is not. What reasonable convention might avoid such keyboard input? There is corresponding input (e.g., DC*.dat) for the DIR choice. In fact, DIR is even more complicated because it is not yet understood how the Salford SELECT_FILE@ menu might be manipulated using the mouse. Has any reader who has the compiler succeeded with such an attempt? If so, please send illustrative code to developers in Portland. To conclude, application of the mouse to Salford EMTP is just beginning. SPY (the logical beneficiary) has not yet been considered except for the PLOT subcommand (see later description of TPPLOT addition).

MOUSET is the new binary flag of STARTUP that either requests use of the mouse (value unity) or omits use of the mouse (value zero). That is for normal, interactive execution that is begun by sending TPP (or the equivalent RUN77 TPBIG that can be found within disk file TPP.BAT). For batch-mode execution where the user does not respond to the opening prompt through standard input, MOUSET will be ignored. That is, execution that involves parameters (see CALL RUNTP use within RUN.BAT on the GIVE2 disk) will never display the mouse cursor. Initialization of the mouse is slow (it may require one second or so), so it is logical enough to save this if the mouse will not be used, anyway.

WARM.COM is the name of a 16-byte utility that might be used to reboot an MS-DOS computer at the bottom of ATPON.BAT and ATPOFF.BAT (see ATPSETUP.COM on the GIVE2 disk). This was added to the GIVE2 disk September 17th. DIR shows:

WARM COM 16 04-25-86 3:44p

The author of the procedure is unknown, although the source is not. Chris Hockert, a student at neighboring Benson High School, is believed to have added this code to a BPA computer following your Editor's installation of Salford EMTP for TCSC simulation by Mr. Hockert. Operation seems to be perfect on that 66-MHz FEI 486 as well as your Editor's 33-MHz AT&T 486 and Dr. Tsu-huei Liu's 33-MHz COMPAQ 486. Other interested persons can try it themselves (just send WARM and see if the computer boots normally).

"Novell pulls plug on desktop OS" is the headline of a story on page 45 of the August 22nd issue of *PC Week* magazine. Paragraph two states: *"Novell is expected to discontinue further development of its Novell DOS operating system, according to sources close to the company."* This would seem to be bad news for Salford EMTP users (see favorable mention in preceding issue). ATP users in Hannover have believed for years that first DR DOS, and then its successor Novell DOS 7, were ahead of Microsoft's MS-DOS. With these competitors gone, what will inspire Microsoft to improve? Also, more than just DOS is being dropped : *"Novell also plans to incorporate its nascent Corsair operating-system technologies into established products, rather than launch Corsair as a full-blown operating system, sources said."*

MS-DOS itself might be nearing its end? In a telephone conversation September 9th, computer expert David Szymanski offered this surprising interpretation or consequence of the force that may have driven DOS 7 out of the market. How might MS-DOS disappear? If MS Windows of the future (Chicago?) might be merged with the operating system MS-DOS, the present operating system by itself would cease to have value. As a former Apollo user, such integration seems logical enough to your Editor. Windows were an inseparable part of Apollo's operating system Aegis. The implications of such a move by Microsoft are profound for developers. In the past, MS Windows (or Quarterdeck's DESQview) was an afterthought. Once Chicago arrives, such casual treatment may no longer be possible. Maybe that is the time to take windows more seriously. But will this be before the second half of 1995?! By now (September), everyone seems to have dismissed the original 1994 target (see preceding issue) as being unachievable. Current speculation suggests the first general release around the middle of 1995 (i.e., the end of the first half).

Novell DOS 7 as a continuation of DR-DOS was made possible by Novell's purchase of Digital Research in 1991. This information comes from a fascinating story that marks the passing of one of the pioneers of personal computing: Gary Kildall. The story begins on page 608 of the November issue of *Computer Shopper*. *"On July 14, 1994, the Associated Press reported Gary Kildall's death at 52, from unknown causes. ... Few of today's computer users will recognize his name or recall his inventions and their critical impact on today's DOS operating systems."* Yes, Digital Research was his company, and before DOS there was CP/M. Kildall "*twice passed up opportunities to cash in on his genius. The first time he failed to come to terms with IBM for the use of a 16-bit version of CP/M for the new IBM PC computers. There are many variations of that story, including the one that a disinterested Kildall was out flying his plane when IBM came to discuss using his system. Another story describes how Kildall told IBM that he would do a 16-bit version of CP/M when he got around to it. Kildall laughed at both those stories."*

DBOS Version 2.71 did **not** solve the compatibility problem of Jeff Selman. But a new computer did! Recall the preceding issue asked: *"Did anyone ever hear how Jeff Selman of Tri-State in Denver fared with his own DBOS update?"* The answer came on October 2nd from E-mail address **<75313.1176@compuserve.com>** Mr. Selman wrote: *"(I) Have installed ATP, TPPLOT, and DBOS 2.71 on recently purchased Gateway 66MHz Pentium desktop computer. TPPLOT appears to be running properly. Gave up on Toshiba 486DX2 laptop due to crowded lower base memory. (Newer laptops have more and more functions that are loaded without user knowledge)."* This would seem to confirm the earlier information of Walter Dykas at ORNL in Oak Ridge.

For MODELS, List 28 of LISTSIZE.BPA limits numeric storage (both integer and floating-point numbers). After talking with author Laurent Dubé on October 20th, it was agreed to double value 57600 that has been used for some time (the past year or two?). As he observed, it would appear that we set the default value of 3200 too small! Recent usage by Gabor Furst, to convert his famous SVC (static var compensation) modeling from TACS (see 4th subcase of DC-22) to MODELS has overflowed the limit of TPBIG. Note that TACS has had more working space for years (List 19 is 120K), so it is reasonable to increase comparably the working space for MODELS. Your Editor will increase the default value from 3200 to 7000. Then, leaving the limiting multiplier unchanged at 18, this will give 126K. Of course, specialized uses will always require more. Mr. Dubé cites as an example the corona modeling of Prof. Correia de Barros, which, during recent testing with many line sections, was working with 300K words!

Variable NOTPPL of STARTUP is a new binary switch that allows Salford TPPLOT to be executed from within Salford EMTP. Value unity means there will be no such use whereas value zero means that the dialogue window of TPPLOT will be opened automatically as the time-step loop is entered. The concept and initial installation occurred during the weekend of September 10th and 11th --- free time following that wide-ranging, hour-and-a-half telephone discussion with computer expert Szymanski. TPPLOT may not even have been mentioned

during the conversation, but there was talk about parallel execution (that 1988 AT&T 386 with Unix, which Szymanski was programming until the following July when it was needed at the Cal Poly short course), and threads. Well, that is the way TPPLOT timeshares with simulation: using SPAWN@ and YIELD@ of the Salford library. More details can be found in the following story, which explains how TPPLOT has been placed in a library in order that it can be linked dynamically (at execution time) to EMTP or any other program.

MODELS provided the second major block of ATP code to be put in a dynamic link library. The result was MODELS.LIB (343 Kbytes). Here, not that much size was saved, and size was not the dominant consideration in any case. Rather, as explained to MODELS author Laurent Dubé in E-mail dated September 14th, the effect on user-supplied source code would seem to be much more important: avoidance of linking with the rest of EMTP. This is an old problem dating to the mid-to-late '70s, when ANALYT (still available but little used) provided the challenge. Only Bob Newell of Basin Electric in Bismarck, North Dakota, succeeded, using a Honeywell mainframe. Everyone else was forced to relink EMTP, which was a slow, demanding operation in those early days of time-shared computers. Well, dynamic link libraries solve this problem for the most widely used platform (DOS computers). Not only does one save time preparing a revised program, one also saves disk space. With Salford EMTP occupying about 2.8 Mbytes before segmentation, this is an important consideration. Your Editor's disk is full, and he can not afford to keep more than one version of executable TPBIG.EXE at a time. Multiple copies of the library for user-supplied source code would be no problem, however, since these would be much smaller. Another advantage would be ease of communication to others, such as via E-mail.

MOD001 through MOD010 and FUN001 through FUN030 are the dummy modules (10 SUBROUTINE and 30 FUNCTION modules) in the UTPF that are available for user-supplied source code of MODELS. Note that one can avoid the burden of ATP linking by the placement of user-supplied source code in a separate library. The same would be true for code of compiled (as opposed to interpretive) MODELS, which should make it more attractive for testing and development of data. Previously, it was said that the interpretive mode would be needed for this in order to save time. Compilation always was fast, and now linking has been reduced to a couple of seconds. Compiled MODELS looks better than ever.

All supporting programs (including batch-mode plotting) were another major chunk of code to be moved to a dynamic link library. With many more COMMON blocks than MODELS, the code of supporting programs provided a better test of general procedures. There was no problem. Library SUPPORT.LIB of size 656 Kbytes required 6.5 seconds to link. With both MODELS and supporting programs removed, TPBIG.EXE is reduced to 1861 Kbytes --- about the size 5 years ago!

Speed of simulation does not seem to be significantly affected by the use of dynamic link libraries within the time-step loop. MODELS provided the test for this as shown by the following tabulation of time spent in the time-step loop for several standard test cases:

DC-:	30A	30C	33C	68A	68G
Old:	3.08	5.22	.77	.60	9.89
New:	2.97	5.17	.77	.55	10.17

Condition of the disk and its cache are believed to be largely responsible for the variations. Note that column 1, for the first subcase of DC-30, does not involve the use of MODELS at all. In theory, the two entries should be identical, but they seldom are. The second column, for the third subcase of DC-30, is believed to be a good illustration. Speed certainly is dominated by MODELS (compare with column 1), and many time steps (3000) are taken. Yet, the two times are comparable.

Inability to use /DEBUG with the code of a dynamic link library has prevented code other than TPPLOT from using this technique. I.e., the preceding experimentation with all supporting programs and MODELS was only research, and has not yet affected the end user. As distributed by the user group beginning September 30th, the only library is TPPLOT.LIB, which is used by both TPBIG.EXE and TPP.EXE (note batch file TPP.BAT no longer is needed because TPP.EXE now is so small).

DBOS2P71.ZIP was repackaged September 29th. At the same time LIBRARIE.DIR was added to support the use of dynamic link libraries, DBOS.INF was renamed DBOSINF.DUM (see Prof. Laszlo Prikler's now-famous medicine in the preceding issue). The one and only line in LIBRARIE.DIR names the one dynamic link library that is being used: D:\ATP\TPPLOT.LIB As with KTRPL4 of STARTUP, if other than disk drive D: is being used, this must be changed.

The Salford compiler option /CHECK was first used on ATP FORTRAN September 22nd. This was at the bottom of the most difficult and depressing search ever for a program (or compiler) bug. After 3 full days revealed nothing, in desperation your Editor turned to the compiler subscript checking for help. What was being investigated? Although all test cases executed correctly using regular source code, it was found that diagnostic WRITEs to I/O channel 46 -- temporarily added to OVER16 for some unrelated experimentation (the connection to TPPLOT) --- would sometimes lead to the DBOS "Error: Unit has neither been OPENed nor preconnected." Eventually, this was traced to the use of a zero subscript with local vector SWCOLD at S.N. 1593. Eventually,

DBOS did trap this erroneous usage. But before it did, perhaps a dozen harmless uses of illegal indices --- mostly for CHARACTER variables --- were revealed and corrected. Also, temporarily, it was necessary to edit real (rather than unity) dimensioning into EMTP FORTRAN in many places. The search had begun Sunday evening, and trouble with SWCOLD was not found until 02:45 Friday morning. About the addition of /CHECK everywhere, the resulting executable is huge: 4.2 Mbytes rather than 2.8 Mbytes. But it **did** work, and ATP is purer as a result of the demanding experiment. It has been about a dozen years since your Editor worked with Stoney McMurray of Ebasco Services in New York. That was using a Burroughs computer that imposed a similar rigorous adherence to subscript limits, subroutine argument types, and the like. In that dozen years, EMTP (and ATP) had become sloppy, as the /CHECK option of Salford FORTRAN showed.

NOCALC of STARTUP has long been a binary flag that either permitted (if zero) or prevented (if unity) batch-mode vector graphics. A third value, -1, took on meaning September 5th following a telephone conversation with Robert Meredith of New York Power Authority (NYPA) in White Plains. Although Mr. Meredith was redirecting his text output to disk using the DISK command, he also wanted to see all batch-mode vector graphics (CALCOMP PLOT output) on the screen. It should now be possible (value -1). Any user of DISK and this new value of NOCALC must be careful about D4FACT, of course. If negative, each plot will be held on the screen until the user presses **<CR>**. On the other hand, a positive value will be the fixed length of time each plot will be held on the screen. The KOLBAK parameter of GRAPHICS has found new use as a result of the change. For virtual plotting (to RAM rather than the screen), Mr. Meredith observed that the second or later plot was superimposed on preceding plots. But by changing background color number KILBAK from zero (meaning no background color) to 16 (black), preceding plots are automatically erased, and the problem is avoided. For the moment, this is the best we can do until the better interactive plot viewer of Robert Schultz might be adopted (another missing piece of that Schultz ATP revolution).

Peter Riedel of the University of Hannover in Germany successfully passed his final examination to become Dr. Riedel last summer. How time flies! This fall marked the 5th anniversary of Dr. Mustafa Kizilcay's success with Salford EMTP at that same university, as documented in the December, 1989, issue of *EMTP News.* Peter Riedel was Dr. Kizilcay's co-author of that historic paper that still is distributed in printed form by BPA to persons who have PCs, and who ask about EMTP for the first time. In private E-mail dated July 7th, Dr. Kizilcay summarized progress of Peter Riedel: *"I was there and followed his successful presentation, and took part in the subsequent celebration. His thesis was on the usage of super conducting magnetic storage devices for improving network stability. Partly, he used also ATP to simulate the electro-mechanical transients. I hope, he will report about his results in a future paper(s)."*

Improvements to Salford TPPLOT

New EPSON and LJ2 choices have been added within FOURIER as a matter of convenience. The modified prompt is :

```
Old harmonic limits =  0   9.
      New [ END, <CR>, ABORT, EPSON, LJ2 ] :
```

This is the second of the 3 FOURIER prompts, split in the middle by the column margin. The first time through, the user normally will click his mouse on **<CR>** unless he wants to change the number of harmonics (ten is the default). Then the inner prompt (unchanged) will appear:

```
Old peak V-max =  0.0000E+00   SEND NEW [ ....
```

Again clicking on **<CR>** will result in a bar chart on the screen. Clicking on the upper-left corner (or the equivalent **<CR>** of the keyboard) then will return to text mode and the new middle prompt. If the user wants a bitmap of his preceding bar chart exactly as it appeared (no changes are desired), he need only click on either EPSON or LJ2 (for a dot-matrix or a laser printer, respectively) at this point. Confirmation of the creation then will follow as before. For example:

```
 ---  Plot next for an H-P LaserJet series II printer ...
 Reject already-existent ... output file name = PLOT1.LJ2
 ---  Put H-P ... output in disk file named  PLOT2.LJ2
```

After creation of the bitmap is complete, the middle FOURIER prompt will be seen again. At this point, all effects of the hard copy request have passed. Unlike use within PAPER outside of FOURIER, this new request for EPSON or LJ2 within FOURIER applies only for the following, single plot. Once the bitmap is complete, plotting automatically is redirected back to the screen (nothing comparable to VECTOR is needed).

POST and HPGL were the other two choices of PAPER. Note carefully that they are not being provided --- because there is no need. PostScript and HP-GL for both WINDOW plotting and FOURIER bar charts is handled differently, recall. Such plotting is produced in parallel with the screen display if parameters NOPOST and NOHPGL (integer indices 265 and 263, respectively) are set to zero instead of the default unity. That is parallel plotting --- nice, but not possible for the bitmaps of printers (which can only be created as redirected screen plots). The new hard-copy alternatives were added over the Labor Day Weekend (September 3-5).

A Salford dynamic link library is being used to store the TPPLOT code. As so often is the case, necessity once again provided the inspiration. TPBIG already was so large, there simply was not room on the GIVE1 disk to hold TPPLOT code, too! So, rather than link TPPLOT with ATP (see mention in preceding story),

consideration was given to long-neglected libraries. This involves added complexity, but is well worth the effort. TPPLOT.EXE once was a big program (534 Kbytes). Now, it is a small program (432 bytes) that connects with the same library as EMTP at execution time. The plotting code now is found in TPPLOT.LIB (539 Kbytes). Section 5.6.2 of the FTN77/486 manual begins with a strong recommendation of the idea: *"Dynamic link libraries are the preferred method for delivering large packages of routines. These libraries operate in much the same way as the system library in that the code which they contain is linked into the program as it is required at run time. This means that .EXE files can be kept small and link times are fast."*

ROLL is an important, new, hidden command of TPPLOT that has meaning only if TPPLOT is being executed from EMTP as mentioned in the preceding story. If ROLL precedes the TIME command to produce a plot, curves of that plot automatically will be extended as the simulation progresses. When the right edge is reached, the plot will be paged with no overlap after the full screen first has been saved in RAM. So, **Page Up** and **Page Down**, as well as the **Home** and **End** keys, should allow the user to change the screen display as the simulation advances. Of course, when a previous page is being displayed, rolling (painting of the ongoing simulation) is inhibited. If and when the user later might page forward to restore the newest, incomplete bitmap, the interrupted rolling will be resumed automatically --- provided simulation has not yet reached end time TMAX. For this case, all backlog of data will be plotted within one time step (before the simulation is allowed to resume).

USE TPPLOT BEGIN is a special request word that marks the start of TPPLOT data within EMTP data. USE TPPLOT END marks the end of such data. This is illustrated by DC-1, which has been enhanced to provide for the graphic monitoring of 9 signals if NOTPPL of STARTUP has value zero rather than unity. For value unity, such TPPLOT data is ignored. The interested reader is advised to simulate in the batch mode:

RUNTP DISK DC1. * -R

Then sit back, and watch the graphic action. There will be 10 frames (or pages) of 20 msec each to cover the total simulation time of 200 msec. Of course, simulation is slowed by the graphics. Whereas with no plotting the total job time is about 71 seconds on your Editor's 33-MHz AT&T 486, this rises to about 105 with the rolling plot. A **<CR>** is required to exit the time-step loop once the simulation is finished. Completion will be noted by a single diagnostic line at the top of the final graph.

Window plotting of the WINDOW command can also be used with ROLL as just described. Any files dated October 7th or later have such capability as documented by the first subcase of DC-63. Extension of the ending time TMAX is advised for any such use, however, since the existing 50 msec covers just 2 pages, and these just last a few short seconds on a 486.

KILL and FRONT are additional, new, hidden commands that have meaning only if TPPLOT is being executed from EMTP. For such execution, STOP will end TPPLOT while allowing the simulation to continue (presumably until end time Tmax later is reached). To end the simulation, too, send KILL, which has the effect of reducing Tmax to the current simulation time, thereby forcing execution out of the time-step loop and on to batch-mode plotting. New command FRONT is used to change a rolling plot interactively. A preceding **<CR>** will drop out of graphic mode and return to the dialogue window. Then sending FRONT T-span (where T-span is a number such as .02 for 20 msecs) will resume the rolling on the latest page that has the requested time span. Note that the idea is the same as used with SPY PLOT, but details are different. The latest addition keeps even numbers on the time axis by working with regular pages. SPY PLOT did not do this.

The **Insert** key serves as a toggle, while in graphic mode, to suspend all execution temporarily (until the key is pressed a second time to cancel the effect). This is a local pause, then. *Local* means that nothing else yet can be done during the pause (i.e., one can not yet pass back to the dialogue window to execute plot commands).

The RELAY command, which is a subcommand within the EXPORT command, was originally limited to 20 variables or 255 bytes total width --- whichever was reached first. As described in the January newsletter, RELAY.BAT then was constructed with one argument (the .PL4 file name) to perform the conversion as a separate DOS utility would. It also was restricted to the conversion of all curves. Well, public E-mail of the Fargo list server dated October 12th indicated a need to handle more variables. The request came from Mack Lund of Westinghouse Electric Corporation, where he uses address **lundm@epsvax.pgh.wec.com** A revised version of TPPLOT.ZIP was mailed to principal contact Scott Williams on October 15th. In addition to allowing 10 times the width (200 variables or 2550 bytes), there now is more selectivity in choosing the curves. The # command of TPPLOT can be used either with ALL (what was done before) or with a single range of curve numbers (e.g., 5-14 for curves numbered 5, 6, ..., 14). This is a new argument of TPPLOT that will be seen within the batch file. But it can be used interactively, too.

Time of the form HH:MM:SS with colons separating the numbers became acceptable on October 14th for a conventional FORMATTED .PL4 file. BPA's Randy Suhrbier prompted this increased tolerance by observing that one of his .PL4 files, perhaps created using some DEC VMS program other than ATP, was not properly

recognized by Salford TPPLOT. Why? It was found that Salford TPPLOT was expecting periods, as produced by Salford EMTP, rather than colons! Yet, colons are just as good --- maybe even better. Now they, too, will be accepted by the normally-used, automatic, .PL4 file type-identification logic (the default value of unity for parameter IDAUTO, which has integer index 178).

Noticeably quicker starting of TPPLOT is a fringe benefit of the interface with ATP SPY (see separate story). For years, any attentive user must have noticed that TPPLOT began slower than ATP. Even using a 486, there was an extra, unexplained second or two between the time the user requested execution (e.g., by sending TPP) and the time TPPLOT began processing input (the automatic initialization of TPPLOT.BEG). Well, some redundancy was found in the window popping and mouse initialization. Particularly the latter was found to be slow.

Japanese laser printers sold within Japan generally seem to be incompatible with full-resolution alternatives of Salford TPPLOT. Thus began a summary of the problem in the preceding issue. Unfortunately, this would seem to be another ball that your juggling Editor has dropped during the past 3 months. Consider the project --- at least the report about it --- delayed. Yet, it is worth mentioning printed documentation that came from Taku Noda via Laurent Dubé on October 28th. The attached note explains: *"I found a special issue of New Japanese Printers in my favorite computer magazine. It describes specifications of new Japanese printers. I put several Post-its on important pages describing which printer supports which graphical language."* The magazine is the August issue of *Super ASCII* magazine, and the table for laser printers that covers pages 112 and 113 shows ESC/P most frequently (4 of the 6 columns) in the row for "languages supported" (Mr. Noda's translation). As Mr. Dubé observed, the only problem is, we occidentals can not tell which is which (manufacturer names would seem to be printed only in Japanese)!

News from Outside USA and Canada

The dominant EMTP news from overseas has to be reorganization of the European EMTP user group (see later, separate story) to replace the former LEC (Leuven EMTP Center) in Belgium.

Indians might have access to ATP materials via a new, alternative user group. This is the thinking on November 1st, following a telephone conversation with Prof. Ned Mohan of the University of Minnesota, who will establish the initial contact. Recall this follows years of non-communication with NTPC (e.g., see mention in the July, 1992, issue). A Professor in Bangalore, who now is in Singapore on sabbatical, has been recommended for the task by someone Prof. Mohan knows and trusts. Ideas about ground rules are now being discussed. No one yet has argued against mandatory public disclosure of detailed financial records. If the user group were based at a university (e.g., Bangalore) it clearly would need to charge for its services. Should any limits (e.g., approval of a majority of members?) be put on this? Mandatory use of an Indian version of LICENSE.ZIP might make this unnecessary since every user then would know there is no monopoly (materials could be obtained from North America or Europe if the new group were unreasonable). One thing is clear: no new ATP user group will be allowed to exploit the ignorance of its customers as LEC did for years. This would be a little like a GNU license (see the separate story about Ghostscript): users have rights that can not be restricted by the supplier.

Chinese language would seem to be another point of contention between Intel and RISC PowerPC by Motorola. A short summary on page B12 of the September 6th issue of *The Oregonian* is datelined Shanghai. It begins: *"Intel Corp. President Andrew Grove has come to China to launch the latest salvo in his company's battle against the rival PowerPC chip."* Intel is said to dominate the Chinese market today, but seems to be worried about inroads by PowerPC: *"Intel will establish a wholly-owned company in Shanghai to develop computer software for the Chinese market ... Intel Architecture Development Shanghai Ltd., will write programs that make it easier for computers to perform tasks using the Chinese language."*

A printed copy of the July newsletter was mailed by BPA to each of its primary EMTP contacts on September 2nd --- the same day JUL94.ZIP was sent by FTP to Prof. Bruce Mork for placement on the plains server **plains.nodak.edu** Seven of the 9 contacts are non-German, and for each of these, an official ETEP preprint of Dr. Kizilcay's latest paper ("Numerical fault arc simulation based on power arc tests," published in the May/June issue) was included.

Dr. Mustafa Kizilcay's paper on frequency-dependent network equivalents was published in ETEP (European Transactions on Electrical Power Engineering) as explained in the July, 1992, newsletter. Recall this paper first had been submitted to IEEE PES. The switch to ETEP followed Dr. Kizilcay's *"unfavorable reception by unknown IEEE PES reviewers earlier this year."* The title of the paper is *"Low-Order Network Equivalent for Electromagnetic Transients Studies,"* and it can be found in Vol. 3, No. 2, pages 123-129 of the March/April, 1993, issue. Well, now, the story continues. This paper that did not satisfy certain anonymous IEEE PES reviewers seems to have won a prize! In E-mail dated September 25th, Prof. Kizilcay explains that he just *"received the official announcement of the prize award,"* which is by ETG (Energietechnische Gesellschaft, which has English translation *"power engineering society"*) of VDE. The

prize is *"for the best publications in 1993."* Included was an invitation to the ceremony in Munich, which will be part of the 1994 VDE congress (to be held October 17th-20th at the Hilton Hotel in Munich).

The Latin American user group at Furnas in Rio de Janeiro, Brazil, was mailed the 3 Salford and the 2 ATPDRAW disks from BPA on August 30th. This was in response to a written request by Marco Polo Pereira in a letter dated June 29th. The response was delayed in part because it took a while to recover the mail from the post office (see explanation of the problem of a required signature in the October, 1993, newsletter). The warning is renewed: do not send to the Fontaine any things that require a signature to be delivered. Registered letters and Express Mail International Service (EMS or Worldpost) are examples that seem to cause trouble. This EMS was what Furnas used.

Prof. Yim Wha Yeong of Kwangwoon University in Seoul had trouble reading some files on some disks he was given at Prof. Ned Mohan's ATP short course during July (see preceding issue). E-mail dated September 22nd requested replacements. Salford DBOS and GIVE1 disks should have left BPA's Mail Room on November 15th as explained in E-mail earlier that day.

Europe (Dr. Mustafa Kizilcay's distribution service outside of Frankfurt, Germany) was mailed a disk of Salford EMTP FORTRAN by BPA on September 1st. Appended were all standard test cases DC*.DAT that had changed since the beginning of the year. That was source code. Later, GIVE1 and GIVE2 disks were mailed on October 7th to demonstrate concurrent plotting.

The Japanese EMTP Committee at Doshisha University was sent Salford GIVE1 and GIVE2 disks by BPA on September 1st. Added was all source code associated with CABLE PARAMETERS as summarized in FAX to Prof. Akihiro Ametani later that same day. Following consolidation, the desire was to document how Prof. Ametani's work at BPA had ended.

Apple Macintosh ATP materials were distributed to others overseas by Ivone Benfatto of the ITER EDA Naka Joint Work Site in Japan. In E-mail dated August 24th, Mr. Benfatto explained that FTP (file transfer protocol of Internet) was used to satisfy interested persons in Padova, Italy, and Kaohsiung, Taiwan. This report came from address **benfati@itergps.naka.jaeri.go.jp** and it ended as follows: *"For security reasons, a private account protected by password was set up."* Like Prof. Laszlo Prikler in Europe (see the April newsletter), Mr. Benfatto is thanked for his exemplary sharing with others. Persons overseas should understand the importance of E-mail for such activity: it avoids the complications and delays of international mailing. For those having unlimited (as opposed to metered) service, it is just as easy and cheap (free) to send files half way around the world as it is to send them across town. The transfer might be slower, but even this is not obvious and guaranteed. To conclude, **real** E-mail (Internet with FTP privileges) is seen as the ATP salvation of those who otherwise would be isolated from a good source of supply.

More about Electronic Mail (E-mail)

KEPCO (the Korean Electric Power Company) heads the Korean ATP user group. As suggested last time, the ending **kepcorc.re.kr** does indicate the power company. Your Editor chose to answer a conventional Air Mail letter from KEPCO's Dr. JinBoo Choo by E-mail, using the address he suggested: **jbc@hanbit.kepcorc.re.kr** This was August 30th. The loop was closed September 2nd when Dr. Choo responded. The conventional letter dated August 20th had explained that Dr. Choo was to be the new user group contact (rather than Tae Won Kwon of years past). The E-mail response then explained about *"Mr. Lee, who is my subordinate, and plays (an) important role in managing Korea EMTP activities."*

MIME is the encoding utility of Pine that caused so much trouble around the end of last year. Well, Robert Meredith and Robert Schultz of NYPA (New York Power Authority in White Plains) know a lot more. Mr. Schultz even wrote a demiming program! Details next time?

Croatia of the former Yugoslavia first was heard from by E-mail of the Fargo list server dated October 7th. The inquiry about Prof. Ametani's CABLE PARAMETERS was from Dr. Srete Nikolovski at Istarska 3, 54000 Osijek. The E-mail address **srete@kulen.etfos.hr** reveals the first unlikely (for the English language, anyway) ending, it is noted. From where is the **.hr** derived?

<meredir@iia.org> is an even simpler address for Robert Meredith of New York Power Authority (NYPA) in White Plains. Three months ago, Agora showed a longer alternative **<meredir@mary.iia.org>**. It seems that either works, according to E-mail from Mr. Meredith during mid-July. Without difficulty, your Editor sent mail to the shorter address on October 1st.

Marco Polo Pereira of FURNAS in Rio de Janeiro, Brazil, is the final principal contact of BPA who can not be reached by E-mail. In a letter dated April 10, he was advised as follows to look for Internet: *"About E-mail, most universities around the world have it. If I were in your position, I would attempt to negotiate use through some nearby university --- assuming it is not charged for use. Even if there might be delays in receiving information this way, it should be invaluable. As the April newsletter will document, Salford EMTP materials already are being distributed by FTP transfers of Internet, and chapters of the newsletter are being exchanged across the*

North Atlantic this way." In his letter of reply dated June 29th, Mr. Pereira wrote: *"We have consulted the persons that could help us in having access to Internet, but till now, we received no answer. We will have to wait for a solution before attempting to use it through a university."*

Israel first was heard from by E-mail on October 13th when Ben Beiski at **<bbeiski@gold.goldnet.co.il>** sent a message on behalf of Nissin Saban of Sintec. It would seem there was trouble accessing the plains server, so your Editor supplied sample dialogue proving that the service really did work as claimed. Your Editor was curious about the ending **goldnet.co.il**, so Mr. Beiski provided the following clarification 4 days later: *"... indeed the **co** stands for company and **Il** stands for Israel. Why not **Is** ? I have no idea. I'm connected to the Internet via Goldnet company. Goldnet is a joint venture between AT&T and Bezeq (the Israeli version of Bell (no babies yet). We are connected via the AT&T Easylink services. AT&T has in Israel one of its switching centers (out of seven all together). I'm still waiting for my first bill, but as I know now we are not invoiced by some distance function of the messages, but only by length. We are charged $60 per month for the first 20 Mbyte of transferred data and minimum of $16 per month by the Goldnet company. It excludes the charge for premium services such as access to Lexis/Nexis data base, etc. I'm not sure but I think it is subsidized by the government's chamber of commerce."* Yes, certainly the rate of $3/Mbyte seems favorable. It is almost an order of magnitude lower than CompuServe (in the USA, this largest of all on-line services charges 2 cents per Kbyte, which is $20/Mbyte). As for *babies*, foreign readers may not understand this reference to so-called *baby Bells*. At the time it was forced by the U.S. government to break into pieces, AT&T, the American telephone company that descended from Alexander Graham Bell, was the world's largest corporation. It had the sobriquet *Ma Bell* and used the outline of a classical bell for its logo. Out of it were created half a dozen or so regional telephone companies that were not allowed legally (i.e., for business purposes) to use mother's name or logo. This was part of making the competition more fair ("leveling the playing field" in popular sports-speak). Nonetheless, the regional companies are informally called *baby Bells* (U.S. West, the company serving Portland, is an example).

"The (relatively) new tool MOSAIC for handling the World Wide Web (WWW)" was demonstrated by Harald Wehrend of the University of Hannover at the meeting of European ATP users (see separate story). A summary came in E-mail dated November 10th. Your Editor had inquired how Mr. Wehrend's on-line demonstration had gone. The response began with an expression of relief *"that the telephone terminal server here at the university really **was** available at that time (one of the few things that were free from Murphy's Law)."* About MOSAIC and WWW, Mr. Wehrend explained: *"I think these tools will be the future .... MOSAIC lets you see graphics pages that can contain images, sound files and movie files also. FTP, TELNET and email are integrated. You are connected to the information just by clicking on words or icons like in MS Windows help files. Then and only then, the client computer connects to the server of that specific information somewhere in the world, it retrieves the information, and immediately disconnects afterwards so as not to stress the grid any more than necessary. Already today, there is an indispensable mass of information behind this World Wide Web. For example, companies such as The Math Works (MATLAB) and Mathsoft (Mathcad) use it to support their users with corporate information, discussion forums, and demonstrative, user-, and staff-donated, files. You click on the name of a file that is stored somewhere in the world (for example on the Mathcad server) and, for this example, your local Mathcad is connected by Mosaic to be able to work on that remote file and "SAVE AS" a local file if that is of interest to you. One can think about such a WWW-page about ATP-EMTP in the future, too. For example this page could explain the status of ATP-EMTP, a little bit of the history, and could contain links to the license-files on the servers in Fargo and Hannover, which could be displayed by a mouse click. There also could be links to the ATP main directories of the ATP aftp servers, and links to explanations about the user groups. But this all is a vision of the possible future. Now, we are just starting to ask about the technical possibilities, and bureaucratic rules here at the university. What is your opinion concerning such possibilities?"* At least through the end of the year when he will leave the university (he now is writing his doctoral thesis), Mr. Wehrend can be reached at address **hawe@server.iee.uni-hannover.de** His work concerning ATP, and possibly the preceding use of E-mail, should be continued by Mathias Noe, who already uses address **noe@server.iee.uni-hannover.de**

RAINet, used by Agora, was *"originally set up by the National Science Foundation to help nonprofits and other groups get onto the Internet"* according to a large, illustrated story on page C1 of the September 21st issue of *The Oregonian*. Now, Portland has one great bookstore, Powell's Books, which stocks some 500K titles. This has a connection to RAINet, too, which is located *"on the second floor of the Powell's building"* on the western edge of downtown Portland. The head of RAINet, Robert Chew, is credited with putting Powell's on the Internet for business purposes about a year ago. *"Powell's Technical Books made maybe $3,000 on Internet sales last month ... a figure that has tripled in the past few months."* Interesting statistics about business are contained in the article. For example, each month, some 2000 new **.com** (for commercial) addresses are added to the Internet. Of connected host computers, 24% are shown as belonging to business. Other slices of the pie chart are: 27% research, 37% individual countries, 5% government, 4% military, and 3% other.

"There are three kinds of physicists: 1) those who understand the math, and 2) those who don't understand the math." This wisdom, of unknown authorship, was read in E-mail dated October 5th from Robert Meredith of New York Power Authority (NYPA) in White Plains. It was particularly appreciated by physicist Dr. Tsu-huei Liu. Maybe next month the newsletter could feature O.J. jokes?

Printed copies of the July newsletter were mailed to addresses in the USA and Canada substantially later than September 2nd, when JUL94.ZIP was sent by FTP to Prof. Bruce Mork. Although such delays in mechanical distribution have occurred before, the reason this time is all new: a printing error. In fact, the 130 copies had to be printed a second time by Office Depot! The error was not small: pages were out of order. Originals are printed single-sided, so one relies on operator intelligence to ensure that page K+1 follows page K for K=1, 19. Apparently this was too much to assume. Fortunately, the error was discovered on September 8th prior to the start of folding, and stuffing into envelopes.

Erroneous addresses usually result in E-mail being returned to the sender as undeliverable. Typically the ending (e.g., **mtu.edu** for the campus of Michigan Tech in Houghton) is correct, so the message makes it to an organization, and then is rejected by a local mail distributor that can find no match for the rest of the address. Well, that is what usually happens. But not always. October 1st, your Editor wanted to send mail to Robert Meredith of New York Power Authority (NYPA) in White Plains at address **meredir@iia.org** That was the intent. By mistake (keying on-line into Elm of Agora), the address was ended in **.com** This message was not returned. Instead, two days later, a note was received from the person who **did** receive the mail: Tim Roberts of Providenza & Boekelheide, Inc at address **timr@iia.com** There was no indication of geographical location. Well, the following day (October 4th), your Editor sent a note of thanks and apology to Mr. Roberts. Included was the first mention of your Editor's city (Portland, Oregon), about which Mr. Roberts observed the following in mail later that same day: *"It always fascinates me to uncover the convoluted paths taken by e-mail. We are in Tigard, which means we are within 20 miles of each other. Yet, this mail had to pass through PSI, which is located in Washington, DC. A 6,000 mile round trip to make a 20 mile journey."*

General Electric in Schenectady, New York, enhances ATP by the addition of its own secret TCSC (thyristor controlled series capacitor) modeling. As explained in the October, 1993, issue, Dr. Daniel H. Baker is the man who does this work. Well, the good news now is that Dr. Baker finally can be reached by E-mail. On October 28th, a reply was sent to **bakerda@psedmail.sch.ge.com** The **psed** probably indicates the Power Systems Engineering Department in which ATP usage is concentrated. The **mail** is the bad part, usually indicating crippled service of some sort (à la Compuserve). Dr. Baker confirmed this as follows later that same morning: *"No, we do not have FTP access to the outside world."* As at so many places, the concern seems to be security. *"GE ... doesn't want the outside looking at our files, so restricts us from accessing others. We are looking at making connections to a remote site to be able to use FTP."*

The Montréal, Québec, Canada area has good, cheap E-mail service as reported in "News:" of the Fargo list server dated June 26th. Unfortunately, this story about Stu Cook of JUST Services is not short. To do it justice, details will be deferred until there is more room.

A BBS for traders, named *Classified Ads*, is another unusual board of the Portland area. Advertising on page 26 of the July issue of *Computer Bits* magazine reads as follows: *"Buy, Sell, or Trade On-Line. Portland's exclusive classified ad database. Post & Review Ads On-line: * Cars; * Computers; * Sporting Goods; * Employment; * Housing; * Personals."* Only a telephone number is given: (503) 666-5012. Well, does one actually buy, sell, or trade on line? Most likely not. Most likely, only the advertising is on-line!

"'Father of Internet' returns to MCI to work on new data project" is the headline of a story on page F5 of the September 25th issue of *The Oregonian*. This concerns Vinton Cerf, whose *"work in networking dates to 1969, when he was a graduate student in computer science at the University of California at Los Angeles. He was one of a handful of young programmers and hardware engineers involved in the installation of the first 'node' of the original, four-node ARPAnet, the precursor to the Internet. .... Cerf's principal contribution has been his work on TCP/IP. .... Cerf worked for years to get TCP/IP adopted as a standard."* So, back at MCI after an 8-year absence, what is Vinton Cerf's preoccupation? *"An ambitious six-year, $20 billion project called networkMCI. ... 'People are increasingly mixing together services,' Cerf said. 'People in business would like to buy a very fat pipe through which they pump everything --- voice, data, video, E-mail and faxes --- rather than using separate connections.'"*

Free FAX and long-distance telephoning seems to be available from some BBSs. *"Treading the Boards"* is the column that covers pages 614 and 615 of the July issue of *Computer Shopper*. This commentary begins: *"In a highly competitive cyberspace, sysops are continually coming up with new ways to serve their customers. The latest surge is in dial-out and fax services. The former let you call in to XYZ BBS, then use one of that board's lines to dial out to another board. .... One local call now can get you instant access to BBSs across town or across the country. Also, if you don't have your own fax capabilities, you can now generally find a BBS to send one for you."*

Some BBSs are free. An example in southwestern Oregon can be found on page 639 of the July issue of Computer Shopper: *"Grants Pass 471-0037. Riverside Software BBS; sysop Jim Weinshrott. 1 line -- 386; 1500 Mb running WildCat 3.90 with Wang at up to 19200 bps. Estab. 06/93; no fee, 9,000+ programs online, 1.5 Gb CD-ROM."* Probably no Internet, however!

Cancellation of an unwanted subscription to the Fargo list server may not be as easy as was implied by the procedure published in the preceding issue. Bardo Muller of Université Paris Sud in France provides an interesting illustration. He uses address **bardo@ief-paris-sud.fr** After carefully following instructions more than once without success, Mr. Muller appealed to your Editor for help on September 7th. In turn, the problem was passed to Prof. Bruce Mork, who provided the following explanation in E-mail later that same day: *"I have manually removed you from the list. At the time you subscribed, your local mailer attached the FROM: address of bardo@GONZALES.IEF-PARIS-SUD.FR to the mail header, and this is the address the ATP-EMTP list server takes as your subscriber address. I assume that a subsequent change to your mail routing did away with the need to specify GONAZALES as part of the address. Then, when you tried to SIGNOFF the listserver, your address was not recognized. This is a common trap that many e-mail postmasters fall into. Better to have one mail router for the whole site than to use machine-specific addresses that tend to change frequently. Only after one or more such changeovers, when the address of every user is changed and everyone from the outside world is bouncing mail trying to reach inside, does the postmaster realize that it is better to route all the site's mail thru one server machine whose address never has to be changed. This mail server's forwarding aliases to individuals at the site can be changed by the postmaster behind the scenes, and the e-mail correspondents are blissfully unaware of any change in hardware."* Apparently this was what was causing the problem: phantom E-mail. Although the Fargo list server was the original source, it was not the immediate source. It would appear that some computer within the French university is resending old mail. This can be seen from the February and September dates in the header of a recent illustration that was supplied by Mr. Muller:

```
Received: from gonzales.ief-paris-sud.fr by
     speedy.ief-paris-sud.fr (4.1/SMI-4.1)
     id AA00985; Wed, 7 Sep 94 18:13:41 +0100
Received: from marion.ief-paris-sud.fr by
   gonzales.ief-paris-sud.fr (4.1/SMI-4.1)
    id AA00372; Mon, 28 Feb 94 08:42:56 +0100
Received: from VM1.NoDak.EDU by
     marion.ief-paris-sud.fr (4.1/SMI-4.1)
    id AA05266; Mon, 28 Feb 94 08:31:44 +0100
```

The U.S. government will relinquish control of the last piece of the Internet by the end of the year. This comes from a story by *The Economist* that can be found on page K5 of the September 11th issue of *The Oregonian*. The story begins with some history: *"Twenty-five years ago, the U.S. Defense Department inadvertently created this electronic commune as a way for military researchers to make contact with each other. Today the Internet connects about 20 million users worldwide -- and it is growing by more than a million users each month."* But Internet has turned commercial, as the Joe Boxer story in the preceding issue should have convinced anyone. *"Later this year the government will transfer its last big link -- a fiber-optic backbone that carries some Internet traffic across the United States -- to the companies that have been running it under contract. That will complete the Internet's privatization and remove the final barriers to commercial use."* So how is business? Apparently, not very good so far: *"In theory, the net looks like a seller's dream. Any company, no matter how small, can gain access to a worldwide market overnight for the cost of an Internet connection (usually less than $100 a month). In fact, the companies that are making a profit on-line are the exception. .... On average, each merchant makes just over one sale a day, bringing yearly on-line revenue to less than $25,000. Why are these innovators struggling? One difficulty with buying on the Internet is that it is tricky to pay. The thought of sending a credit-card number in an e-mail message stops many potential consumers dead in their tracks."*

Altered Can/Am Distribution Policy

LICENSE.ZIP contained in WordPerfect format the 6-page form letter that is used as a combined licensing and order form by the Can/Am user group. October 8th, changes to this were completed. This is a continuation of the story having the same title in the preceding issue.

The order form that is to be used by Dr. Kai-hwa Ger has added 2 pages to LICENSE.ZIP making a total of 8. Whereas the first 6 pages continue to use no soft fonts, the order form uses fonts much as this newsletter does. On October 8th, the new disk file was sent to Prof. Bruce Mork of Michigan Tech in Houghton for placement on his plains FTP server.

Dr. Ger's order form shows the following prices for three basic items. This is for mailing by air (1st Class in the United States and Canada) to anywhere in the USA, Canada, or Mexico :

Printed ATP Rule Book	$50
Salford EMTP for Intel 386/486 or Pentium DOS PC (3 floppy disks)	$10
ATPDRAW and manuals (2 floppy disks)	$5

For any other part of the world, prices are double for the same shipment by air. For a limited time, as mentioned in the preceding issue, anyone who has never before ordered from Dr. Ger is being given ATPDRAW at no cost along with a regular order for Salford EMTP.

The old offer of free Salford EMTP, and a $30 ATP Rule Book, was cut off November 12th when orders for incoming Rule Books matched the stockpiled supply. For the record, printing in recent years has always been done in quantity 30, and the last of those 30 copies that were printed on June 22nd now are gone. October 8th, it was decided that the simplest way to transfer distribution to Dr. Liu included the selling to him of Rule Books at cost ($26.83) until the June printing was exhausted.

The unlimited supply capability of Dr. Ger's service first was used by Parsons Brinckerhoff Quade & Douglas of New York City. On November 5th, Dr. Ger mailed 3 sets of everything (Rule Book, ATP, and ATPDRAW).

Frequency Scan Includes Saturation ?

The 1994 Minnesota Power System Conference, held in Minneapolis on the campus of the University of Minnesota during October, includes an interesting paper by Glenn Wrate and Prof. Bruce Mork of Michigan Tech in Houghton, and Kalyan Mustaphi and Steve Dellwo of Northern States Power in Minneapolis. Entitled *"Using the electromagnetic transients program for frequency scans,"* the abstract follows: *"The frequency response of the southern terminus of the 500-kV portion of the Manitoba-Minnesota Transmission Upgrade project is obtained using the 'Frequency Scan' subprogram available in both the EPRI/DCG and ATP versions of the Electromagnetic Transients Program (EMTP). A novel time-domain method of determining the frequency response of a power system containing nonlinear elements is presented as an alternative to 'Frequency Scan.' The MODELS feature of the ATP version of the EMTP is used to dynamically vary frequency."*

An apparent error in DCG/EPRI's EMTP or its documentation is the preoccupation of much of the paper. This begins on page 3 with the section heading *"Problem encountered with EPRI/DCG's Type 98 Element."* Is this possible? How can this be? During the spring of 1986, BPA's Chief Engineer (then Marvin Klinger) was assured by EPRI PSPO project manager (for EMTP) James Mitsche that EPRI did not release programs with bugs! For readers who have not heard the story, this was Mr. Mitsche's imaginative excuse to explain EPRI's inability to deliver **any** EMTP version in timely fashion (since starting in mid-1984). It ranks right along with Pres. Clinton's *"I will not raise taxes on the middle class"* when it comes to unforgettable, and obviously false (even at the instant of utterance!), promises.

The basic idea by Wrate, Mork et al is to inject in the time-domain a variable-frequency signal --- ramped with time --- on top of the basic steady-state excitation at the power frequency. This would seem to be small-signal, nonlinear analysis at the actual, nonlinear operating point, then. The idea might be very good, and very important. Yet, no sample data of the new procedure can be found in the paper even though 4 of the 12 pages are filled with ordinary, old, EMTP output of a conventional frequency scan. This is Appendix B, which begins after data assembly ($INCLUDE) with a heading that indicates use of *"DCG/EPRI/Electrotek version 2.1 Microsoft Windows Translation. Distributed by Electrotek Concepts, Inc."* Nearly all other output remains in capital letters, and looks like output from BPA's public domain EMTP did in 1984. By the end of 1984, ATP had progressed to lower case, of course. Ten years later, DCG/EPRI EMTP still does not offer this obvious improvement to practice that can be traced to old CDC computers, used at BPA for EMTP through early 1979 (the first DEC VAX-11/780 arrived in March of that year). With a mere 6 bits to store each character code, only 64 combinations are possible, and this precluded the use of both upper and lower case. CDC chose capitol letters, and DCG and EPRI would seem to remain stuck with them ten years later. Amazing!

But why does one need MODELS for such new frequency scans? The perceptive reader may already have asked himself this question. The variation of frequency requires nothing that complicated. Is this like Noda frequency dependence, where MODELS was used for testing because it was convenient? Of course, MODELS carries its own extra overhead that slows simulation. But more than this is involved. When BPA's Robert Hasibar and your Editor discussed the matter with Prof. Mork by telephone on September 23rd, a more compelling reason to use MODELS was mentioned. There is substantial numerical processing that must be applied to the variables of interest as functions of time. Recall that conventional FREQUENCY SCANs work directly with algebra of complex numbers (phasors) whereas those Michigan Tech researchers are working with functions of time in discrete, numerical form. Of course, it takes work to relate the two, and perhaps monitor the convergence or settling after each frequency change. Your Editor concluded that as long as MODELS is needed anyway, it made no sense to provide an alternative just for the frequency variation. Nonlinear frequency scans would seem to be a new, legitimate, permanent use of MODELS .

So, when and where can the average reader obtain an illustrative example? None has yet been released by authors of the paper, as far as your Editor knows. It is believed that details remain secret, for the moment.

Free Ghostscript Shows PostScript

Ghostscript by Aladdin Enterprises is shareware that allows PostScript to be displayed on computer screens. This was explained in a story in the preceding issue. But at that time, there was not enough space to explain the associated licensing. So, the story continues here.

The GNU General Public License, Version 2 dated June, 1991, accompanied Ghostscript in a 18-Kbyte file named COPYING . This is an interesting standard agreement to which all contributors seem to subscribe. First comes the Preamble, which begins as follows: *"The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too. When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things. To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it. For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights."*

Replacement European User Group

This is a continuation of the story on pages of the preceding issue. It documents the slow replacement of the former LEC (the Leuven EMTP Center on the campus of K. U. Leuven in Belgium).

The Congress-Center in Hannover, Germany, was the site of the formative, first meeting of the new European EMTP user group. This was November 7th and 8th. The story is lengthy, however, so will be delayed 3 months.

Although still living outside of Frankfurt (Muehlheim am Main), Dr. Kizilcay has a new working address:

Prof. Dr.-Ing Mustafa Kizilcay
Fachhochschule Osnabrueck
Fachbereich Elektrotechnik
Albrechtstr. 30
D-49076 Osnabrueck
GERMANY
FAX : +49 - 541 - 969 - 2936

E-mail from this new location arrived on October 12th. This was from **kizilcay@osfhrz70.rz.fh-osnabrueck.de**

BPA EMTP Theory Book in WP 5.1

Most of the 700-page EMTP Theory Book of BPA has been converted to WordPerfect 5.1 storage from the crummy, old, paper copy that was submitted to BPA in 1987 by its contractor, Hermann Dommel. The present mention is a continuation of the story last issue.

Kwang-yi Ger, the daughter of Drs. Tsu-huei Liu and Kai-hwa Ger, did key most of the text. Some 80 pages toward the back remain, however. It now is hoped that the job can be completed over the Christmas holidays. So, fairly soon it will be time to reconsider the figures, for which no one thus far has suggested anything better than scanner output (bitmaps).

A Reinvented BPA Will Do What ?

"Retirement of your Editor from BPA was scheduled for the last day allowed: September 2nd. However, with approval of all concerned, departure has been delayed by six months." This summary conclusion of the preceding issue now will be clarified in considerable detail. At issue is meaningful assurance from BPA that your Editor should be able to continue to work on ATP development full-time. The associated $25K bonus was **not** an important consideration. The following three paragraphs are pasted from a letter to BPA management (to acting supervisor Robert M. Hasibar) dated August 26th:

"Uncertainty about the future of continued work on the ATP version of EMTP is primarily responsible for my decision to retire now. I have waited as long as prudence allows in the hope of obtaining clarification from higher levels of the new BPA. But none has yet been received. With future work uncertain, and the September 2nd deadline approaching, I have chosen the conservative alternative. By retiring now, I avoid being trapped for 7 or more years (the nominal 30-year eligibility requirement) doing unknown work that I might not enjoy in a new BPA with which I might no longer agree. I do not want to be retrained to do something else. What I want most is the freedom to be able to continue working on ATP. Retirement guarantees this.

My understanding is that management could, without difficulty, delay my departure until next March. If BPA wants another 6 months or so of work on ATP, I would encourage you to make this request. For the record, if the choice were mine, I would delay my departure as long as possible while I continued to work on ATP as a regular BPA employee.

*.... The concern is not much about **where** I would be working (with developers rather than with users), or even for **whom** (Dr. Liu as opposed to Mr. Wedick). It*

rather is about ***what*** *I would be working on, and* ***why****. The new BPA might have quite different ideas than the old on these final two aspects."*

The strategy of requesting retirement at the deadline (September 2nd), and then being held over by BPA for another half year, is believed to preserve everyone's options. If higher management decides during the next six months that it really does want to continue work on ATP, it should be able to hold such a position open for your Editor. On the other hand, if another six months (more than a year, total) is not adequate for new management to decide what it wants to do, then it probably **is** time for your Editor to leave BPA.

"Employee can back out of buy-out agreement" is the headline of an important and relevant story in the August 1st issue of the 4-page newsletter *Federal Employees News Digest.* The first paragraph is critical to your Editor's proposal to new management (see preceding paragraph) about future work: *"Federal employees who accept buy-out offers from their agencies can change their minds up to the day they are to leave unless management can show that it would be too disruptive to the agency or other employees, the Merit Systems Protection Board has ruled."*

Only in the government does management seem to be so inept as to do nothing for months about many workers and their present jobs. This seems to be an inevitable companion of monopoly: indecision. More than 6 months after the revolution was begun (this story is being keyed September 3rd), those who program computers in and around Dr. Tsu-huei Liu still know nothing about the future (if any) of their present work. Much more than just EMTP is involved, it is important to note: load flow, transient stability, and other programs are similarly affected. No worker on any of these applications seems to have received any assurance of a continuation of his work. Neither has there been any assurance that present work will **not** continue (although, in fact, workers today seem to be doing the same things as in years past).

If BPA were competitive rather than governmental in nature, following an announcement of major restructuring, management typically would move quickly to do one of the following two things. It would either 1) reassure workers that their talents were still needed; or 2) end projects quickly, perhaps firing some or all workers in the process. But such decisiveness would seem not to be the governmental way. As others have observed, changing government titles to those of private industry (e.g., Chief Executive Officer, Vice President, Account Executive, etc.), and changing the government rhetoric to that of private industry (e.g., talk about being market-driven, competitive, etc.) does not seem to change the skills or actions of the bureaucracy much, or quickly. One obstacle to meaningful change is obvious: management typically has little or no experience in the private sector. It was not brought in from the outside. Instead, the same old BPA employees are being asked to do new things for which they may have no particular talent. Political pressure to select managers who are women, or persons of color --- *affirmative action* is the official euphemism for such discrimination based on race or sex as opposed to merit --- probably is not helping to promote competence, either. BPA remains a politically-controlled monopoly like the post office, despite recent rhetoric from management.

Speaking of the post office, *"murder is number two cause of postal deaths"* according to a headline in the August 29th issue of *Federal Employees News Digest.* Not surprisingly, *"motor vehicle accidents were the leading cause of death."* But it is cause of the murders, which constitute the number two threat, that is the shocking aspect : *"More than half --- 57 percent --- of murders of postal employees were committed by co-workers or former colleagues."* So, there might be a small management problem in the post office, too!

About the cost of water spilling, summary numbers appear on the front page of the August 15th issue of clearing up: *"January-through-July runoff totaled 75 million acre-feet, or 71 percent of average at The Dalles. The system also provided 10.5 MAF of water to flush migrating salmon this year. BPA says the flush and other water for fish cost close to $200 million."* That's right, folks, whereas mother nature shorted the turbines by 30% (round numbers), another 10% was wasted by those wacko environmentalists (preceding issue). Is it any wonder BPA has financial problems, and that the once-cheap hydro power has disappeared?

Criticism of BPA's spending on fish comes from many sources, including the office of the U.S. Inspector General. This is the lead story of the October 24th issue of *Clearing Up*, which provides the following summary. *"The audit said BPA paid for work that was never done and paid for equipment that was never used on BPA projects. .... BPA officials say the problems had been discovered long before the audit was released, and that new management practices would correct most of them by 1995."* This might be taken to mean that some of the problems will continue indefinitely, and all will continue through the end of the year -- which is outrageous. Yet, who is the most to blame? The audit *"portrayed BPA as hamstrung by federal law giving state and tribal fish agencies nearly complete control over fish projects."* As observed before, the environmental wackos are in control.

Those $100 million worth of smoke and mirrors by BPA (see the April newsletter) have not enthused many customers, it would seem. *"BPA joint customers come unglued in contract negotiations"* is the headline of the story that begins on page 12 of the October 3rd issue of *Clearing Up*. At issue is BPA's revised billing scheme,

which has been named *tiered rates*. Following contract negotiations the preceding week, *"the level of discomfort expressed with BPA's proposal bordered on flu-like symptoms"* according to writer Pamela Russell. *"Steve Waddington, deputy director of DSI Inc., said the time has come for a reality check. ... 'It's extremely complex, probably impossible to embody in contracts. It's very divisive; it has the seeds of huge cost allocation battles in future rate cases.' .... One negotiator .... said the general feeling among customers is that 'tiered rates is really stupid. I don't know of an dissenters at this point.'"* Yes, tiered rates do sound well-matched to, or appropriate for, the new, reinvented BPA!

E-mail in Portland : BPA and Agora

thliu@bpa.gov is the real, new E-mail address at BPA for Dr. Tsu-huei Liu's computer. This is the real thing, not to be confused with the preceding crummy X.400 and AT&T Mail nonsense that was described in the January issue. The new service first was used on October 4th, when Dr. Liu successfully sent a message to Agora, and your Editor responded to close the loop. That is the good news: an alternate, on-line (unlike the occasional telephone connection to Agora) mail box that is connected to real Internet.

But there is some bad news, too. Remember who provided the service (BPA's computer establishment). Like CompuServe or other commercial services, for now, BPA allows no direct access to Internet (most importantly for FTP use). Details might be found in the next issue.

Speed of Agora FTP has increased by an order of magnitude --- at no extra cost! This was first noticed around 16:00 Portland time on September 2nd when the July newsletter was sent to Prof. Mork in Houghton. Agora summarized the transmission as follows:

```
 61143 bytes sent in 5.1 seconds (11.7 Kbytes/s)
```

Yes, all 61 Kbytes arrived (confirmed by DIR), and human perception confirmed the five seconds. At log in, a recent announcement by Agora has been the following 2 lines:

```
  *** Live from SW Portland:  It's a T1!
  *** If you're telneting to agora, use "199.2.210.241"
```

The much greater speed was confirmed a second time when the new LICENSE.ZIP was sent to Prof. Mork in Houghton. On Saturday, October 8th, shortly after noon, Agora reported that the 14.7 Kbytes were transmitted in .75 seconds, for a rate of 14.7 Kbytes/sec. Again, the FTP statistics are believable (human perception suggested less than a second). Wow. Maybe T1s are made by Maseratti or Lamborghini? What reader knows precisely what a T1 is?

Chris Hockert of neighboring Benson High School, who last summer worked for BPA's Bill Mittelstadt on TCSC (Thyristor Controlled Series Capacitor) studies, was found to be a fellow Agora subscriber! As explained in "News:" of the Fargo list server dated June 29th, your Editor had tried to introduce him to E-mail by showing him Agora. No introduction was necessary (the guy knows more about Agora than your Editor)! This suggests another source for information about cheap, Agora-like service: inquire of whoever teaches computer classes at a neighboring trade school.

Agora will continue to be used --- at least through the end of March. Another $30 was sent to Agora owner/ operator Alan Batie at the end of September to pay for 6 more months. What a deal!

News about Laurent Dubé's MODELS

The speed --- or more precisely, slowness --- of MODELS has been documented by Gabor Furst for SVC (static var compensation) modeling. Recall that he began the 4th subcase of DC-22, which then was enhanced by Dr. Kurt Fehrle. Now Mr. Furst has taken another big step: conversion of this data from TACS to MODELS. This data case differs from many others in that control system modeling dominates. Also, it is burdensome on the CPU --- even using TACS. In E-mail dated October 31st, Mr. Furst supplied a table that summarizing nine of his comparative simulations as follows:

DELTAT in µsec :	46.3	185.2	185.2
TMAX in seconds	1.0	1.0	0.3
Original TACS data	140.0	40.7	20.3
MODELS without arrays	873.0	216.0	101.9
MODELS with arrays	1019.0	242.0	109.9

Entries between the horizontal separator lines are ATP job times in seconds for his 486-based Toshiba 4700 laptop computer. Note that the most favorable comparison for MODELS seems to be the column on the extreme right, which takes 1620 steps of size 185 µsec. But even here, MODELS takes a full 5 times as long as TACS.

The preceding results are believed to be Mr. Furst's deliberate, carefully-considered reaction to public E-mail of the Fargo list server dated August 29th. In this, Timothy Rae of the University of Natal in Durban, South Africa, explained that his project required *"the simulation of an HVDC scheme .... a pumped storage scheme utilizing a back - to - back converter topology."* He concluded with a question: "Which programming module (TACS or MODELS) .... is best suited" for this? A public answer recommending MODELS followed on September 5th from Bruno Ceresoli of ENEL in Milano, Italy. But, as Mr. Furst and your Editor both agreed during a following telephone conversation, the issue of speed was not addressed in this recommendation. Yet, it should be. How slow would MODELS be for his SVC? Mr. Furst decided to find out, and is thanked for sharing

his conclusions with others. Next question: who can speed Mr. Furst's simulation significantly without making changes to the program (reference to compiled MODELS or possible new and improved parsing)?

User-supplied source code of MODELS is used for Taku Noda's new frequency-dependent component (next).

Taku Noda Frequency Dependence

New frequency-dependent modeling for cables, overhead lines, and who knows what else (time will tell) is being supplied by Taku Noda, the former student of Profs. Akihiro Ametani and Naoto Nagaoka at Doshisha University in Kyoto, Japan. Since spring, Mr. Noda has been studying and working with Laurent Dubé, who lives on the Oregon Coast.

Previously, university research below the doctoral level never has profoundly affected EMTP. But Mr. Noda now is rewriting such rules as he extends the research of his thesis for the Master of Engineering degree at Doshisha University. From the cover, this thesis is dated January 25, 1994, and the effort was supervised by Profs. Akihiro Ametani and Naoto Nagaoka.

"Phase domain modelling of frequency-dependent transmission lines by means of an ARMA model" is the title of a paper that was submitted to IEEE for possible presentation at the 1995 PES Winter Meeting in New York City during February. The authors are Noda, Nagaoka, and Ametani. The theory and formulas of the new modeling are fully documented in this 7-page paper that soon should be available to all, so will not be repeated or discussed here. Yet, the new acronym ARMA probably should be defined: it stands for **A**uto-**R**egressive **M**oving **A**verage. Also, readers should understand that complications of frequency dependence of the modal transformation matrix [T] are avoided because modal analysis itself is avoided. Modeling is done in the phase domain. Another difference is use of Z transforms rather than Fourier transforms. To summarize, all new mathematics would seem to have solved a decade-old problem of EMTP. It is very important news for those transmission circuits that are not modeled well using JMARTI SETUP because the frequency dependence of [T] is significant. At long last, we seem to have an alternative to the *cold fusion* of Luis Marti. Readers who do not understand this reference are referred to the article by Tsu-huei Liu and Li Jin-gui, *"Call for help ..."* on pages 9-12 of the March, 1988, issue of *EMTP News*.

Noda frequency-dependent simulation first was demonstrated at BPA on September 20th during a short visit by Messrs. Dubé and Noda. The latter removed his notebook computer from his backpack, set it up on a corner of Dr. Liu's table, and rapidly showed simulation followed by batch-mode CALCOMP PLOT graphics for the energization of a 3-phase, flat overhead line. Since Mr. Noda also knew the correct answer (he compared the ATP simulation with an oscillogram of a field test), he is convinced that operation is correction for this case.

The new Noda modeling is coded in object-oriented C++, which was compiled using the Salford C compiler (see preceding issue), and then linked to Salford EMTP using the source-code interface of MODELS. If there were doubt about the viability of such mixed-language programming, this use should satisfy any skeptic; the mixture of C and FORTRAN would seem to have been mastered for Salford EMTP use. Yet, one must hasten to add that it is premature to time Noda simulation speed. This is not because of C-language itself, but rather because the MODELS interface is being used. This is understood to be no more than a temporary complication, however. Later, after all have agreed that Noda modeling is just what ATP needed, recoding could bypass the use of MODELS and thereby speed simulation.

The number of uses of Noda frequency dependence, and the number of coupled phases in each such use, are understood to be without obvious limit. There is no phasor solution yet, although STARTUP parameter SSONLY allows other branches to provide a presence during the steady state, should this be needed. See the final story for more about SSONLY use.

Salford SPY uses TPPLOT for I/O

A mouse soon can be used for input to SPY. This is for Salford EMTP, which runs on MS-DOS computers having 386 or newer Intel processors. As already well known, Salford TPPLOT has been highly developed for use with a 2-button Microsoft mouse. Well, this has been borrowed by SPY to act as a front end. Salford TPPLOT acts as a **back** end for SPY, too. The 132-column TPPLOT dialogue window now is used for SPY output (before, SPY output was 80 columns), and the mouse can be used for SPY input --- initially, just to select the basic command from a yellow pop-down menu that has the following content:

NAMES	STOP	PLOT	HELP	EXAMINE	DEPOSIT	SWITCH	APPEND
SAVE	RESTORE	GO	ECHO	FIND	LIST	SPY	BREAK
WHEN	COMMENT	@	ROLL	TYPE	VERIFY	FILES	SLEEP
SOURCE	UNUSED	WAKE		CATALOG	BEGIN	STEP	UNUSED
DATA	RAMP	TIME	TEK	BRANCH	YFORM	NOY	FACTOR
NOF	RLC	OS	BUS	SIZE	LIMIT	IOUT	NODE
NONLIN	SPACE	LUNIT4	SERIES	LOCK	[Y]	[F]	NOROLL
$	DEBUG	SM	HONK	HEADING	TACS	WAIT	V-I
MENU	DICE	FONT	OVERVIEW				

The new SPY windows are fast! Like the HELP window of TPPLOT, the new SPY windows can be scrolled in excess of 200 lines/second using your Editor's 33-MHz AT&T 486. For the 3738 lines of DC-1 output, one can scroll from one end to the other in 16 seconds. This is without time-sharing (e.g., an ongoing simulation), and while using the mouse. The mouse is critical since

scrolling is substantially slower using the up- and down-arrow keys of the keyboard. The heading of the new LUNIT6 window within SPY begins as follows:

Scroll: ←←← →→→ ▲▲▲▲ ▼▼▼▼ Home End.

Operation should be obvious, with the first four mouse targets providing for leftward, rightward, upward, and downward scrolling, respectively. Finally, the **Home** button will position the window at the oldest RAM-stored (but not disk-stored) history, and the **End** button is for the most recent history. On the extreme right will be painted three counters: 1) the index in RAM storage for the bottom line of the window; 2) size of the RAM cache; and 3) the number of lines that already have overflowed to disk. In between will be found two exit buttons. For example, at the bottom of DC-1 output, one sees:

Exit to: Spy Bitmap 3738 5000 0

Clicking on the **Spy** button will switch to the SPY menu whereas clicking on **Bitmap** will change the screen to graphic mode and then display the current bitmap. In this case, the third counter is zero because the 5000 lines of RAM storage have not filled. If and when 5000 lines of LUNIT6 output ever might be generated, the first counter would wrap around from 5000 to unity as the third counter began incrementing (as output was generated by an on-going simulation).

Spy dialogue and TPPLOT dialogue share the same window. In fact, this is within plotting, although the heading line will change when there is a change from plotting to SPY. Since the TPPLOT heading line is unchanged, it need not be illustrated here. But the SPY dialogue heading line is all new. It begins as follows:

MENU ←←←← →→→→ ▲▲▲▲ ▼▼▼▼ Home End.

The right half of this heading line, following completion of a HELP ALL command, appears as follows:

Exit to: LUNIT6 Bitmap 1080 5K 0

Note that the same 5000 line limit exists in the middle, only here it is abbreviated in order to gain 2 columns.

The simulation of DC-1 is faster when LUNIT6 output is sent to the new SPY window than when it is sent to the screen. Such is the magic of Salford windows (who knows why or how). It is a fact, though: one can update a Salford window faster than one can add a line to the bottom of the screen using a direct, FORTRAN WRITE statement! For that same 33-MHz 486, timing of DC-1 is as follows :

	dt-loop sec	total sec
output to screen	96	134
output to windows	71	90

Of course, output to DISK (one choice of the opening prompt) with no display at all is faster still (62 and 75 seconds, respectively).

Filling of the SPY window is very fast, too. As an example, the HELP ALL command will dump in the SPY window all 1012 lines of advice. The first time this is done, immediately after starting execution, takes 5 seconds. As long as RAM rather than disk is being used (the issue of a swap file, and also the more complex matter of disk caching), both windows are very fast. Repeating the HELP request 4 times results in a window containing 4110 lines, and this can be scrolled from top to bottom in 17 seconds.

The PLOT command of SPY will result in a switch from the SPY: prompt to the PLOT: prompt. As TPPLOT is entered, there will be automatic selection of plotting from RAM (the ongoing simulation) rather than from a .PL4 disk file. The CHOICE command also is issued automatically --- but only the first time PLOT is entered. Clicking on the ##### target on the right, the user then would begin selecting variables for a plot of the ongoing simulation. Alternatively, if the user instead wants to plot from a disk file, such a change is possible using the PL4 command. The STOP command of the TPPLOT menu has ben replaced by SPY in order to make it clear to the SPY user where he will be going (not back to the DOS prompt). Finally, one more command has been added to the TPPLOT menu. This is LUNIT6, to provide an immediate transition to the other text window. Should this be used, a subsequent click on the **Spy** button of the LUNIT6 window then would return the user to the TPPLOT dialogue window rather than the SPY dialogue window. I.e., SPY remembers where it was (inside of PLOT in this case), and returns there. A Bitmap button has **not** been added to the TPPLOT menu because there always have been two ways to ways to display the current bitmap JBIT : 1) press the F1 key; or 2) click the mouse on BITMAP in the TPPLOT menu. There did not seem to be any great need to modify this existing procedure.

The LUNIT6 window is a thread (multitasking), and this has some interesting consequences. Perhaps later SPY might run as a thread, but it does not now. Furthermore, although SPY generally retains its time-sharing with the simulation code as in years past, this is not true of the PLOT command because TPPLOT was not designed for it. Users should be aware that a simulation will not advance while control is within SPY PLOT. Of course, this is hardly an issue for pre-programmed procedures (the **@** command) that commonly would be used. But it is an issue for spontaneous, interactive use. Remember, while a bitmap is studied on the screen within the BITMAP command of PLOT, the simulation is not advancing. On the other hand, the user can study the same bitmap by using the **Bitmap** button of the LUNIT6 window, and have the simulation advance at the same time --- thanks to the multitasking of Salford threads (the SPAWN@ and YIELD@ commands of the Salford library).

Reddish-brown highlighting of TPPLOT commands continues, and has been extended to SPY commands, too. Clicking the mouse on any such line will recycle the command, recall --- but only if the prompt is the same. That is, while the PLOT: prompt is effective, it is not

possible to click on a line such as SPY:LOCK that was created using the SPY: prompt. The program will reject any such attempted mixed use by ignoring the click (there will be no error message). Because of the new SPY-command highlighting, each in-line comment of a command file really should be preceded by an in-line comment symbol (open brace **{**), which will limit the coloring. The INCLSPY1 file of Salford distribution has been modified in this way.

The Christmas / New Year's Season

The Christmas season is upon us once again. This year, public mention will be made of what Dr. Liu and your Editor have told and written many others many times in the past: corporate Christmas cards always are to be discouraged. The practice is wasteful, and has to be a burden on those who must sign their names over and over. Of course, intelligent, meaningful notes with EMTP-related news are always appreciated, so if someone wants to use a Christmas card as the vehicle to convey such information, that is a different matter. But these are the exception. Usually, the cards have nothing more than a signature, and at times not even that. Some companies must, as a matter of policy, mail these to every known address (i.e., by the many hundreds if not thousands). So, Drs. Meyer and Liu request that their names and addresses be purged from any such holiday mailing lists. In place of standard Christmas cards for us, why not consider the performance of an act of ATP kindness toward others? E.g., share useful information with some other licensed ATP user who needs assistance. The user group is much more impressed by such meaningful actions than it is by the standardized, symbolic gesture of a printed card.

New Ametani CABLE PARAMETERS

Prof. Akihiro Ametani of Doshisha University in Kyoto, Japan, spent all but 3 days of the period July 25th through August 13th in Portland working on cable-related problems at BPA. As explained in the preceding issue, Prof. Ametani's all-new CABLE PARAMETERS code was added to CABLE CONSTANTS during this period. This present story is a continuation of what was written under the same headline three months ago.

A change was made to the Bessel function calculation in PTZY1. Before, an infinite series was used; now it is closed form --- but only for a pipe-type cable. Prof. Ametani documented the change in a note dated 9/8/94.

LU6VRT of STARTUP no longer is reduced for CABLE PARAMETERS usage as was described in the preceding issue (see top of page 17). The output to disk of CABLE PARAMETERS now is fully buffered, so it occurs at full speed.

Increased UTPF size should be noted. We have passed another milestone. The Salford translator counted 107323 lines of UTPF input on September 25th, and the CABLE PARAMETERS code accounted for more than 3400 of these.

The work of Ms. Yumi Ito, financially supported by the Fujikura Electric Line Company, was not mentioned in the preceding issue only because details could not be clarified at the last minute. It would seem that Ms. Ito, a former student of Prof. Ametani, programmed part of the computation herself (other students also contributed), and keyed all of the code. Laurent Dubé provided this clarification in E-mail dated September 2nd. He wrote: *"Taku obtained the above information directly from [Prof. Ametani] ... yesterday."* Obviously, without all of this great preparatory work, the installation in ATP this past summer would not have been possible. So, belated Can/Am thanks to Ms. Ito and the other, unknown students who supported Prof. Ametani's work back in Japan.

IEEE COMTRADE . PL4 Files

IEEE PES COMTRADE is one alternative for the input (or output) of signals to (or from) Salford TPPLOT as introduced in the January, 1993, issue. The following writing is a continuation.

No one has yet provided tangible evidence of any error in TPPLOT handling of COMTRADE files. If any user knows of one, he is advised to send the proof to ATP developers in Portland. It was around mid-summer that a telephone call from someone at the BPA high voltage laboratory (across Columbia river in Vancouver, Washington) telephoned, and alleged that there was trouble. Your Editor did not understand very well, and responded that if this were true, send the proof. Nothing ever was received, however.

Jeffrey Peggs summarized use of the conversion feature at Virginia Power in Richmond. Quoting from the postscript of his letter dated October 13th: *"I was able to use the COMTRADE output from TPPLOT and successfully read it into a PowerTec Digital Fault Reconstructor (DFR). This will now allow us to use ATP files to test microprocessor relays. We are planning to create a library of faults and unusual conditions with ATP and use these to help us evaluate the performance of new microprocessor relays."*

Interest in BINARY COMTRADE testing remains, so it time to renew the offer. Remember, the code to read and write such files already exists in Salford TPPLOT, but this feature has never been tested. It may be compatible with itself, but that is not the question. Rather, is it compatible with others? Once again, the offer --- to anyone having independent software that

could create a binary COMTRADE file. Send a small example (e.g., 4 or 5 signals having a dozen or so time steps), and it will be reconciled with TPPLOT. Your Editor needs both the ASCII and the BINARY version in order to understand easily what is in the latter. It should be acknowledged that one person of the relay industry actually sent a program that would generate a COMTRADE file. This is what was briefly mentioned in the April, 1993, issue (*"it proved to be different than what was wanted"*). Your Editor's problem is: he knows nothing about that program. All he wants is a trivial example --- the signals themselves, in both formatted (ASCII) and unformatted (BINARY) forms.

JMARTI Instability with Cables

CABLE CONSTANTS use within JMARTI SETUP has been evaluated by Ivano Bonfanti of CESI in Milano, Italy. Thus began a story in the preceding issue that now is being continued.

The correct, general solution for cables is to avoid Marti modeling entirely. A separate story about Taku Noda, and his new frequency-dependence, provides details.

The CESI use that was described last time was for GIS, so it involved a single phase of the 3-phase system, it should be mentioned. This is an important special case: no coupling to the second or third phase of a 3-phase system. On the other hand, this is far from general, so is not at all a test of whether the existing JMARTI fitter can handle general cables. Remember, Dr. Tsu-huei Liu made the connection without any assurances that Marti logic could cope with cable functions. The first indication that Marti logic has trouble came from Robert Meredith of New York Power Authority (NYPA) in White Plains. His E-mail dated October 7th contained the following report of trouble: *"I spent most of Thursday attempting to make a Marti model of a typical lead sheathed 115-138 kv cable. To make the fitter work it was necessary to relax most constraints and to avoid symmetry of spacing. The fitter usually just hangs up for hours .... Specifically, the attached case shows the greatest accuracy I could obtain: 1) not more than 2 points per decade; not greater than 10% accuracy over six decades. The fourth mode is the problem, despite use of 59 poles/zeros."*

IREQ / Hydro - Québec ATP Interest

Neither IREQ nor Hydro-Québec --- both with headquarters in the greater Montréal area --- is licensed to receive or use ATP materials as this story is being written October 7th. However, ATP materials are in the hands of some employees for use at other organizations (universities of the area). Then, for the first time, public E-mail of the Fargo list server (run by Prof. Bruce Mork of Michigan Tech) was received from Hydro-Québec on October 4th. It is time for the associated issues to be explained publicly. Continued in the next issue.

Miscellaneous Intel PC Information

"Pentiums Under $1500; 60 MHz Bargains Make 486s Obsolete" is the cover story of the September issue of Computer Shopper. Inside, on page 134, Bruce Brown explains why high-speed 486s have lost their attraction in recent months: *"What did Intel do? Lowered the cost of its 5-volt Pentium, of course, and made its DX4 line scarce."*

"RISC notebooks in trouble" is the headline of a story on page 45 of the August 22nd issue of *PC Week* magazine. The story begins: *"With Pentium notebooks on the horizon, the window of opportunity for some RISC notebooks demonstrated last fall appears ready to slam shut. Nine months ago, MIPS Technologies Inc., Digital Equipment Corp., and IBM showed prototypes of portables based on high-powered chips designed specifically for notebooks. However, only IBM's PowerPC 603 is now expected to show up in a product this year, and when 75 MHz Pentium notebooks start shipping, Intel Corp. will erase any gap in performance, industry analysts said."*

Suggested Retail Prices (SRPs) are disappearing, with Microsoft being one company to abandon them recently. So says an article on pages 14-15 of the July issue of *Computer Bits* magazine. *"Suggested retail prices have been around for a decade or more, replacing 'list prices' after some companies got in trouble with the government for decreeing what their products had to sell for. .... explained Mike Appe, Microsoft VP .... 'Today, the discrepancy between SRPs and actual retail prices is such that SRPs no longer serve this purpose at all.' .... The elimination of SRPs .... will probably have little practical effect."* Right, let the market set the price.

Amiga PCs by Commodore International are orphans according to a story entitled *"Commodore Folds"* on page 13 of the July issue of Computer Bits magazine. Yes, a pioneer has disappeared: *"Commodore, once a typewriter repair shop and later a maker of calculators, was among the first entrants into the personal computer business in the late 1970s. After considerable success with its PET series of business computers in the late 1970s, the early 1980s saw the low-priced, eight-bit Commodore 64 computer chalking up respectable sales volumes in the home computer market. In 1985, Commodore launched the Amiga, a powerful personal computer with strong graphics features."* Your Editor clearly remembers Herbert Konkel showing advertising for the PET, which was exciting to think about even though nothing was done with it. The more expensive routes of

first DEC VAX-11/780 and later Apollo were pursued instead. It was toward the end of 1986 before real PCs were used to support EMTP --- and again Mr. Konkel was centrally involved, as documented by his 1987 paper.

About PowerPC, *"Apple/IBM plan goes off track"* is the headline of a story on page B2 of the September 15th issue of *The Oregonian*. For this story by John Markoff of the New York Times News Service, the subheadline reads: *"The alliance that was planned to derail the Intel-Microsoft cartel is in trouble."* Why? Because Apple Computer and IBM have different software objectives, of course. *"Executives at both companies ... have confirmed privately in recent weeks that it may be years -- if ever -- before IBM and Apple fulfill their promise of giving computer users, and the computer industry itself, a true alternative to the Intel-Microsoft standard that accounts for 85 percent of personal computers now in use."* The President of Forrester Research, George Colony, provided the following summary quotation: *"This was the last hope to stop the Intel-Microsoft cartel, and it's not going to happen."* Rather than use Apple's new System 7.5 operating system, IBM will be using Unix, NT, and OS/2, it would appear. *"Within a year, IBM expects to have a Power PC version of OS/2 ready."* Unix and NT are here today, of course. The article ends with a quotation from Daniel Farber, Editor in Chief of PC Week magazine: *"It comes down to geopolitics. Apple is afraid of becoming a serf in IBM's feudal kingdom."* Well, there are worse things (remember the humble beginnings of Bill Gates).

"Apple to allow clones of Mac" is the headline of a short Associated Press story by Catalina Ortiz that can be found on page D6 of the September 17th issue of *The Oregonian*. This would seem to be one more clear sign that Apple has been losing the battle of the PC marketplace. *"Apple Computer Inc. will let other companies make clones of its Power Macintosh computers, ending 18 years of technology exclusiveness that cost it a chance to dominate the personal computer industry. Apple will license both software and hardware designs by the second half of next year, the company said Friday. ... The move is viewed as crucial for Apple to maintain a fight for dominance in international markets .... Apple already has lost the fight in corporate America."* Yes, long, long ago.

"Intel's MP Spec v 1.1 multiprocessing standard" is mentioned by ALR (Advanced Logic Research, Inc.) in its advertising that covers page 27 of the August 22nd issue of *PC Week* magazine. The subtitle is: *"Quad 100-MHz Pentium MultiProcessing!"* Yes, 4 pentium microprocessors in one PC. But whose compiler would practically exploit such hardware for EMTP? The October issue of Computer Shopper addresses this issue on page 57 at the start of the Trends & Technology section. *"DOS, Windows, and Microsoft's pending Chicago support only single processors."* Although some vendors offer multiprocessor systems, others are not convinced about viability of the market: *"IBM, NEC, VTech, and Zeos have chosen to abstain, citing high development costs for limited anticipated demand. Although IBM came out with such a system in 1993, it has since phased out the machine."*

Multimedia production is expensive because writable CD drives are expensive. The read-only drives are cheap, but writability is not. Yet, prices are dropping. In his column on page 118 of the August 22nd issue of *PC Week* magazine, Jim Louderback writes: *"the sub-$1000 CD ROM recorder will be here soon."* The guy seems believable. Consider what he writes about handwriting recognition: *"Sorry. This technology is still a long way out. Remember OCR (optical character recognition)? Even 95 percent accuracy is totally unacceptable. The same thing goes for handwriting."* Following his work on the January, 1989, newsletter (see preceding issue), your Editor must agree. Keep things in their proper order. Before working on speech recognition, solve the problem of handwriting recognition. But before working on handwriting recognition, solve the problem with the recognition of printed text!

Hard disk prices were summarized in the preceding issue. After reading this, MODELS author Laurent Dubé contributed an example of his own during a visit September 20th. By mail order, Mr. Dubé recently purchased a 540-Mbyte Maxtor 7546 for $305. Prices continue to drop. Newer FAX advertising by Supercom dated September 24th shows a 340-Mbyte IDE hard drive for $149 and a 1-Gbyte Micropolis for $539. Backing up such large devices practically requires tape, of course, and this, too, is cheaper than ever. Supercom offers a 250-Mbyte Conner tape drive, with tape, for $145. Then BPA's John Schaad, stationed in Eugene, said during a September 28th visit that Costco, a national warehouse club, is selling a 546-Mbyte Maxtor IDE drive for $289. Next, Robert Meredith of NYPA wrote on November 13th : *"The latest Egghead prices on WD drives (flyer through 11-2-94) is $270 for the 540 MB and $500 for the 1080 MB drive."* Wow! The downward price spiral continues.

DEC advertising covers page 216 of the October issue of *Computer Shopper*. The noteworthy thing about this is a complete absence of VAX or VMS. Intel-based PCs, presumably running MS-DOS (although no operating system is mentioned), are all that are described. How times have changed. The product name is DECpc, and attributes include low power consumption (*"it uses less than 30 watts in sleep mode"*).

Overdrive is the name used by Intel for replacement kits that double the internal speed of 25-MHz or 33-MHz 486-based PCs. Prices are reasonable enough. Arlington Computer Products advertises *"DX2-66 Double 33 MHZ"* for $229 on page 24 of the November issue of *Computer Shopper*. Of course, after purchase there remains the

problem of installation (not always trivial). Computer expert David Szymanski has told the story of how he once was unable to extract an 80x8x, even with a proper chip puller!

Miscellaneous Small Items

SSONLY of startup defines the name for branches that are to be ignored after the phasor solution. As requested by Laurent Dubé and Taku Noda on the Oregon Coast, this seems to work for multiphase branches as well as single-phase branches (for which it was designed). In E-mail dated August 16th, illustration PHASOR.DAT was provided. There are two restrictions for multiphase use, however: 1) each phase must be named (using the reference branch fields of columns 15-26); and 2) in order of input, any such component must not be followed by any branch that will exist in the time-step loop. That is, there can be as many such components as the user wants, but he must force them to the bottom of his data.

The interpretation of **C$** in columns 1 and 2 as an unorthodox comment symbol for input data cards began on August 27th. This provided quick and sloppy relief for those at BPA who incorrectly convert $-cards to comment cards by forgetting the blank in column 2. If any reader has data for which this will cause trouble, he is asked to contact your Editor immediately in order that better protection could be devised to replace this quick, temporary change. The $-sign is particularly troublesome because it is taken as indication of a free-format number, when then can not be extracted. For some reason, the DEC VMS code, when run in batch mode, then began a tight loop prompting for a correction. Salford EMTP simply died cleanly (no problem).

Two different frequencies of sinusoidal excitation at the same node of a phasor solution were not rejected prior to the addition of such protection on September 7th. The need came from Gabor Furst of DC-22 fame, who had interest in multiple frequencies for the study of resonances. Once in the time-step loop, the user is able to have as many different frequencies as he wants. But for the phasor solution, a user is limited to a single frequency for each isolated network. The logic that protected against the overlap of different frequencies did not cover the case of two such sources at the same node, however. So, a new 2-line error message was added:

```
Warning.  It is not possible to have phasor
 sources of different frequencies at the
 same node.  But rows  XX  and  YY  of the
 source table attempt this at node  "ZZZZZZ".
 Ignore the 2nd.'
```

Note that this is only a warning. Ignoring the second source of the pair means that its T-start will be changed from the user-supplied negative value (typically -1) to zero. The result will be a consistent phasor solution. This was not the case previously, when sometimes (depending on order of input) the phasor magnitudes were added even though the frequencies were different, and impedances were calculated at only the first frequency!

New DEC Motif does not support Randy Suhrbier's VMS plotting program. The first your Editor learned of the problem was in E-mail dated September 1st from Bruno Ceresoli of ENEL in Milano, Italy, who had trouble using *"graphical library DECW MOTIF version 1.2 (corresponding to release 5 of MOTIF) ."* Mr. Suhrbier's confirmation was passed back on September 9th. The new operating system seems to be OK, but at BPA, Mr. Suhrbier restored Motif 1.1 in order to make his program run correctly following an update of system software by others. He also warned against use of new Fortran 6.2, which also seems to have errors.

118 printed copies of the July newsletter were mailed (15 to Canada), and 2 were hand-carried to BPA. No, this many readers did not resubscribe as required by the story in the April issue. In fact, only about 20 had renewed as of the date of mailing (September 16th). Was the timing bad (too many other things for readers to do in the spring and summer)? In the past, the *"Need to Resubscribe"* stories always have been run at the end of the year (fall and winter). Of course, increasing numbers of readers pick up copies electronically, from Prof. Bruce Mork's plains FTP server, and some have sent notes to Portland indicating that paper copies no longer are need. Are we now seeing the end of massive mechanical printing and mailing? Let us all hope so. Disk files really are better, since they can be computer-searched as a family using Vernon Buerg's shareware LIST (on the GIVE2 disk).

Robert A. Schultz of New York Power Authority (NYPA) in White Plains successfully eliminated that global SAVE in APPEND (see the January newsletter). In E-mail dated February 17th, he communicated a list of 49 variables that could be selectively SAVEd instead. This did correct the execution of **SPY @5** although your Editor postponed mentioning it until this late date.

Computer expert David Szymanski visited BPA on September 23rd, and spent the afternoon with your Editor talking about object-oriented programming, and how it might make EMTP better. Mr. Szymanski brought and demonstrated his own impressive drawing program that was coded in C++ and which ran under MS Windows. Your Editor understands well how SPY and any EMTP graphics might be connected to MS Windows using Szymanski's skills, but does not yet see how *objects* might profitably change much else. Dr. Liu will return Monday, and your Editor must repeat his report of months past: he still does not have a clue about how to use object-oriented programming to rewrite EMTP. He is convinced, however, that it should be worth the Nobel Prize for anyone who succeeds! Laurent Dubé and Walter Powell are others who have contributed opinions about the bold, new --- and perhaps impossible --- idea.