Can / Am EMTP News

Voice of the Canadian/American EMTP User Group

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Salford Compiler and DOS Extender

$DEPOSIT was conceived on August 18th following a visit by Laurent Dubé, and discussion with both him and BPA's Randy Suhrbier about how to allow users more flexibility in changing any STARTUP parameter. Later, your Editor asked himself: why limit the capability to STARTUP? Think bigger! The DEPOSIT command of SPY can change anything in ATP tables, so why not connect this power with data input at the $-card level? Indeed (what a great idea)! Illustration is provided by DC-6 beginning August 23rd, when the old PRINTED NUMBER WIDTH declaration was replaced by two equivalent $DEPOSIT declarations --- two because both the column width KOLWID and the intercolumn separation KOLSEP must be defined.

/ZEROISE was removed from ATP compilation as reported to Walter Dykas of ORNL (see separate story about ClearWin+) in E-mail dated August 7th. This is a request for the initialization to zero of all local (not COMMON) variables. When or why it had been added no longer can be remembered. It should not be necessary, and your Editor proved it by removal (all standard test cases gave the same answers). As part of his attempt to make ClearWin+ work, Mr. Dykas had experimented with such switches. The reform of standard Salford EMTP setup was an unexpected fringe benefit of the testing.

Version 2.66 of the Salford linker can not be used with object files that are produced by a newer Salford C compiler. This was verified August 6th when an object file from MODELS developer Laurent Dubé was added to satisfy previously-unsatisfied externals that were associated with user-supplied C-language source code. Version 2.66 of the Salford linker issued the following fatal error: *"Use a more recent version of LINK77."* So, this is what was done. Linking **did** proceed normally using Version 2.73 of LINK77, it was determined; and subsequent execution using the three associated data cases of MODELS -- CFUN , CMODEL , and RANDOMC -- was correct. This is clear progress. Previously, execution would end abruptly with DBOS recognition of an unsatisfied external. To conclude, your Editor continues to use Version 2.66 of the compiler on his computer. This is to convert ATP FORTRAN into

object files. Then anyone else having a new-enough linker can link these along with CLIBMOD.OBJ by MODELS author Dubé to create a complete executable that seems to run correctly under Version 2.66 of DBOS. Such a complete executable then can be distributed to others. This small improvement began August 7th.

How about the use of even newer C? It was found that Version 3.0 could be used to compile CLIBMOD if all the rest of ATP creation was done using Version 2.73 tools. Execution then seemed to be correct, but the user could not manually enter Salford's symbolic debugger using /BREAK on his RUN77 execution command. So, Mr. Dubé's consideration of even newer Salford C for more sophisticated tasks of ATP is not without complications for other developers who have no such comparable FORTRAN compilers, and no inclination to upgrade. Salford compilers remain expensive, and neither the user group nor BPA has been convinced to purchase the latest software than runs under Windows 95.

Virus protection in ROM can conflict with DBOS installation. This was the warning from Mike Ransick of Basler Electric in Highland, Illinois, USA. In E-mail dated September 7th, he wrote the following from address **mike.ransick@circellar.com** : *"I tried installing and booting dozens of times (with various autoexec.bat and config.sys settings) before I thought about a BIOS setting causing my problem. My computer simply locked up while loading DBOS. I finally tracked it down to a virus protection program invoked by the BIOS. It is called 'Chip Away Virus'. I disabled it and everything seems fine. My IBM clone is using the following BIOS .... American Megatrends Version 2.3 having date 08/08/93"*

Might ATP somehow overwrite an input data file? Glenn Wrate of Michigan Tech in Houghton (USA) first suggested this possibility in private E-mail. Writing from address **gtwrate@mtu.edu** on July 25th, Mr. Wrate showed an output file that involved branch cards as would be punched by JMARTI SETUP. He stated: *"I have had several cases crash and overwrite the input data file with a portion of the output. I'm using TPBIG dated May 8, 1995."* When asked for an illustration, Mr. Wrate responded as follows two days later: *"I can't repeat the error because the case was destroyed. I'm keeping backups in a separate directory now, so when it happens again I'll send the case. I've had it happen three times since May."* Yet, nothing more has been heard about the trouble as text is frozen for publication on October 8th.

"Salford on the Internet" is the title of a short announcement on page 7 of the September issue of the Salford newsletter. *"We have been accepting technical support questions by email since January. This has proved to be a very efficient way of dealing with technical questions."* Two addresses are used. For information about purchases, use **sales@salfsoft.demon.co.uk** The technical support team can be reached at **support@....**

Improvements to Salford TPPLOT

The LJ2 subcommand of the PAPER command may prove fatal if newer DBOS Version 2.74 is being used rather than older 2.71 as handed out by the user group, or 2.66 as used by your Editor. This discovery was made by Walter Dykas at the Oak Ridge National Laboratory (ORNL) in Tennessee (USA) last spring as documented in an exchange of E-mail between March 18th and the 25th. DBOS would complain of a "General protection exception at ...." So, usually old programs can be run under new DBOS. For example, your Editor continues to use Version 2.66 compilation even though the user group hands out Version 2.71 of DBOS. Mr. Dykas would seem to have found an exceptional feature that is troubled using Version 2.74. So, readers are advised to be cautious of such use of newer DBOS (in the case of ORNL because PTI software used it).

JULES of integer index 270 is a new binary switch that either requests (value unity) or bypasses (value zero) the automatic loading of the first three .PL4 comments (created by $BEGIN PL4 COMMENTS) as plot labeling. The default value is zero (no such use), which maintains continuity with the past. Concerning the variable name, it is appropriate to mention that this is the Esztergalyos Memorial Switch. No, Jules has not yet left BPA, but we want to be prepared for the time when he does! Jules was the one who found the automatic loading of comment lines indispensable. The new TPPLOT feature simply approximates what Randy Suhrbier has for years been offering Jules in Randy's DEC VMS plotting program. The first line is taken as the super title, and the two following lines are loaded as a 2-line case title. This is done as the .PL4 file is connected, so labeling still could be added to, or modified, prior to plotting, if the user wanted. The feature became operational August 5th.

The COMTRADE subcommand of the EXPORT command was modified at Randy Suhrbier's request on August 7th. The change has to do with default labeling of the signals. There was no problem within disk file COMTRADE because signals were labeled manually (see the six lines following the LABEL= tag), and the labeling was complete (Mr. Suhrbier warns that four quantities, separated by commas, are required). He demonstrated that it is possible to use the feature interactively without any LABEL= input, and in this case the resulting output has incomplete (and illegal) labeling. Apparently BPA's Jules Esztergalyos had come to him with this problem. So, if the user does not define labels himself, TPPLOT now will add ", A, , V" after the variable name or names (if a branch quantity) that already was present. Previously, the variable name or names was all that was provided. But this was just the first of 4 required quantities. Mr. Suhrbier added the remaining 3, beginning with a separating comma. Note that the third of four quantities is blank or empty. As for

interactive use, your Editor never envisioned this. But it does work very simply, as Mr. Suhrbier demonstrated. It is a lot like hard copy. First, using the mouse, the user selects and plots his curves on the screen. Then he goes into COMTRADE within EXPORT. This ends with a GO to produce the corresponding COMTRADE output. Thanks to Mr. Suhrbier's simple modification (one line of code), such interactive output now is legal. Neat.

Japanese laser printers sold within Japan generally seem to be incompatible with full-resolution alternatives of Salford TPPLOT. Thus began a paragraph one year ago about a problem for which there finally would seem to be a solution. The good news arrived in E-mail from Prof. Yoshihiro Murai of Gifu University in Japan. Dated the 2nd and 3rd of September, Prof. Murai wrote about the work of one of his Master's degree students, Masakatsu Matsubara. *"... we needed ESC-Page protocol which Epson originated and many Japanese printers are now using. ESC-Page is a laser printer protocol. Even other printers, such as HP deskwriters, are adopting the code as well as their own codes. The code ESC-Page includes graphic functions to draw circles, lines, letters and others. My student, Matsubara, developed a program in Quick Basic, that transforms HP-GL code to ESC-page code. The result was almost OK (graphics are OK, the size of the letters were not perfect. It was under revision ...). .... We also tried using Excel on Windows 3.1, and printed out EMTP graphics on an ESC-page printer. That was OK, but it took a long time."*

News from Outside USA and Canada

A printed copy of the July newsletter was mailed by BPA each of its 9 primary EMTP contacts on August 4th. This was two days after JUL95.ZIP was placed using FTP in the /incoming subdirectory of Prof. Bruce Mork of Michigan Tech, and was attached to E-mail to Mathias Noe in Hannover, Germany (for placement on the European mirror).

Prof. Laszlo Prikler of T. U. Budapest in Hungary, who supplies other Europeans by FTP, was sent current (new) Salford EMTP materials. On August 17th, the GIVE1 and GIVE2 archives were attached to E-mail messages.

Xian, China, is the home of Northwest Electric Power Testing Research Institute. Zhu Yue of this organization was informed of the availability of Salford EMTP and TPPLOT on October 5th when BPA's Dr. Tsu-huei Liu mailed to him a Chinese-language cover letter along with January and July newsletters and the user group's form letter. The incoming request dated September 10th cast some light on MS-DOS ATP usage and misinformation in the People's Republic. If any reader is interested in details, they could be provided next time.

The 300-dpi figures of BPA's EMTP Theory Book were Air Mailed to Prof. Kizilcay from BPA on August 21. These complement (can be used instead of) the 75-dpi figures within TB075.ZIP on the Hannover FTP server.

The Latin American user group at Furnas in Rio de Janeiro, Brazil, was experimenting with E-mail during August. It seems Marco Polo Pereira hoped to use FTP to acquire MODELS information from Laurent Dubé. This is important progress for the last user group that is not yet reachable using the information superhighway.

The Hannover mirror was more than a mirror between August 17th and the 23rd, for those interested in BPA's EMTP Theory Book (see separate story). During this period, Prof. Bruce Mork was unavailable due to vacation, so TB075.ZIP sat in his mail box. On the other hand, Mathias Noe was on the job in Hannover, and he was able to place his own copy of the file on the Hannover FTP server during this period. Once again, the importance of redundancy was demonstrated.

More about Electronic Mail (E-mail)

Armageddon or Doom's Day arrived for the Fargo list server on July 27th. Each of the 300 or so subscribers received an electronic form letter that stated: *"You have been removed from the ATP-EMTP list .... by E-Mail Postmaster ...."* Of course, this was just an error that was quickly corrected. But what could not be known at the time was the magnitude of the trouble. Writing from **hoag@vm1.nodak.edu** the following day, Marty Hoag provided the following interesting summary: *"Thousands of subscribers were accidentally temporarily removed from 129 of our 290 e-mail lists (including this one) .... on the afternoon of July 27, 1995 (starting at 13:07 CDT). The removals were issued from .... our postmaster account. This message to the affected lists is a bit late, but is to let you know that you are back on the list. .... The lists affected were restored to their membership as of 23:55 CDT July 26, 1995 (i.e., the previous midnight, 13 hours before the error). Most of you should* ***not*** *have to do anything. .... The generation of thousands of informational messages in such a short time also put a strain on the mail system here and backed mail up for a bit. A few mail items may have been lost but we tried to be very careful to save all of those not related to the removals. .... We are very sorry for all the false alarms and inconvenience this has caused you. We have taken steps to try to prevent this from happening again (it was a problem with some local tools we use to manage the lists ...."* So, where was Prof. Bruce Mork during all this excitement? He explained the following in public E-mail dated July 28th: *"I just returned from the PES meeting and was confronted with several hundred individual e-mail messages informing me that all subscribers ... had been removed, during a one hour period on Thursday."* Yes,

this would seem to be the ultimate in junk mail: a mailing machine that has gone crazy!

MIME was the subject of a story in the preceding issue. Within disk file PCMIME.ZIP from Prof. Mustafa Kizilcay was found a README file that began as follows (useful information): *"mpack/munpack version 1.4 Mpack and munpack are utilities for encoding and decoding (respectively) binary files in MIME (Multi-purpose Internet Mail Extensions) format mail messages. For compatibility with older forms of transferring binary files, the munpack program can also decode messages in split-uuencoded format. The Mac version can also decode messages in split-BinHex format. Versions are included for unix, pc, mac and Amiga systems. The canonical FTP site for this software is* ***ftp.andrew.cmu.edu*** *..."* (look in pub/mpack/).

Japanese language is Internet-compatible! This was the conclusion of a demonstration by Taku Noda at BPA on September 1st. First, using your Editor's 486, Agora was used to connect to Doshisha University using Telnet. But displays involved a lot of garbage because our English software could not properly display Japanese characters that were being sent. Next, the telephone line was switched to Mr. Noda's Epson notebook computer, which was equipped with MS Windows in Japanese language. The experiment was repeated. This second time, displays from the Doshisha computer looked perfect in Japanese, according to Mr. Noda. It is believed that two 7-bit bytes are used to represent each Japanese character, and these escape the distortion that plagues French or other accented European languages. The January, 1993, issue explained that the 8th bit is relied upon for European languages, with accented characters having codes 128 and above.

CompuServe rates seem to have tumbled again, as the service continues to fight off competitors. The October issue of *CompuServe Magazine* announces new, lower rates on page two. For the same basic fee of $9.95 per month, members now receive five free hours. *"And how you spend your 5 hours each month is up to you. ... And if you want more time, it's only $2.95 per hour."* This does begin to look competitive once again. Using CIM or some other program to automatically log on and off, each transfer might average 30 seconds. That would be 600 per month. Each transfer typically would (could) involve several messages. For $10, that would be less than a penny for each one! Also, CompuServe users now can think about receiving Salford EMTP and TPPLOT files by E-mail. The first such recipient was Haukur Asgeirsson of Detroit Edison in Michigan, who was sent GIVE1 as an attachment on September 27th.

Rejection of a submission to the Fargo list server was the trouble of Mathias Noe of the University of Hannover in Germany. Following his successful reception of disk file TB075.ZIP of BPA's EMTP Theory Book (see a separate story), he had wanted to inform others of its availability at the **Hannover** FTP site. Imagine his surprise when he received the following rejection message (sent to your inquisitive Editor on August 18th): *"Your message is being returned to you unprocessed because it appears to have already been distributed to the ATP-EMTP list. That is, a message with identical text (but possibly with different mail headers) has been posted to the list recently, either by you or by someone else. If you have a good reason to resend this message to the list (for instance because you have been notified of a hardware failure with loss of data), please alter the text of the message in some way and resend it to the list. Note that altering the 'Subject:' line or adding blank lines at the top or bottom of the message is not sufficient; you should instead add a sentence or two at the top explaining why you are resending the message, so that the other subscribers understand why they are getting two copies of the same message."* So, the concept makes sense, but it might have been misapplied in the case of Mr. Noe's announcement! This explains the second, somewhat-indignant announcement by Mr. Noe, which began as follows: *"This is the second time I try to announce that I received the BPA EMTP Theory Book from the Can/Am user group and put it on the server in Hannover. Maybe the person who decides what is rejected should read more carefully the text in this mail. The last time I sent a message, I announced a newsletter and not a Theory Book!"* Do you suppose the same guy who wrote that famous program to purge subscribers also wrote the redundancy-checking program (joke)? Alternatively, is it possible the Hannover mail system might have sent two copies of the original without Mr. Noe knowing it? This leads to another occasional problem of the Fargo list server: not everyone on the list receives a copy. Mr. Noe did not receive any copy of his original attempt, so it was natural enough for him to believe the rejection notice and try again. The problem of occasional incomplete service of the list was raised by your Editor during Prof. Bruce Mork's presentation at the user group meeting in Portland (see preceding issue). No one has a good explanation.

The shape of Australia is easily recognizable in the signature line used by Rodney Peters. His E-mail of the Fargo list server dated July 25th ended as follows:

```
Department of Electrical Engineering
Central Queensland University       _--_|\  Tropic of
Rockhampton                        ---/-----*\----------
Queensland 4700                       \_.--._/ Capricorn
Australia                                v
```

What about a Web (WWW) page for ATP? This question was raised during the presentation by Prof. Bruce Mork (of Michigan Tech in Houghton) at the user group meeting in Portland on July 23rd. Eight days later, Gerald Lee of BPA discovers one accidentally by beginning with IEEE standards (the home page shows *SPA system*, whatever that is). This is at **http://stdsbbs.ieee.org** Following the hyperlinks, he ended up at Prof. Mork's Houghton FTP site. Amazing (it is not as though ATP is invisible to Web surfers)! Yet, interested users of the Web might want to suggest changes. The listing of, or

dynamic connection (hyperlinks?) to, the different user groups of the world is one thought that occurred to your Editor, and was mentioned at the user group meeting.

"The University of Oregon will transmit a live audio broadcast of three home football games via the Internet this fall, in one of the first efforts of its kind in the country." This from a story on the front page of *The Oregonian* dated August 28th. Think of the possibilities. Before, the recipient had to be close to broadcast towers within the state. Soon, the UO signal will be available anywhere in the world. For more information, begin at home page **http://www.goducks.com** (a duck is the mascot of the school).

A college degree via modem? The University of Phoenix seems to advertise this across about 1/3 of page 6 of the September issue of *CompuServe Magazine*. The headline reads: *"New this Fall. An Information Systems Degree, Online!"* Later, in the explanation: *"Discover the unparalleled flexibility of commuting to class by modem .... Five professional degree programs from which to choose. ... Call us today at 1 - 800/742-4742"*

user_name@msn.com is the form of addresses of Microsoft's new E-mail service, The Microsoft Network (see the January newsletter). The first message from there came on July 28th from computer expert and Unix-ATP pioneer David Szymanski, who now is a beta tester of MS products! This can only be seen as another sign that the Intel-Microsoft domination of the industry continues, and Unix users are looking hard at what may be their, and nearly everyone else's future: MS Windows NT (a later step after Windows 95). That assumes Bill Gates can avoid anti-trust prosecution by the U.S. government (possible action that has been advocated strongly by existing on-line services).

Erienet is the provider of David Szymanski's preferred access to the Internet. **szymansk@moose.erie.net** is his address. Concerning services, the following is taken from an information file: *"ErieNet is a PC based system which runs on three networked computers, Squirrel, Moose, and Boris. ... Moose runs the Linux operating system .... In addition to running the BBS, Squirrel provides FTP, Telnet, Gopher and Finger functions. On Moose, ErieNet offers SMTP E-mail using PINE and Usenet news. Squirrel houses our World Wide Web server. Moose is home to our users' home pages. .... The current rate for individual ErieNet members is ... $20.00 per month for each month thereafter."* While this is expensive by Agora standards, the service is high-speed (28.8 Kbaud), and no limit on usage is seen. Erienet also offers consulting-type services. For example: *"Production of Web Pages: $25.00 per hour. One hour minimum. Average Web Page without graphic images is likely to be one to two hours of production."* Yes, Szymanski, too, has one of those. It is located at address **http://moose.erie.net/~szymansk/**

Prof. James R. Smith of Montana State University in Bozeman (USA) explained why or how he recently was inspired to obtain the new, alternative E-mail address **<jrs_cti@montana.avicom.net>** This is a real horror story about what might possibly go wrong with E-mail on campus. Quoting from a message dated October 3: *"Over the course of the summer I think it was down for up to 4 weeks - with about another 3 weeks where I was receiving mail but could not get access to it. We had one hard drive on the machine fail in mid-June. It was under warranty but it took until early July to get the replacement and restore all the files. In early August, the system hard drive failed (after 7 years of use) and had to be replaced. We also had a new system manager start this summer in the College of Engineering (we only have one amazingly enough) so things took a little longer than normal. We have had 3 companies start offering internet access to the public in Bozeman this summer. One of them is the local newspaper, which has become very involved with the internet for news stories and communications."*

EMTP-type faculty at the University of British Columbia in Canada are said to have started another bulletin board for EMTP information by E-mail. The formation was announced via the **power@globe** mailer to which Prof. Laszlo Prikler of T. U. Budapest in Hungary subscribes. In E-mail dated August 18th, Prof. Prikler provided BPA with its first look at a form letter inviting subscription to the new service. This began: *"Modern power systems are becoming very complex and the need for accurate simulations has become a necessity for economic and safety reasons. The EMTP, which was originally developed by Prof. H. W. Dommel in the late 1970s, has ...."* Needless to say, Prof. Dommel did **not** develop EMTP in the late '70s, so this was not an auspicious beginning. In fact, Dr. Dommel left BPA in 1973 --- before your Editor even coined the name EMTP (during 1985; Prof. Dommel had used the acronym T.P. for his work). Later in the form letter, a universal pitch is made: *"Improve the interaction among EMTP users and researchers (of any EMTP version or type, e.g, ATP, DCG/EPRI, Microtran, etc.). Allow the free exchange of information and knowledge among people working on similar topics and interests."* But there are problems with this, too --- **serious** problems. ATP users are reminded that they are not entitled to exchange ATP information with unlicensed persons such as Prof. Dommel. Recall that the nondisclosure agreement (see LICENSE.ZIP on the Houghton FTP server) prevents this. Anyway, how fast a start has been made by the tardy E-mail aspirants at UBC? The following report was received in E-mail dated September 29th: *"you can report ... that you've heard anecdotally from a contact of a contact that, aside from the first welcoming message, there has been no information at all exchanged on the UBC list server."*

Those UBC EMTP types seem to continue their attempts to rewrite or deny history. Attached to E-mail

dated August 27th from a trusted collaborator was an August 24th announcement that purportedly originated at **emtp@ee.ubc.ca** Above Prof. Dommel's name, the message begins as follows: *"Ever since the EMTP Newsletter closed publication with the December 1987 issue as a vehicle of information exchange for users of all types of electromagnetic transients programs, I have been thinking whether it would make sense to revive it again."* Now, as your Editor keys this paragraph, he is looking at Robert Hasibar's notebook of 1987 newsletters. At the tops of page 1 of all 4 issues that year, explanations about which programs *EMTP Newsletter* was to apply to can be found. In no issue is there mention of any applicability to the commercial offering of DCG/EPRI. Yet, despite this official declaration, Prof. Dommel seemed to be following his own commercial agenda at the end of 1987. If there is enough interest, your Editor might explain next time how the Professor was removed from the newsletter in order to open the way for a flood of ATP information (see the March, 1988, issue). There are so many, great, unpublished, ATP stories!

European EMTP User Group

This is a continuation of related stories in preceding issues. It documents the continuing evolution of ATP user organization in Europe. The acronym now being used is EEUG, which indicates the *"European EMTP-ATP User Group e.V."* as formed in Hannover during November of 1994.

EEUG Chairman Mustafa Kizilcay has a new, shorter address for E-mail at FH Osnabrueck in Germany. On September 22nd, his message was received from address **kizilcay@hermes.rz.fh-osnabrueck.de** Still not short, but an improvement!

EEUG News is the name of the European newsletter and/or journal. In E-mail dated September 2nd, Prof. Kizilcay reported that *"EEUG News have been sent to the members together with July 1995 issue of Can/Am EMTP News. We could find a less expensive way of sending this mail as 'book' after negotiating with the officials of the post office in Offenbach am Main. Your copy attached to a 4-ring binder will be shipped on Monday."* The copy **was** received at BPA, and it looks very professional. Rather than being just a newsletter or just a journal, *EEUG News* seems to be both, with a clear demarcation between news and published papers. It was your Editor's suggestion that the newsletter front end might be made available to any interested person free of charge just as Can/Am newsletters are. Can any reader imagine better advertising for EEUG (your Editor can not)?

The next EEUG meeting is scheduled for November 13th through the 15th at the Congress-Center in Hannover, Germany (see preceding issue). Registered participants numbered 33 on October 2nd, when Prof. Kizilcay also reported that a total of 18 contributions (papers) had been scheduled for presentation.

Walter Dykas Tests ClearWin+

ClearWin+ is the Salford product that extends the old DOS compiler FTN77 / x86 to MS Windows and Windows 95. The experimentation of Walter Dykas at Oak Ridge National Laboratory (ORNL) in Tennessee (USA) has progressed since that initial summary of troubles in the preceding issue.

Those Salford experts at the factory in England did suggest changes that eventually allowed Salford EMTP to be run under ClearWin+. That Dykas inquiry by E-mail dated July 6th (see preceding issue) was answered by Jose Louvet on July 14th as follows: *"We sent you today the latest version of Clearwin+ (version 4.2). We think the first thing to do is to try this new version and see if you get the same problems. It may not cause any trouble but in the link script you don't need the options 'common_base', 'defcom' and 'le winlib'. Would you let me know if by removing these linker options this problem has been solved. 'ws 100000 100000' should give you enough stack and heap."* This advice came from address **jose@salfsoft.demon.co.uk**

"News:" of the Fargo list server contained the following progress report dated July 20th: More recently, Mr. Dykas seems to have switched to much smaller programs, to better understand what ClearWin+ is doing. One of these was described in private E-mail dated July 18. In this, Mr. Dykas wrote: *"By entering a function call 'I=OPEN_PRINTER@(I)', a ClearWin program brings up the Windows printer dialogue box (print selection, setup, etc.). This seems pretty close to getting access to the entire Windows printer library (virtually everything)! Note the following creates a 592-Kb file, which should give you some idea of what the minimum file size is.*

```
WINAPP  50000, 50000
OPTIONS(INTL)
PROGRAM SIMPLE2
IMPLICIT NONE
INTEGER*4 I
INCLUDE <WINDOWS.INS>
I = OPEN_PRINTER@(I)
END
```

Success using ATP first was learned in E-mail dated August 7th. Mr. Dykas wrote: *"Quickly .. There remains much to do before this is usable. Of course, I am pressed for time. The user interface is non-existent .... I tried to get some quick memory figures. .... so far it doesn't run with 15.8MB available (including a 12 MB) swap. It did run with 32 MB RAM plus 20 MB swap (total available 40.8 MB). Note that the Salford Launcher seems to take*

1MB." Execution times in seconds for DC-1 without any concurrent plotting (NOTPPL = 1 in STARTUP) can be summarized as follows:

	dT loop	Total
Original TPBIG, Ver. 2.66	13.2	16.4
Recreated TPBIG, Ver 3.11	13.4	16.6
TPBIG with some changes	13.6	17.2
TPWIN using ClearWin+	14.7	17.2

Among changes that were required (line 3) for later CW+ use was the elimination of virtual scratch files. Omission of this part of the 1993 Schultz Revolution did slow the simulation slightly, it will be noted. But the final step to use of CW+ (see row 4) involved no further retardation of the total job time. The second that was lost in the time-step loop seems to have been gained elsewhere.

News about Laurent Dubé's MODELS

POSTPROCESS PLOT FILE has not been interfaced to MODELS because the interface to TACS (see preceding issue) should suffice. Among the first to ask about such MODELS usage was Prof. Mustafa Kizilcay of FH Osnabrueck in Germany. Your Editor responded as follows in E-mail dated July 27th. *"You can feed the signals into TACS, and then pass them to MODELS without loss of a time-step. Interesting idea (no need for Laurent to do anything)!"* Of course, this is a reference to author Laurent Dubé's recent extension that allows the coexistence of TACS and MODELS in the same data case (see preceding issue).

As different tasks are completed, they should be summarized in this publication. This was written in the April issue about Laurent Dubé's most recent contract with BPA to improve MODELS. So, the summary of progress reports as they were issued in public E-mail of the Fargo list server continues.

"Rules of context" was the headline of a 7-Kbyte *MODELS Technical Note* that was broadcast from the Fargo list server on July 14th. It began as follows: *"Following recent modifications to MODELS in ATP, a simple set of rules now determines how the named values of a model are visible for reference in expressions in different parts of the model. First, here are the definitions of the types of named values that can be found in a model ..."* This went on to explain about 3 classes of constants (global constants, constants, and data) and 6 classes of variables (global variables, simulation variables, inputs, variables, FOR arguments, and function arguments). Details are rather complex, and Mr. Dubé concluded that *"more thinking needs to go into this .... it's likely that eventually something similar to this will be done. Ideas and comments are welcome."* Why are such details of concern? *"It might be tempting to avoid the problem altogether by not duplicating names in the two models. In a small project, this is easy to do. But when we start building libraries of models, we need the flexibility of being able to define names without worrying about their use somewhere else, that is, we need a local name space for each model, which is one of the principles on which MODELS is designed."*

"Functions and array values" was the headline of a *MODELS Technical Note* that was broadcast from the Fargo list server on July 16th. It began as follows: *"Recent modifications to MODELS now make it possible to use functions with arrays of values. Multiple values can be used as input arguments of a function where before we were limited to single values. And functions can return multiple values where before they were limited to single values. Here are the details:"* An illustration was provided using both FORTRAN and C languages.

The DEC C-language compiler was used by BPA's Randy Suhrbier on August 11th to port Laurent Dubé's CFUNMOD.C file (see opening story) from the Salford dialect in which it was written to VMS that will be required for production users within System Engineering. Changes are substantial, as documented on a printed listing that was found on your Editor's disk the following morning. These begin with different #include usage. For the date and the time, Mr. Suhrbier seems to use <time.h> rather than <dbos\lib.h>. Also, he has added <descrip.h> with the note "needed for descriptors." The generation of random numbers is done for VMS using the call srand(time(NULL)) rather than date_time_seed() of the Salford compiler. Mr. Suhrbier noted this change as follows: *"redo using ANSI-standard RTL."* He has another comment: *"VMS passes character strings by the address of a descriptor (a 16 byte structure)."* There also was change to the unusual way Mr. Dubé calls the ATP output routine OUTSIX : extern "FORTRAN" void outsix (char*, int&, int&) "OUTSIX"; Etc. Whereas the struggle for portability of EMTP FORTRAN was won more than two decades ago by the discovery of machine translation (see 1977 PICA paper), a comparable struggle for C might just be beginning. Your Editor is appalled. Are there any other good reasons to avoid C (joke)?

"Commonly-used signal sources" was the headline of a 8-Kbyte *MODELS Technical Note* that was broadcast from the Fargo list server on August 15th. It began as follows: *"Simple signal sources can often be described by a single logical and/or algebraic equation. Using a statement function to express this equation is then the easiest way to create such sources. For example .... However, a less obvious formulation, like that of the triangular waveform below, is better described only once in a function definition, and then used as a function call when it's needed. .... Included below are a few commonly-used signal sources. If turn-on and turn-off times need to be added, this can be easily done on the outside of the function definition. .... A data case illustrating the use of these functions is shown below."*

"Complex functions" was the headline of a 9-Kbyte

MODELS Technical Note that was broadcast from the Fargo list server on August 15th. It began as follows: *"A recent MODELS technical note .... indicated that we can now write functions that return an array of values. Another technical note .... illustrates the use of a library of commonly-used functions. This note combines both ideas in the form of a library of basic complex functions. .... Now that functions can return an array of values, we can use functions to define the 2-element array algebra of complex numbers. The following is the seed for a library of ready-to-use functions covering the basic operations we can apply to complex numbers. These functions would likely be kept in a separate file, and included in a model when needed."*

NOBLAN of STARTUP automatically will be set to zero upon entry into MODELS, and restored to its original, user-supplied value upon exit. This was agreed to by Mr. Dubé during his visit to BPA August 18th. The change seems obvious, once one thinks about the problem. The improved operation was explained as follows by Mr. Dubé in a *MODELS Technical Note* that was broadcast from the Fargo list server on August 21st: *"MODELS has its own syntax rules, separate from ATP. Among other things, it allows the insertion of white space anywhere in the text of a model, including blank lines and tabs. So there is no need to start blank lines in the MODELS section with 'C ', used for indicating comment lines in the rest of ATP."*

TACS devices, which have type codes 50 through 66, first were made available to the general public as MODELS models by Gabor Furst in suburban Vancouver, British Columbia, Canada. The January newsletter contained a single paragraph about Mr. Furst's MODELS Primer. Not mentioned was a voluminous Appendix that began on page 51 with title *"MODELS Versions of TACS Sources and Devices."* Mr. Furst began: *"To assist first time MODELS users who previously used TACS and are accustomed to use the TACS sources and devices in developing data files, the equivalent MODELS version of these sources and devices has been prepared."* Recently, Laurent Dubé has provided such capability in his own materials. *"Models of TACS devices"* was the headline of his *MODELS Technical Note* that was broadcast from the Fargo list server on August 27th. This began: *"I'm sure that many users have already done something similar themselves, but just for the sake of the exercise, I have prepared a file of models operating like the devices type-50 to type-66 of TACS. The file can be included in a data case whenever one of the models is needed. The file libs.zip has been placed on the ftp archive. It contains 3 library files: 1) TACS.LIB -- models of TACS devices 50 to 66; 2) SOURCES.LIB -- functions of commonly-used signal sources; and 3) COMPLEX.LIB -- functions of operations on complex numbers."*

To be continued next time (there have been more announcements than there is space to summarize them).

MS Windows 95 finally arrives

Microsoft (MS) Windows 95 was officially released for consumption by the general public on August 24th (called Winday by the press). *"Windows 95: And the hype goes on, on"* is the headline on page C6 of *The Oregonian* that morning. An example: MS *"revealed it would pay to light the Empire State Building in Windows 95 colors and buy out the entire press run of Thursday's editions of the Times of London, which contain special ads. ... Microsoft said it was spending about $200 million this fiscal year on advertising ..."*

"ATPDRAW runs under Windows 95! But only as single application; not in a DOS box." Thus began the exciting announcement by Christian Hoelzl of University of Technology in Vienna, Austria. This was in public E-mail of the Fargo list server dated August 4th. It was followed on August 7th by a report from Prof. Laszlo Prikler of T. U. Budapest in Hungary: *"Yes, I can confirm .... that ATPDRAW is running under Win95. The speed loss is not significant even on machines having only 4MB of RAM, like my home clone."* Later that same day, Prof. Prikler clarified his usage as follows: *"ATPDRAW is running like a DOS application in full screen mode (not in a DOS window), like TPPLOT under Win 3.1. .... I have simply created an icon for ATPDRAW. The icon points to my draw.bat file that contains a single command: GIGS ATPDRAW. ATPDRAW can be started by clicking on its icon; and after finishing ATPDRAW, the control turns back to Win95 normally."*

Computer expert David Szymanski outside of Erie, Pennsylvania, USA, has reentered the ATP validation war. This was on the Windows 95 front, shortly after he received Watcom ATP (see separate story) from NYPA. The postscript of a note from Robert Schultz on August 9th stated: *"1) RJM E-mailed the Win/NT version to Szymanski this afternoon."* The next thing your Editor knew, Szymanski responded on the 18th as follows: *"I am forwarding the output from 2 runs using wntatp. .... The .dat files I have are quite old (1987). If there are other cases you would prefer to have run, please E-mail me a copy. I am expecting the newest version of Win'95 next week."* Yes, execution of the NT executable was confirmed using Windows 95.

IBM OS / 2 Warp Tested by NYPA

IBM's OS / 2 is being used for the support of ATP by Robert Meredith and Robert Schultz of NYPA (the New York Power Authority in White Plains). This is a continuation of the same story in the preceding issue.

Version 9.5c is the vintage that is displayed by both the compiler and the linker, it should be stated. Among the services that Mr. Schultz performed during his 12.5

hours at BPA on July 27th was updating of the Watcom software to correspond to this latest revision, which is understood to be used at NYPA, too. This change is important because it should ensure that the same compiler is being used in both Portland and White Plains.

"Note that only a DOS version of the WATCOM Graphics library is available." The previous issue contained this quotation from a Watcom manual, and it implied that all of your Editor's work using the Watcom DOS extender (DOS4GW) graphics was lost during the move to OS/2. Not so, Mr. Schultz has demonstrated. Despite what the Watcom manual says, he is using those DOS graphics under OS/2 ! After a couple of weeks of confusion between White Plains and Portland, definitive clarification arrived from Mr. Schultz in E-mail dated August 11th: *"I received your voice mail and understand your confusion. Let me clarify some points. .... This is corrected with the attached library of scripts. There are some very esoteric embedded features of Watcom which must be handled carefully for cross-platform use. .... In the past, these problems were 'solved' quickly by using the 'DOS Window' trick under OS/2, as I sent you several days ago. I spent 2 hours today officially resolving the 'DOS Extender' target using native OS/2 compiler/ linker, and have succeeded. The results are in the attached library of scripts .... Now you can truly compile for the dos extender under OS/2 without resorting to a DOS Box. Not that the DOS Box method was bad -- indeed I never noticed any performance penalties or problems. The linked executables under both methods are identical."* In another message, Mr. Schultz wrote: *"Yes, the DOS4GW version executes properly under a full dos window in OS/2. This includes the graphics. To run, I say*

dos4gw atpdos disk plottest.dat plottest.out -r

I haven't 'pushed' the system yet (i.e, hi-res graphics). That's next. You, too, should be able to test it out on Tsu-huei's machine." To conclude, all the credit for such minor miracles must go to Robert Schultz, whose work with (or trickery of) computers remains an inspiration.

Adaptation of this same DOS4GW ATP FORTRAN for use directly under OS/2 was accomplished by Robert Meredith. The following summary is from his E-mail dated August 17th: *"Even though I'm on vacation, I did spend a couple of hours tonight getting _YOUR_ code to run in an OS/2 window (without graphics of course). There's not much to this process. I simply commented out about 5 lines that wanted to use _BLUE and other colors in one subroutine, added a dummy subroutine for your dos4gw graphics calls (attached) and created empty graph.fi and graphapi.fi files (off the dos path). Then compiled and linked using attached commands. Copied a few object files from the dos version for blocks not in RAS's comp1 script (vardim, veclib, etc). I suspect I might not have needed to recompile as much as I did, but I let them compile while I watched a movie. Voila. Plottest.dat and dc1.dat both ran to completion, producing output files. DC-1 was correct. .... I think we are closer to universal code than you have imagined. Next step: universal graphics output file creation -- sort of like the postscript output for Display.exe and Postplot. I'll fiddle; Schultz will figure how to open it while it's being written in SPY or CalComp. We _could_ be up and running in a couple weeks. Not bad for a couple hours experimenting! .... I'm on vacation. I wouldn't do any real work! I didn't even look at more than the one subroutine that had colors in it. Dumb luck, I say."* It is true that the *Dynamic Duo of NYPA* **do** seem to have more than their share of ATP luck. However, this obviously is anything but dumb or an accident! It is an honor to be collaborating with these talented individuals.

A freeware alternative to DOS4GW was mentioned in E-mail dated August 18th from Tom Short of Power Technologies (PTI) in Schenectady, New York. It seems that Charles Scheffold of **daredevi@dorsai.dorsai.org** announced the following: *"I have uploaded to SimTel ... available by anonymous ftp from the primary mirror site **ftp.coast.net** .... SimTel/msdos/c/ pmw120.zip .... PMODE/W is a replacement for DOS/4GW and is fully compatible with WATCOM C/C+. PMODE/W provides you with a number of advantages over DOS/4GW. .... *Self contained extender is internal to the EXE .... *Fast execution time; *Protected mode EXE compression; ... *Free for non-commercial use."*

The installation of OS/2 Warp can involve problems. The ultimate horror story (i.e., whatever can go wrong will go wrong) comes from Mr. Meredith in E-mail dated September 9th: *"Fred Pagano of our office just managed to get Warp running at home after months of delays. He ran into a lot of problems: Needed new disk drive and new motherboard to add the 3rd drive to; drive turned out to be bad and had to go back to mfgr; his Future Domain scsi controller was set to irq=5, which conflicted with his sound board -- a no no to OS/2. (OS/2 is the best hardware conflict finder in existence!) He needed a special driver for the new motherboard controller; his ATI Mach32 video card (like mine) would not run with Mach32 drivers due to the timing defects on his early board; had to use 1814a drivers. Still, he says he is now a 'happy camper'."*

"ATP for OS / 2 and WNT / W95 Personal Workstations" was the Subject of a 9-Kbyte public E-mail announcement of the Fargo list server by Robert Meredith. Dated September 30th, this began: *"The Meredith-Schultz duo at the New York Power Authority announce the availability by uuencoded e-mail of ATP for the OS/2, Win NT and Win 95 operating systems, running on Intel-compatible workstations."* The final paragraph clarified that delivery was to be by E-mail (readers who do not yet use this, are there any other good reasons to consider approaching the Internet on-ramp?!): *"Licensed ATP users may simply send a request for either atpos2 or atpwnt to either **wmeredr@ip3gate.usa.com** or*

wschulr@ip3gate.usa.com *Our NYPA gateway is quite slow, so we will send only one package per day, late in the afternoon, 'first-come-first-served'. Consider yourselves beta testers. We have not run the test cases. No guarantees. Unlicensed people should pursue licensing through Dr. Meyer (**atp@agora.rain.com**) before requesting code, since we will be checking with him."*

The exploitation of PostScript output of batch-mode plotting is a dominant attraction of the work by Meredith and Schultz using Watcom. Continuing the quotation: *"In the tradition of 'a picture is worth a thousand words,' NYPA has incorporated unequalled screen graphics plotting and printing capabilities in this version of ATP. OS/2 users can page through color plots at any time after the case runs and can compare plots from different cases in multiple pop-up windows, all infinitely scaleable with your mouse from thumbnail to full screen if desired. Within the plots the keyboard can toggle individual traces on and off, remove text, grids or axis labeling to get a clean view. Plots need not be restricted to traditional dimensions. If you want to generate a plot three times as long as it is high and your monitor can show sufficient resolution, go ahead and do it. Such 'strip charts' can be displayed one above the other for comparisons. All plots and text are stroked vector graphics which scale to any size on screen and when printed to high resolution printers. The plot files are compact vector format and readily compress to even smaller sizes. For instance, the Postscript plot file from our 15-plot test case is only 179 kB before compression and 34 kB after compression. This makes it possible to save thousands of plots in the same space as a few bit-map plots."*

About the choice among OS/2, Windows 95, or Windows NT, Mr. Meredith offers the following advice: *"NYPA has found OS/2 Warp Connect to be the ideal ATP and engineering platform, with so much quality shareware and freeware available for OS/2 that there is little need for commercial programs. The built-in Novel and IBM Peer networking installs flawlessly with simply a mouse click to confirm your token ring board. Bob Schultz is successfully accessing the Internet with the built in Web browser, ftp, telnet and Newsreader programs. The enhanced editor is superb for ATP work and, of course, OS/2 also does Windows. So our Word for Windows, Network Excel and Groupwise e-mail work quite well. Every engineering need, including such things as a binary editor, graphical file comparison, HP-GL viewer, DAT tape backup software, MIME decoder, Grep utility, decompilers, etc has been FREELY available. The only thing we've really bought, besides Warp Connect, is the Watcom Fortran compiler and IBM floppy tape backup software for our personal OS/2 systems. Virtually all of NYPA's engineering programs, including short circuit, are now running under Watcom Fortran on OS/2. Fortunately for those of you who can't get the best O/S, NYPA has also prepared ATP for Win NT and Win 95 with similar capabilities. Users of that code must rely on Ghostview/ Ghostscript for plot display. It is not nearly as fast or as versatile as OS/2's display program, but it provides an identical color plot display capability, including the ability to page through the plots. In the past few days the ATP Postscript code was upgraded to provide color with users' choice of background black/gray/white shade selectable, without compromising the printability of the plots. We have found that color on black or dark gray background is easier to view than on white background, which washes out yellows and greens. However the black background would print that way too, except for recent modifications to our psplot program. That program has always allowed us to print selected plots at one, two or four plots per page to a postscript printer. It now will automatically strip out background black and optionally convert all traces to black for printing. So ATP Postscript can now be viewed with your customized choice of trace, grid, lettering and background colors and then converted to black/white for printing from Ghostview/ Ghostscript or directly to a Postscript printer. Custom header files can be applied by ATP when it executes or by psplot at any later time, in case you want changes, such as color hard copy plots or '.eps' figures to embed in electronic publishing."*

The Watcom ATP version is new. This is important progress. Mr. Meredith wrote: *"This code is all July 1995 vintage Can-Am material supplied by Dr. Meyer, who prepared the first (extended DOS) Watcom code. NYPA has completely revised the graphics, added longer file name capability, added the ability to obtain a sorted input file and done a bit of debugging. Being 'large case' people, we have also added the ability to sort up to 150K input cards in memory, greatly speeding sorting in large cases. All code is Pentium optimized for maximum speed on all platforms. Code is dimensioned to at least 20 times default, sometimes much more. Runtime redimensioning and 'turbo tapsav' for restart case efficiency are of NYPA origin, so are retained, of course. DC1.DAT runs in about 17 seconds on a Pentium 90, without extraordinary efforts, such as using a virtual drive partition. (We try anything!) Rudimentary instructions about new features are included in the distribution package, which is about 1.4 MB before encoding. Instructions for finding the free Ghostview and Ghostscript programs are included. We have made no attempt to support SPY or TPPLOT. ATP's replot capability suffices for the latter here."*

About early Microsoft support of OS/2 (see the April issue), there is the parallel hardware story about how IBM tried to fight off AT clone makers such as Compaq. This is well summarized on pages 587-589 of the July issue of *Computer Shopper* under the title *"What ever happened to PC clones."* From the middle of this story can be seen PS/2, Micro Channel, and OS/2: *"By 1987, the majority of all 286 personal computers being sold were clones, and IBM no longer dominated the market. To fight this trend, IBM decided to build a 'clone-killer,'*

a series of computers using new Intel CPUs and featuring a completely new bus structure: MicroChannel. IBM fully expected the majority of business users to move to the new PS/2 Micro Channel. Big Blue explained that Intel was coming out with a faster processor, the 386, and that IBM was about to release a much better operating system called OS/2." This is under the section heading entitled *"The clone-killer fiasco."* It **was** a fiasco, too --- both for hardware and for software (early OS/2). Remember, when EPRI and its agents were pushing OS/2 for the support of EMTP, their simulation was quarter-speed.

Trapezoidal Rule Oscillations

CDA (see April and July issues) was discussed at the user group meeting that followed Prof. Mohan's short course in Portland, it might be mentioned. No conclusion was reached, however. Next, Roger Argenal and Prof. Laurie Snider tried to build a consensus for such change using Prof. Bruce Mork's public E-mail (the Fargo list server). This was in messages dated August 30th and September 1st. Rather than damping, the subject already had changed to the interpolation for estimated current zeros as was said to be used by EMTDC from the Manitoba hvdc Research Center. Predictably, some subscribers who had no idea what was involved joined the chorus. Others (e.g., Prof. Yoshihiro Murai of Gifu University in Japan) discussed the matter intelligently using private E-mail. An eloquent and informed rebuttal to the stream of unreal public euphoria eventually was posted by Robert Meredith of NYPA. On September 8th, he reacted publicly as follows (the entire enormous next paragraph):

*"In over ten years of EMTP/ATP use I have **never** found a case of numerical oscillation that was not an indication of improper or inadequate modeling on my part. I have come to regard the oscillations as a **useful** indicator that my model needs more work either to accurately represent the oscillation or to represent realistic damping of it. The numerical oscillations are always associated with switching that causes abrupt flux changes -- essentially current chopping in an inductive circuit. That can include switching the 'hanging inductor', slope transitions in Type 98 NL inductors, improper initialization of Type 96 Hysteresis or related cases, such as the 3-legged transformer with Type 98 excitation. The current chopping can be deliberate or inadvertent, as when chopped 'near' zero due to the time step not allowing switch or diode opening at 'exactly' zero current. The desire to interpolate the opening times of switches between time steps is, in my opinion, misguided. It would make all switches more ideal than most of them actually are. For instance, all circuit breakers do chop a few amps of current. Whether or not the chopping that occurs near the zero current transition in a switch is realistic may depend on the time step size, but at least the chopping/numerical oscillation is a reminder that one should properly represent the circuit capacitances that absorb and damp the energy in the inductances when chopping occurs. The 'numerical oscillation' is simply a reminder that your model stinks, **if** any current chopping could occur. Chopping is **always** possible with circuit breakers. Getting rid of the 'noise' is usually easy. Just represent the capacitances and their series damping resistances that are actually present on the inductances and use a small enough time step. If the actual TRV would require too small a time step, exaggerate the damping to allow use of a larger time step, since you obviously do not want a realistic result in that case. In general any switch 'noise' problem can be eliminated by 'snubber' circuitry, as used in power electronics. i.e. damped capacitances across the switch to limit dV/dt and series inductances to limit dI/dt. Paralleling inductors with resistances is also a useful technique, if the resistances are representative of actual conductor eddy current losses at high (numerical noise) frequencies. I have successfully used these techniques to eliminate all noise on a 32-phase, 64-diode rotating exciter model. It required no more than use of the actual circuit capacitances. The fact that a user is too lazy to model the circuit capacitances is **not** an indication that EMTP/ATP needs to be revised. Problems with Type 98 NL reactors are also easy to solve. ... Etc. (lots of good advice about saturation) .... In short, I like the reminder that numerical noise gives me about the inadequacies of my switch modeling. Whether they be circuit breakers or diodes, modeling of realistic capacitances and time steps small enough of observe the TRV or exaggeration of the damping to allow larger time steps **always** solves the problems. When high speed Pentium mother boards equipped with processors cost less than a mediocre monitor, I fail to see **any** merit in the argument that a small time step would make the simulation take too long. Get a faster computer, or learn to model."*

"Rule of TEN for modeling" was the subject of yet further public explanation by Mr. Meredith two days later. Too involved to quote in its entirety, this classic tutorial involved the number 10 in varied and creative ways. An illustration is provided by the sixth of Mr. Meredith's ten points: *"6) At the highest frequency of concern you must use TEN time steps to obtain reasonable results. This is related to the need to see TEN points on a sine wave to have any assurance it is not some other shape. It may also be related to the need to have TEN pi-sections per wavelength to model a travelling wave phenomena. More time steps or pi-sections always is better of course. TEN is my minimum."* In his August 30th message, Mr. Argenal had asked: *"If we do not want to worry about numerical oscillations every single time we build a circuit with a switch (about 99.999% of the time) what do we do?"* Mr. Meredith's final paragraph seems to respond to this: *"If you follow these rules you should spend less than 1% of your time dealing with oscillations. (Sorry, I just can't envision spending anywhere near TEN % of even*

one day in a month if you model with these rules in mind.)"

Dr. Kurt Fehrle is another respected advisor on the subject of power electronics --- particularly for high power. Two decades ago, he was among the first to use EMTP to model hvdc and svc. This was as an employee of General Electric at the headquarters of its hvdc operation in Philadelphia, Pennsylvania, USA. Later, he worked in Erie on traction (electric locomotives). Around 1991, he advised your Editor about the importance of using snubber circuits during Prof. Dennis Carroll's Florida short course. Dr. Fehrle explained that he never had trouble with artificial oscillations because the actual snubbers (used with all hardware) were represented. It was during the first week of September that he was reached by telephone in suburban Philadelphia, and informed of the preceding controversy on the Fargo list server, to which he does not yet subscribe. His idea was to ask those who have so much trouble with oscillations to describe in detail one illustrative example. Good idea. This is the challenge: describe a configuration --- as small and simple as possible, please --- for which ATP is unsuitable. In other words, cease the general verbal complaints, and be specific. The description should include specific mention of snubber circuitry. Is the hardware not sold with such protection?

Roger Argenal really began to distort details toward the end, after it had became apparent that expert users were not supporting his call for change. In public E-mail dated September 26th, he wrote: *"At the July 23, 1995 meeting - I believe Mr. Meredith attended this also, Dr. Scott Meyer mentioned that 'if there was a demand for change in ATP, these changes would happen'. .... The point is: He offered, we replied. What now? Why offer something and then say that it cannot be delivered because other things take priority? If time was limited, why not be upfront and say 'You can ask all you want, however many of you, but the changes won't happen.' ... One should never, under any circumstances, try to bite more than they can chew and then justify what can't be accomplished by excuses, no matter how true it is. Learn to be upfront. This is the mark of a professional. ... If you cannot deliver, please do not offer. Leave this job for the politicians; This is an engineering forum. I still hope this is all one big misunderstanding. Although at this moment, it does not seem to be so."*

Well, exaggeration, accusations, and mistakes **do** seem to be characteristic of the written Argenal style. No, Robert Meredith did not attend the user group meeting, and no promise to satisfy Mr. Argenal's demands ever was made, or ever will be made. For the record, what this writer talked about was the need for consensus in this case. The desired consensus should be among those who really do know what they are doing, of course; it was not consensus among the ignorant, the misinformed, the mentally handicapped, the deliberately argumentative, etc., that was being sought. If all experts could and would agree on both the need and also the medicine, then changes would be made. That is the statement that was made, and it is not at all equivalent to a promise to respond to any particular bad idea from any particular loose canon.

Gabor Furst in suburban Vancouver, British Columbia, Canada, is another expert who seemed not to be convinced by Roger Argenal's arguments. In public E-mail dated September 27th. He wrote: *"I would like to fully endorse the excellent and common sense comments made by Bob Meredith .... on the subject of oscillations in ATP. I also concur with his remarks regarding demands or just polite requests for modifying ATP to cater to a very rare problem, if one takes into consideration that a vast majority of 'oscillations' are due to modeling which from a practical engineering point of view is not correct. The casual reader of the server mail over the last four weeks may conclude that there has been a substantial demand for modifying ATP to eliminate the 'problem of oscillations'. In fact, less than 2% of the server subscribers has requested it. .... I have been using ATP since 1988, in a variety of applications in power transmission problems, e.g. switching surge, resonance, harmonic analysis, SVC modeling, etc. I have not encountered any oscillation problems once the model was adjusted for correct engineering application. I am not suggesting that we should completely reject the idea of improving ATP in this field, but let's ascertain if there is a real problem. My personal opinion is, that this is not a priority development problem."*

Snubbers seem to be a necessity of analog simulation as well as real-world hardware. At first, your Editor had speculated that maybe ignorance of their existence and/or importance might be attributable to time spent working with analog simulators. But Stu Cook of Just Services in suburban Montréal, Québec, Canada, put an end to such a simple explanation. In E-mail dated September 28th, he wrote: *"I checked with the simulator lab at IREQ and their thyristor bridges do have RC snubber circuits. The values chosen may not scale to real world values, but could be changed if someone's requirements demanded it. They also have negative resistance amplifiers in series with the thyristors to bring the model resistance in line with full scale bridges."*

Prof. Ned Mohan of the University of Minnesota in Minneapolis is another expert who certainly understands the importance of snubber circuits. His popular soft-cover manual of *"Computer Exercises for Power Electronics Education"* prominently shows the representation of snubber circuits from the very beginning. Included are 64 sample circuits beginning with Exercise 1, which is entitled *"1-phase diode bridge rectifier."* This has 4 diodes, and the schematic shows one of these paralleled by a snubber. Parameters are named R_{snub} and C_{snub}. The associated data listing includes a comment card that

reads: *"Snubbers (next 4 records)."* Text below the schematic includes *"snubbers for diodes (not optimized):"*

Miracles are being sought by a lot of ignorant ATP users. That is the conclusion your Editor draws from the entire unhappy E-mail exchange. It is not known whether the average person supporting modification had any idea what was involved. Some responses were as simple and inane as *"Yes, I vote for the change."* The problem is, this writer never opened the polls of any election! Calling for discussion of a problem at a user group meeting is not at all equivalent to asking for a vote by the 300 or so subscribers of the Fargo list server and agreeing to abide by it. In retrospect, maybe that spontaneous voting of the **power@globe** mailer (see the January, 1993, newsletter) should have been viewed with more sympathy. Well, such voting finally infected the Fargo list server, too; and it was not a pretty sight.

The unendorsed calls for voting would seem to have backfired. That much is obvious. Far from prevailing by establishing a consensus, those who called for change seem to have isolated themselves from the expert users and developers. One last time: change occurs because those doing the work are convinced that an idea has merit; and a consensus among real experts certainly should be convincing. But change to ATP is **not** likely to result from repeated demands by inexperienced or incompetent users. It never has, and it probably never will --- either for your Editor personally, or for BPA (with the latter being particularly unconcerned about what subscribers of Prof. Mork's Fargo list server might think). Development of ATP involves neither a popularity contest nor an election among users. If somehow Roger Argenal had convinced himself otherwise, he **was** sadly mistaken. Is any reader surprised, considering the historical record? Review accusations mentioned in the July, 1994, issue.

The hanging inductor is a special case for which revised ATP logic would be easy. In fact, the correction was coded September 9th, following a 4.5-hour visit by Laurent Dubé, who has other, more-general ideas (a separate story). For nearly 20 years, your Editor has known a simple solution for the hanging inductor: kill the inductor history when the switch opens. He now believes the procedure could be automated, and is foolproof. So why not use it? The trouble is, many or most problems with artificial, saw-tooth oscillation of the trapezoidal rule are not of this simple type (see pages 6A-14 and 15 of an ATP Rule Book for an illustration). Anyone who believes the hanging inductor is worthy of special treatment is advised to make his case publicly. Meanwhile, the sample code will be retained as disk file OVER16.OSC in D:\ATP. \DATA\OSC.DAT is an illustrative data file that demonstrates perfect operation for that Rule Book example (from Prof. Dommel a quarter of a century ago). Both the old time-controlled switch and the newer diode have been successfully stabilized. One thing learned from a comparison of the two solutions is interesting: the times of the echoed openings are identical, but the current outputs for that step differ. The old time-controlled switch shows zero current for that instant whereas the separate diode logic of Laurent Dubé shows the actual, illegal, reverse current for that final step before opening. No one has ever called this discrepancy to the attention of program developers. At this late date (20 years after introduction of the diode by Mr. Dubé), it is unclear what, if anything, should be done. The difference has been validated by historical practice.

Substantially more could be written on the subject of numerical oscillation, but this story already is too long. Look for a continuation in the January issue.

Macintosh ATP by Stu Cook

Stu Cook of JUST Services in suburban Montréal, Québec, Canada, has been compiling new Macintosh ATP FORTRAN using the Language Systems compiler on his Apple Quadra (a Motorola 68040-based Mac). This is a continuation of the story in the April issue.

Extraneous 1A (hexadecimal) characters at the end of some Salford EMTP data files was found to be the cause of trouble with three standard DC-XX test cases. Normally there would be no consequence, since the end of the file would never be read, anyway. But exceptions occur for $INCLUDE usage. Just as BPA's James Randall had trouble with extraneous blanks at the end of $INCLUDE files (see the October, 1993, issue), so Mr. Cook had trouble with 1A using his Mac Quadra. Upon hearing of this, Laurent Dubé offered the explanation that 1A was an end-of-file mark for CP/M, which predated MS-DOS as the dominant operating system for personal computers. He warned that Norton Editor of Norton Utilities by Peter Norton will place such an extra 1A at the end of files. These can be seen using either LIST or FC (both shareware on the GIVE2 disk), but are invisible within MS-DOS EDIT. But they were easily removed using EDIT : your Editor merely leaned on the **Del** key with the cursor positioned one byte past the last real byte of the file. This is what was done to remove 1A bytes from nine files as listed in Mr. Cook's E-mail dated August 8th. Execution was corrected for DC-8, 17, and 58. As for when or how the 1A characters entered the files, no one knows. The MS-DOS DIR dates indicated 1988, which is well before any Salford use. Mac would seem to be the first system to choke on what other systems seemed to recognize and ignore (or treat as an end-of-file).

LINE MODEL FREQUENCY SCAN

LINE MODEL FREQUENCY SCAN (or LMFS in its short form) first was described in the April, 1992,

newsletter. Until just recently, LINE CONSTANTS use was implied. That is, as a function of frequency, the user would compare some transmission line model such as a JMARTI section against the theoretical (correct) answer as determined by LINE CONSTANTS. But what about the newer CABLE CONSTANTS, or the even newer CABLE PARAMETERS? The inclusion of these other two alternatives has been the latest generalization of LMFS by Dr. Tsu-huei Liu. This was in response to a request by BPA's Daniel Goldsworthy, who was thinking of the coming changes from Taku Noda (see separate story). Since NODA SETUP can connect with Prof. Ametani's CABLE PARAMETERS (see the July, 1994, issue), the need soon will be great. LMFS will be used for validation of Noda branch cards, of course.

The first card of LINE CONSTANTS data now can be preceded by such a request. Previously, the use was implied. Beginning August 11th, it can be either implied or explicitly declared. The two alternatives involving cables must be explicitly declared, of course. These rules are being adopted in order to maintain continuity with the past. Old LMFS data continues to be accepted as in years past. On the other hand, anyone setting up new data is advised to add the LINE CONSTANTS request if, in fact, this is the destination of his data.

Dr. Liu's work required that non-comment changes be made to just 4 UTPF segments : MAIN25, CCZYMX, CCEIGN, and SUBR27. Work can be located on or near lines bearing idents BPA95AUG or WSM95AUG (the latter involving only trickery associated with a change of overlay number NCHAIN to 26 for cable usage).

A new second subcase of DC-52 illustrates usage with CABLE PARAMETERS for the simplest 3-phase situation: no sheaths, armor, or pipe. The Marti model being evaluated leaves something to be desired, naturally.

Miscellaneous News about Cables

CABLE PARAMETERS comes from Prof. Akihiro Ametani of Doshisha University in Kyoto, Japan, as explained in the July, 1994, issue. Well, Rule Book pages for this, stored as a disk file of WordPerfect 5.1, were announced in "News:" of the Fargo list server dated July 14th. *"That experiment with simpler non-WP tables was a success. In fact, this writer not only completed all of them, but also all scanning for the remaining dozen bitmaps, within 16 hours of deciding to forge ahead. The resulting disk file .... compresses to a .ZIP file of size 162 Kbytes. .... Although not yet ready for placement on Prof. Bruce Mork's FTP server as a Rule Book chapter, this is the ultimate goal."*

CABLE PARAMETERS will punch branch cards for constant-parameter, distributed modeling as illustrated toward the end of DC-28. The numbers have not changed. But August 15th, BPA's Dr. Tsu-huei Liu corrected a problem with the node names for a second or later data subcase within CP. The storage was not being reinitialized as it should have been.

CABLE PARAMETERS will punch branch cards for constant-parameter, distributed modeling. But prior to generalization of the logic associated with the current transformation matrix [Ti] on August 16th, there was a limit of 6 phases. BPA's Dan Goldsworthy had noticed the problem with more phases, and Randy Suhrbier had pinpointed the location where ATP died, before coming to your Editor for relief. Modifications were made in CDATOU at the bottom of the SUBR27 disk file.

Branch cards punched by CABLE PARAMETERS did not include documentation of the input data on comment cards prior to August 16th. This extension was added by BPA's Dr. Tsu-huei Liu and your Editor in order to extend to CABLE PARAMETERS the service that has been available for other supporting programs for a decade. At the same time, $UNITS, 0.0, 0.0 has been added to inform ATP that units are mH for inductance and microfarads for capacitance. At the bottom of the punch file, a second $UNITS serves to restore the original units, it will be noted (e.g., see DC-28).

Kwang-chien Ger, the son of BPA's Dr. Tsu-huei Liu, was busy pulling text of CABLE PARAMETERS outside the program where it belongs. This was for disk file SUBR27 during his final two weeks of summer vacation before heading back for a second year at Duke University in Durham, North Carolina. Continuation one month later: All text has been removed from ATP code, and added to program data (disk file KILLCODE.MUP that is input for BLOCKD51 --- either .BIN or .FTN, with the latter being part of the 1993 Schultz Revolution). Kwang-chien began this work after he had completed the computer storage of BPA's EMTP Theory Book (see separate story). Unfortunately, a return to Duke prevented completion during August. But, with a little help from his mother, the overhauled code was being tested September 15th, and it entered the UTPF on September 23rd. As part of the reform, lower case was used for text that originally had been keyed using capital letters only. By having text outside the program, multi-linguality (i.e., a language other than English) is possible, of course.

IEEE COMTRADE Signals

The COMTRADE subcommand of the EXPORT command of Salford TPPLOT was modified to provide default labeling of the signals for interactive use. Details can be found in the second story of this publication.

COMTRADE output was of interest to Stanley Thompson of Multi-amp, now a subsidiary of Avo International, in Dallas, Texas (USA). In a detailed letter dated August 22nd, he explained that some who try to read the .CFG header files have primitive software: *"their software cannot read the .... scaling data in the exponential format, and they do not want to change. They suggested that the standard did not originally allow for this and, therefore should not be allowed."* By whom? The IEEE PES powers that be. Mr. Thompson explains that he sits *"on the IEEE PSRC HTF4 COMTRADE Users Task Force (what would we do without acronyms?). The PSRC will be forming a Working Group this year to start on the revision of the IEEE C37.111 COMTRADE Standard. I will be on the working group."* So, more help for brain-dead programmers or standard setters (are there any other reasons to wonder about committees?). Mr. Thompson pointed to the scaling factor and offset, for which E14.6 had been used. These two parameters have been changed to optimally-encoded F-field numbers from which any trailing zeroes will be stripped. A maximum of 14 bytes has been retained, so readers should note that the range now is limited to about (1.E-13, 1.E+13). Any smaller number should underflow to zero, and any larger number will overflow (DBOS should interrupt execution). Any reader who has trouble with this decision is invited to send a written explanation of his problem to Portland. Meanwhile, the change sits where it was made on September 7th. BPA's Randy Suhrbier was informed, and copy of the GIVE1 and GIVE2 disks for Salford EMTP was sent to Mr. Thompson the following day.

Then BPA's Robert Hasibar became involved. After reading Mr. Thompson's letter, he produced an official copy of the IEEE standard dated October 21, 1991. At the top of page 16, header variables are defined. Of interest here are "a" and "b," the scaling factor and offset, respectively. What are these? *"a= real number (see below); b= real number. Channel conversion factor is ax+b ..."* Some committee members do not know what real numbers are? Where does it say that these can not involve scientific notation? Finally, are there any other good reasons never to trust a committee with anything important? It would appear that **some** vendors have been incompatible with **some** legal COMTRADE files for four years! This would seem to be their problem, not ours. If any reader believes otherwise, he is advised to make his case both publicly and conspicuously (e.g., using Prof. Bruce Mork's Fargo list server).

BPA EMTP Theory Book in WP 5.1

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 in the July issue.

The general public first was informed of availability in "News:" of the Fargo list server (public E-mail) dated August 15th. This began: *"TB075.ZIP is the 1.304-Mbyte archive that stores the complete, 700-page book in low resolution. This includes the set of 75-dpi figures and the universal (independent of resolution) text files to which they connect. This file was sent to Prof. Bruce Mork's E-mail address .... shortly after 10:30 Portland time this morning. .... In terms of structure, there are 13 chapters (EMTP1 , ... EMTP13) , 7 appendices (APPEN1, ... APPEN7), one reference section (EMTPREF), one preface (EMTPPRE), and one table of contents (MASTER.LIS). Figures are in separate, external disk files that number 298. Most of these are named F*.WPG (e.g., FIG1-1.WPG), although figures for appendices begin with the associated Roman numeral (e.g., III-1.WPG for the first figure within Appendix III). PKUNZIP-ping of the archive will result in final storage that totals 3.577 Mbytes."*

Details of the WP5.1 storage were provided later in the same announcement. Quoting from an insert that was written by Kwang-chien: *"The text of the EMTP Theory Book was typed in WordPerfect using the Marin font with a size of 10 point. This is a scalable font from the Publisher's Powerpak which is similar in appearance (although not identical) to Times New Roman. The line spacing was set at 1.5. Margins at the top, left, and right of the page are one inch, while the margin at the bottom of the page is one-half inch. Automatic page numbering places numbers at the bottom. The figures in the Theory Book are located in individual, external files. In other words, the figures are not actually part of the text files. The widths and heights of the figures were based on their sizes in the original Theory Book; as a result, the figures range in size from just over an inch wide to over six inches in width. The sizes of the figures can be adjusted by entering the Graphics tool (Alt-F9), selecting Figure (Option 1), Edit (Option 2), and then the number of the figure to be adjusted. The explanations accompanying most of the figures were entered as Captions for their respective figures. However, those labels which were too lengthy were typed into the regular text. A problem was encountered concerning the location of the text surrounding the figure boxes. Currently, the 'Wrap Text Around Box' option in the Figure menu has been set to 'Yes' to prevent text from being displayed directly over (on top of) the figures. The text has been 'pushed' below the figure boxes using carriage returns. However, given the varying sizes of different fonts, the text does appear to the side of the figures or several lines below the figures at times. For now, the spacing must be adjusted manually depending on the font selected."*

Where does HP ScanJet technology stand today? In 4 pages of Sunday newspaper advertising that was said to be valid through August 18th, Computer City offers the following for just under $1K: *"HP ScanJet 3C Color Scanner. 2400 dpi enhanced resolution scanner; captures*

over 1 billion colors; 600 dpi optical ... One-year warranty." Well, the Theory Book had no color, and the resulting files would be too big, anyway!

Mohan Course : Portland, July 22 - 23

Prof. Ned Mohan of the University of Minnesota did give his portable EMTP short course immediately prior to the 1995 IEEE PES Summer Meeting here in Portland, Oregon. Thus began a story in the preceding issue that can be continued now (at the end of July) because space in a new issue always is available.

Despite his continuing success (37 paying students), Prof. Mohan is seriously considering important changes to course content and operation. The 23 points contained in private E-mail from Prof. Mohan on July 30th formed the basis of telephone discussion among Dr. Tsu-huei Liu, your Editor, and Prof. Mohan. No one seems inclined to change the 2-day, airport-based format that immediately precedes the IEEE PES Summer Meeting. This seems to be an obvious success. But shortage of time has been an increasing problem. Some time might be gained by having meals (bland, airline-type food?) provided with the course. Just lunch? Or breakfast, too? As a way of improving the value of the notes, video taping has been proposed by Prof. Mohan. Many readers may not realize it, but sale of the notes alone, as opposed to chairs in the room, is a significant business. Particularly for persons overseas, who might never travel to this country, the video recording should be invaluable. It might also be popular with students, who can not possibly remember everything they hear and see. But could recording be done well enough, and easily enough (i.e., by faculty rather than Hollywood professionals)? Back home in Minneapolis, professionals could do the editing and indexing, it is understood.

Recall that EMTP education in Florida and Madison changed in response to shortfalls of registration (see adjacent stories in the April newsletter). Prof. Mohan wants to avoid such later need by making preemptive changes now. He is to be commended for his imagination and ingenuity. The response remains big, but so do costs (e.g., the printing and distribution of some 15K course brochures). The course also is expensive because it is given on the road (next year, near the Denver, Colorado, airport, according to current plans). So, costs need to be, and are being, watched closely.

Saturday evening (July 22nd), Hans Kristian Hoidalen flew to Portland from Gainesville, Florida, in order to make his presentation about ATPDRAW. Why Florida? There was not space to explain this detail in the preceding issue. It seems the originator of ATPDRAW is involved with lightning, and Florida has more than its share. The most quotable (i.e., humorous) observation about this came from Prof. Bruce Mork of Michigan Tech in Houghton. As he prepared to leave for Norway, Prof. Mork wrote the following In private E-mail dated August 1st: *" (I) had hoped to visit with Hoidalen a bit, but he will apparently be in Florida taking lightning measurements. Interesting how, in his line of research, he sits around and prays for lightning to strike."*

About the new ATPDRAW, Mr. Hoidalen provided an excellent summary in public E-mail of the Fargo list server dated August 21st. The following is pasted from that announcement with only minor editing:

" **Protected mode** : No memory problem. 3-4 MB of upper memory.*

** **More components** : TACS (a demo version). MODELS (multiple use).*

** **New mouse operations** : Click left, hold down and drag (MOVE) . Double click left (DATA) . Click right (SELECT / UNSELECT) .*

** **Connections** : A connection picks up intermediate nodes. Thick connection between 3-phase nodes. Repeatable (press ESC to return to EDIT mode).*

** **Node-naming** : Display property added to node. Output property removed. Instead a new probe-object under Connections - Probe gives output voltage. Better track-keeping of phase sequence of 3-phase nodes. Node name left adjusted. Warning if node labeled twice.*

** **Object attributes** : New input menu (double-click left). Label (8 char). Moveable from EDIT + Move Label (press ESC to return). Group. Group number used as a sorting criteria. Comment (78 character written in ATP file). INCLUDE / USE AS (for User Specified Obj. and Models).*

** **ATP file sorting** : High/Low precision (low: no $Vintage cards written). Sorting by cards. Sorting by group (lowest group number first). Sorting by x-pos (leftmost first).*

** **ATP / TPPLOT** : ATP / TPPLOT direct executable via ATPDRAW. Editor included. (Specify your own editor in ATPDRAW.INI).*

** **ToolBar** (DRAW) : A toolbox with a selection of 10 edit operations and the 6 latest used objects.*
The ATPDRAW project will continue, financed by BPA, and phase 2 will be finished before X-mas. We will focus on more components and debugging the following month."

ATPDRAW could face more competition if one is to believe a September 21st telephone conversation that Dr. Tsu-huei Liu and your Editor had with someone in Maryland at number (703) 317-8708. The man gave his name as Tamir Orbach, but he refused to identify the company for which he worked, which was said not to be involved in this matter. The caller proposed an ATP GUI for MS Windows that was *"far better than ATPDRAW."* In response, your Editor read from the E-mail that had been exchanged with Myra in Rio earlier this year (see mention of DESTRO in the preceding issue), saying that this latest inquiry is not much different. He further explained that it was late because BPA already had spent

about a quarter of a million dollars in Trondheim to develop ATPDRAW. Your Editor offered to send details about Prof. Bruce Mork's Fargo list server, about which the caller seemed not to know. But he did know about the former LEC of Leuven, Belgium, and seemed to have some connection with or to Johannesburg, South Africa.

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, now a doctoral student of Prof. Akihiro Ametani at Doshisha University in Kyoto, Japan. This present story is a continuation of the brief mention in the final paragraph of the preceding issue.

Mr. Noda's IEEE PES paper (see January issue) is understood to have been successfully closed on schedule. Interested readers are advised to look for this later in the IEEE Transactions on Power Delivery. One problem that authors Noda, Nagaoka, and Ametani had in writing the original paper was a shortage of space. The closure in response to several discussions provided additional room to show details that would not fit in the paper itself.

Mr. Noda's fitter arrived by E-mail dated July 28th. This was as a separate program ARMAFIT that is to be run using Salford DBOS (it was created using the Salford C compiler). ARMAFIT reads TAKUNODA.CCC as produced by NODA SETUP, and does the fitting. A separate batch file G then produces vector screen plots to confirm the fitting for the user. About execution, Mr. Noda supplied the following table, which applies to that famous Japanese, 3-phase, horizontal, 500-kV overhead line (see his paper):

Table I. Fitting time comparison ....

My new fitter	76.5 sec.
My old fitter	203.2 sec.
JMARTI SETUP	374.2 sec.

(IBM compatible 486SLC 50Hz + 387SX)

That middle row ("My old fitter") is what Mr. Noda reported about in his IEEE PES paper. Today, he produces comparable answers nearly 2.7 times as fast! How? Mr. Noda cites 3 reasons: *"1) I rewrote all my library functions from C++ into C; .... 2) When I rewrote them, I tried to optimize in terms of speed .... 3) The new fitter .... considers the symmetry of the matrices to be fitted, regarding to the line configuration. Therefore, one element that has the same response as another does not need"* to be fit. As one who is ever-suspicious of the recent object-oriented craze, you Editor loves point 1 (elimination of the object-oriented support of C++)! As for that 486SLC processor, this would seem to be inside that same little Epson notebook PC that was seen at BPA last year (see the October, 1994, issue).

Taku Noda arrived in Portland on August 26th, and his last day of work at BPA was September 29th. In between, he was absent one week to attend the IPST'95 conference in Lisbon (see a separate mention). While here, he worked very hard and effectively to make his new frequency dependence a production feature of Salford EMTP for MS-DOS computers. NYPA plans to use the Watcom compilers, when the time comes.

In terms of ATP structure, the new Noda frequency dependence is almost completely modularized. Written in C language, this code does not (can not) appear in the UTPF, which was designed in 1974 to be specially-modified FORTRAN. But the various interface locations can easily be located by searching either the UTPF or FORTRAN for the character string "Noda". Noda subroutine names, and the UTPF segments from which they are called, are as follows: NODA3 and NODA3A are called by OVER3, NODA10 is entered from SUBR10, NODA11 from OVER11, NODA13 from LAST13, NODA17 from SUBTS2, and finally, NODA20 from MAIN20.

Three guinea pigs outside of BPA will be allowed access to Noda frequency dependence ahead of the general public. These were as follows, in the order they responded to the public E-mail requesting qualified collaborators: 1) Robert Meredith of NYPA in White Plains; 2) Dr. Gary Thomann of PTI in Schenectady, and 3) Dr. Ivano Bonfanti of CESI in Milano. E-mail will be used for all communication in both directions (including ATP itself) --- a first for ATP development.

LINE CONSTANTS usage within NODA SETUP first was tested using Mr. Noda's fitter on September 15th, it would seem. Using logarithmic looping as for Marti in DCNEW-3, it was found that there was duplication at the end of each interior decade. That is, the start of a new decade repeated the end of an old one. Also, what should have been $[Tv]^{-1}$ was [Ti] rather than its transpose. Another problem in TAKUNODA.CCC was that English units had not been converted to metric (the line length and vector CEIGEN were affected). Lack of ordering of the eigenvalues, and use of only the real part of complex eigenvectors, was another difference from CABLE PARAMETERS (assumptions required by the fitter). Finally, Mr. Noda learned from 180-miles of DCNEW-3 data (an old, BPA, 500-kV line that was represented in DC-3 using 18 Pi-circuits) that a separate, extra, high (nearly-infinite) frequency should be used in addition to the usual logarithmic frequency scan. For NODA SETUP use, the frequency scan involves much more reasonable frequencies (e.g., 10 Hz to 10 KHz for that 180-mile line) than has been the case for other models. So, changes were made to SUBR25 and LCMODE. Data of the final, exceptional frequency follows the logarithmic scan, separated in the .CCC file by a line that reads: 2ND FREQUENCY CARD .... It does require a second frequency card as part of ATP data.

LINE CONSTANTS failed to meet the needs of Mr. Noda's fitter, however, in spite of these numerous accommodations. Changes of the preceding paragraph were largely mechanical. After all had been made, Mr. Noda's graphical comparisons of his fitting still showed warning signs at both low and high frequencies, and the resulting simulations rapidly (within a cycle or two) became unstable. For line energization of DC-3, this was delayed, so initially was seen only as a longer-term problem. But once a phasor solution was added (the data of DC-31, 41, or NEW-4 interrupts the steady state using a fault to ground), trouble could be seen within a quarter of a cycle. This was first seen September 21st. Reasoning that he never had experienced such trouble back in Japan using Prof. Ametani's Cable Parameters program, LINE CONSTANTS was the only thing Mr. Noda could believe was wrong. Not at all convinced at first, Dr. Tsu-huei Liu converted the 500-kV BPA data from LINE CONSTANTS to CABLE PARAMETERS format, with Robert Hasibar supplying critical missing values of resistivity. Work was completed before noon on September 22nd, and Mr. Noda rapidly demonstrated his success to an amazed audience. There was no trouble fitting, and a normal-looking plot of receiving-end voltage concluded the subsequent simulation. To summarize, a 10-year-old skeleton has fallen out of BPA's EMTP closet. As a likely culprit, Dr. Liu quickly found Equation 5.8 in BPA's EMTP Theory Book. Above this, Prof. Hermann Dommel wrote about his subroutine TUBE (not available in Portland). Note the following mention of Prof. A. Ametani and his reference [149]. This would seem to be the first known published correction of trouble that remains in BPA's EMTP and ATP today.

DCNEW-13 and 14 are two additions to standard benchmark test cases that illustrate usage of the new Noda frequency dependence. All NODA SETUP usage is being confined to the first of these, which produce the DCN14*.CCC punch files that are used as input for ARMAFIT (Mr. Noda's fitter, which remains a separate program that runs under Salford DBOS). Batch file DCN13.BAT then runs the fitter for all these subcases, and also graphically displays plots that summarize the order and quality of the Noda approximations. The graphs are produced by Mr. Noda's separate DOS (not Salford DBOS) plotting program PGVGA. Finally, disk files DCN14*.DAT that are created by ARMAFIT are used by the simulations of DCNEW-14. Comment cards describe the different configurations, which begin with single phase (like DC-37), but include both single and double-circuit, 500-kV, overhead BPA lines.

Type-59 S . M . Damping Error ?

Damping of the Type-59 S.M. was of concern to Douglas Selin of Arizona Public Service in Phoenix (USA). In public E-mail of the Fargo list server from address **dselin@apsc.com** , Mr. Selin began as follows on September 27th : *"At the end of last week I sent a memo to ATP developers at BPA and to EPRI. This ... documents a problem with the Type 59 synchronous machine model as currently implemented in EMTP (both ATP and EPRI versions). A copy of this document is now available on the server .... in a file named pub/atp/dcase/typ59prb.mw6 (the file is written in Microsoft Word ver. 6.0)."*

The memorandum is nearly 4 pages long, and it includes Figure 1, which is entitled *"Undamping as a function of load."* This summarizes the complaint -- that Type-59 modal damping varies too much with load. Mr. Selin concluded: *"From our tests, we have concluded that the Type 59 synchronous machine model has a problem with either the code or the basic equations which were used to define the synchronous machine. The result is that the program does not properly represent the torsional interaction phenomenon of SSR when the study machine is loaded. This has implications for FACTS modeling where a FACTS device is used to control unstable system conditions. Only subsynchronous modes were investigated."*

News about Intel Pentium

Another flaw affecting Pentium PCs is being talked about, and once again Intel seems to be responsible for keeping consumers (including IBM) ignorant as long as possible. A summary was provided by Robert Meredith of NYPA (the New York Power Authority in White Plains) in E-mail dated August 15th *"Turns out that there is a bug in a widely used RZ1000 chip made by PCTech and used on about 1/3 of all pci motherboards. Its an EIDE controller chip. On multitasking O/S it corrupts data and executables on the hard drive, building up errors over time. It seems that Intel and Microsoft knew of the bug but kept quiet for over a year. Microsoft wrote winNT3.5 code and Win95 code to work around the bug. Intel changed its bios to avoid the bug. Everyone else was left hanging. .... The problem became public over the last couple of weeks, when Powerquest, the makers of Partition Magic, identified the source of a problem affecting use of their software. There were hundreds of posts on* ***comp.os.os2.bugs*** *last week."*

"IBM PowerPC fizzles under Intel strength, scarce software" reads the headline of a story on page 57 of the October issue of *Computer Shopper*. *"Except for Apple's delivery of about 2 million Power Macintosh models, PowerPC systems remain scarce .... Three factors weigh against the PowerPC's chances of success. First, software vendors have not exactly bought into the plan. Second, the cross-platform concept .... remains vaporware instead of hardware. And finally, time is running out as Intel Corp. drives its next-generation P6 right into the PowerPC's prime target market of high-end servers."*

Miscellaneous Intel PC Information

A conventional FAX machine can be converted into an optical scanner if one selects the right modem. This interesting prospect is mentioned on page 497 of the August issue of *Computer Shopper*. In a review of model VFP 14.4V by Zoom Telephonics, one learns the following: *"When you want to use the modem's scanning features, you plug your fax machine into the VFP's 'phone' jack and load the document as if you were faxing it. Then you set your fax machine to dial a specific five-digit telephone number. This number activates the VFP's HotScan feature, which in turn scans the document. The image then appears in your fax software."* Of course, resolution is limited to that of the fax machine (typically 200 by 200, which is terrible by computer standards).

Hard disk prices continue to drop. On page 367 of the October issue of *Computer Shopper* will be seen the price of $179 for an 850-Mbyte Conner drive. This is offered by Drive Outlet Center (DOC) in Mundelein, Illinois. Or, if more space is needed, try a 1274-Mbyte Samsung drive for $214 --- just 17 cents/Mbyte.

USB, the Universal Serial Bus, is a new standard that should make the connection of multiple peripherals easier. A story about it begins on page 574 of the August issue of *Computer Shopper*. In this, William Wong reports: *"Due to tremendous industry support, USB is predicted to appear on all types of computer systems, not just Intel-based PCs. While it will take one to two years for USB to blossom, we may see some products by year's end. .... USB was designed to make cabling as simple as plugging in a telephone. After all, you should be able to plug a peripheral directly into your PC without any hassles."*

120-Mbyte floppy disk drives were mentioned in the preceding issue. That was about Compaq. CompuServe provided more information in its September magazine, and a different company was involved. On page 9, the headline reads: *"Causing a commotion: Iomega's Zip drive."* The round numbers are $200 to store 100 Mbytes of data on a $20 disk. Iomega Corp. has headquarters in Roy, Utah. *"The drive offers a maximum sustained data-transfer rate of 1.4 MB per second and a 29-millisecond average seek time. The peripheral works with all standard software, including data-compression products."*

CD publishing is the way Austin Direct advertises a computer with a writable CD drive in its monthly catalog for July. *"Build your CD publishing empire"* is the headline for page 8 that describes its expensive ($8K) new PC that is named CDMS-ELS. One can only conclude that the creation of CD-ROM storage for others is still a little too expensive for casual consideration. The user group can (and will) afford to wait. Added information was learned during an August telephone conversation with computer expert David Szymanski. Beyond the issue of price, there is the issue of the mode of writing. Yes, one can write the typical, cheap, CD drive from beginning to end as one would write a magnetic tape. So, writable CD drives should be great for file backup. But what about the random addition of individual files of unpredictable size? Not so easy, it would seem. For such use, those 120-Mbyte floppy disks look increasingly attractive.

A $400 PC to run Salford EMTP and TPPLOT? Yes, in the form of a slow 386 SX. Page 753 of the August issue of *Computer Shopper* is filled with various bargains from Dollar Computer Corporation of Santa Ana, California. One of the boxes reads as follows: *"IBM desktop with IBM monitor. 386 SX/20 MHz; 2 MB ram; 40 MB HDD; 1.44 or 1.2 floppy; 101 keyboard; VGA card. $399."*

Miscellaneous Small Items

Hewlett-Packard (HP) Unix has a new ATP version thanks to the work of Prof. G. Corwin Alexander of Oregon State University in Corvallis. This began on August 11th when he supplied notes that detailed his modifications of Sun ATP FORTRAN for use with HP during the spring of 1991. This time, a separate translation was established using files HP*.*, and the first HP translation was sent to Corvallis by E-mail on August 14th. Look for more information next time.

The sharing of a printed copy of the newsletter within each geographical site is a requirement of subscription, recall (see the subscription form). Well, Westinghouse in Pittsburgh, Pennsylvania, USA, at that famous 1310-Beulah-Road address, provides an excellent illustration of compliance. In E-mail dated August 14th, Mack Lund wrote: *"I have been placing the newsletters in a binder and have the binder in our department library, available for everyone to read them."*

/G_FLOAT is the DEC VMS compilation qualifier that is needed for double-precision floating point like that used by other vendors. BPA's Randy Suhrbier contributed this information on August 11th when he was called upon to solve an overflow problem of VAX/VMS ATP user Dan Goldsworthy. First, he executed on Alpha under Open VMS, and found no trace of the overflow. I.e., DEC seems to have switched the default setting for use with its newest hardware. When asked whether software emulation might have been involved in the earliest of days (i.e., for the original VAX-11/780), Mr. Suhrbier said that he did not believe so. In any case, there seems to be no speed loss today for those who switch to the use of lower precision and greater range. How many bits have changed? Probably 3, which would imply a factor of 8. Since its first use in March of 1989, 10**38 has been the approximate limit of VAX floating point whereas

Salford EMTP regularly displays undefined numbers in excess of 10**300. Simply because the use of DIFF on all DC*.LIS benchmark solutions would experience a discontinuity, developers are not anxious to make the change now. Maybe later when there is more free time.

USE SEATTLE XFORMER is the special request word that indicates a desire to use the 3-phase, saturable transformer model of Prof. Xusheng Chen, who teaches at Seattle University (Washington, USA). Background can be found in the January, 1993, newsletter. Well, Prof. Chen was in Portland for the 1995 IEEE PES Meeting, and he spent the afternoon of July 25th at BPA. The two subroutines associated with Prof. Chen's model, XFCHEN and PMB, were updated at that time. The answers of the third of three subcases of DC-31, which illustrates such usage, have changed noticeably as Prof. Chen might explain in some future mention. For now, it is sufficient merely to note the change, which is documented on comment cards of the data case. Prof. Chen continues to work on transformer modeling within ATP, although no longer supported by a BPA contract. At the Portland meeting, he presented his latest IEEE paper, it is understood. Prof. Chen talked about the possible addition of a 3rd (tertiary) winding.

EPST'95, an International Conference on Power System Transients, was held at IST, the Technical University of Lisbon, Portugal, on September 3rd through the 7th. A creation of IST Prof. M. T. Correia de Barros (the corona modeler), this meeting was attended by many ATP users. A copy of the 563-page bound Proceedings was brought back to Portland by Laurent Dubé, and it certainly does look professional. Unlike IEEE meetings, most who attended the Lisbon conference seemed to be authors of papers. Of greatest immediate interest in Portland was the contribution by Peter Kuffel, Kelvin Kent, and Garth Irwin from Winnipeg, Manitoba, Canada. See pages 499-504. More about this next time.

Electrical System Analysis (ESA) is the company that grew out of engineering consulting by Chet Davis. It is located in a southern suburb of Portland, and last was mentioned in the April, 1991, newsletter. Imagine your Editor's surprise on July 17th when, in E-mail from Croatia (the former Yugoslavia), Prof. Srete Nikolovski of the University of Osijek named this as the source of a computer program that he liked. EASYPOWER is the load flow and short circuit program having graphical interface that he had recommended for educational use in public E-mail of the Fargo list server dated July 4th. For universities, the price was said to be low enough: $175.

Free printed copies of the 20-page July newsletter were mailed by First Class (air) to 9 Canadian and 74 American addresses on August 15th.

PL42MAT is the utility that will convert an ATP .PL4 file into a signal file for MATLAB (from The Math Works, Inc.). This was explained in the April, 1994, issue. On August 25th, public E-mail of the Fargo list server announced improvements by Massimo Ceraolo at the University of Pisa in Italy. The new version was announced as follows: *"pl42mat 2.1 contains the following other improvements over pl42mat 2.0: 1) The naming rule of MATLAB variables now can handle also ATP names with embedded blanks .... 2) Previously the Synchronous Machine variables were simply identified as TACS variables; now they are more precisely identified as SM variables. 3) Previously no support was present for files containing multiple U.M.'s and multiple S.M.'s, now this support has been added. .... I hope that every one using the routine will upgrade soon. I keep waiting for possible additional bug reports. I think that a strong limit still present in the routine is that it is* ***very*** *slow with big files. This problem will be approached in the near future, asking Laurent Dubé to compile the source code (in C) with his Salford compiler."*

Using NORUN = 1 within the STARTUP file was explained in the January newsletter. Until August 25th, however, there was no protection against overflow of input data card limit LIMCRD during $INCLUDE use. Using data from Jules Esztergalyos, it was discovered that the inclusion simply was truncated at the storage limit, so was incomplete. Had normal execution followed, a correct error message would have been issued. But it was not --- because the special NORUN usage bypassed such protection. So, added protection was added at DO 4273 within OVER1.

That Microsoft PowerStation compiler is of interest once again. Recall that the April, 1994, newsletter had a story about the pioneering work with MS PS by Stephen Boroczky of Electricity Transmission Authority (formerly Pacific Power, and before that Electricity Commission of New South Wales) in Sydney, Australia. At the time, the compiler was found to be usable, but less than obviously desirable. So, Bill Gates would seem to have told his workers to try harder. Information about a new version came from computer expert David Szymanski in E-mail dated September 15th: *"If you have access to the World Wide Web, look at:* ***http://www.microsoft.com/DevOnly/*** *Click on PRODUCTS, then MS FORTRAN. Then click on WHITE PAPERS, DATA SHEETS, FAQ, COMMENTS, and A NEW ERA ...."*

Yin Yuexin, graduate student at the University of Florida in Gainesville (USA), has left the campus after satisfying all requirements for his Ph.D. degree during three years of hard work and study under the guidance of Prof. Dennis Carroll. This was the bad news that was received in E-mail dated September 22nd: Prof. Carroll has lost an important collaborator for his annual spring ATP short course! The trouble with graduate students is they graduate (joke). Nonetheless, all involved are happy for Dr. Yin, and wish him well. Initially, he will be working in or near Atlanta, Georgia, it is understood.