
Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Salford FORTRAN Compilers

The opening prompt ("*EMTP begins ...*") of OVER1 was split October 23rd ... Thus began a paragraph in the preceding (January) issue. A modification to PRMSPY was mentioned, and this was generally correct, but insufficient. Exactly one month later (November 23rd), further change was made because **Backspace** behaved improperly. Instead of the cursor moving left one byte, it

jumped to about column 4. Your Editor had failed to distinguish between real prompts (which require holding the cursor) and non-prompts (without a colon, the cursor is not being held). Also, it turns out, there is a distinction between batch-mode use and interactive use (the cursor must be disabled for the former in order to avoid cosmetic corruption of the first line of SPY output, as demonstrated by DC-56 and DC-57 solutions).

Virtual common is Salford's name for storage that is paid for only if and when it is used. For more than a decade, this enormous advantage of Salford's DOS extender named DBOS has been appreciated. While examining a description of Salford's FORTRAN compiler FTN95, your Editor found the following at the Salford Web site on October 25th: "*FTN95 supports the concept of virtual common blocks. Using this facility, the linker binds a common block to a region of address space where memory is allocated on demand. This means that a single executable can handle problems of widely different sizes. Again, the idea for this facility comes from DBOS, where this concept was available automatically!*" About Salford's use of the term prior to F90 or F95, see a brief mention in the July, 1996, issue. Well, it would seem that the desirable feature has been carried into F95, even though significance is not appreciated. With the ability to create storage arbitrarily and dynamically at execution time, the need using F77 seems to have disappeared. In fact, the use of COMMON has disappeared for storage of consequence (Masahiro's Kan's revolution proposal). It is not obvious what if any significance Salford's virtual common might have for F95 ATP. If TPLOT were converted from FTNF77 to FTN95, presumably dominant storage for it, too, would use ALLOCATE rather than COMMON.

News from Outside USA and Canada

Translation among foreign languages has been of interest to your Editor for years, and mention of promising freeware to do the job was heard while listening to the Kim Komando radio program (see www.komando.com) on October 28th. A day later, your Editor visited the recommended Web site www.babylon.com and was pleasantly surprised. At the beginning, under the heading "What we do," the following was found: *"Bringing a world of information to users' fingertips in a single click, Babylon.com's freeware instantly unlocks everything from definitions to translations to conversions. Babylon's platform enables individuals, businesses and organizations to easily share their own expertise with millions of Babylon users worldwide."* Note the key word *free*. Of course, your Editor downloaded the 1536-Kbyte `babylon31.exe` (the price was right). History of this product is fascinating if only because it is so recent and unusual: *"Babylon.com's inception came in 1995 when Amnon Ovadia, who now leads the company's R&D efforts, began development of a software program capable of translating words without disturbing the reading process. Less than 18 months later, Ovadia shared the first version of Babylon.com, an English-to-Hebrew translator, with Babylon's CEO Shuki Preminger, who then ran a small consulting firm. Together, with financial backing from Mashov Computers, they opened Babylon.com for business and continued the development process full-time in 1997."* So, the effort began with Hebrew, but has since spread to more common languages such as French (in which your Editor has interest) and Chinese (two dialects).

What is the status of Oriental language for ATP output within MS Windows? Today, this could be for use with either Mingw32 or Watcom ATP; and soon one will be able to add the F95 alternatives from Lahey and Salford (see recent newsletters). Meanwhile, what has happened to possible use of Oriental languages? It is curious how this detail has been ignored for years, as program developers concentrated on other things. All was understood for both Japanese and Chinese using real DOS to support Lahey ATP within the classic 640-Kbyte barrier. See pages 31-39 of the December, 1988, issue of LEC's journal *EMTP News* for a paper entitled *"Japanese and Chinese languages connected to ATP version of EMTP,"* by Naoto Nagaoka and Chun-Heng Chiang. But this was prior to Mustafa Kizilcay's revolutionary discovery in September of 1989 that the Salford compiler FTN77/386 could handle ATP using virtual memory. In the January, 1992, issue, a paragraph begins: *"Chinese language would seem to be compatible with Salford EMTP and TPLOT according to two pages of FAX dated January 14th from Chun-Heng Chiang of Taiwan Power Company."* A year later (January, 1993), the subject was mentioned again, but with less certainty. About Oriental language, your Editor terminated a paragraph as follows: *"It would be nice if the Salford compiler somehow could be shown to be equally tolerant."* As best BPA's Dr. Tsu-huei Liu and your Editor can recall, nothing specific ever was done. Now, about 8 years later,

primary interest is in ATP versions for MS Windows rather than Salford DBOS-supported Salford EMTP. Who in the Orient has an idea how to extend that great 1988 work from MS-DOS to MS Windows?

Quality of the 400-Hz power of air planes or ships (dirigibles) was of interest to Chris Severns of CargoLifter in Brand, Germany. As Web site www.cargolifter.com shows after a click on the English button, helium-filled airships seem to be the item of interest. *"Site Briesen-Brand"* is the title of a paragraph that explains the following: *"This site, 60 miles south of Berlin, where the giant CargoLifter dock hangar is being built ... was formerly a Soviet military airfield."* Fascinating. In E-mail dated November 13th, Mr. Severns had inquired about EMTP while mentioning other tools of the power-quality trade: *"I'm familiar with Saber and various SPICE tools. I've been happy with Saber, but I think it is too expensive / over kill for my application (e.g. I'm not doing SMPS design)."* Your Editor's reaction was guardedly optimistic: *"In theory, I can think of no reason to believe there would be trouble. Both 50 and 60 Hz are common uses, so changing to a third frequency should not be a problem, from what I can imagine. Yet, I am not sure I could locate another user of 400 Hz."* Of course, both EEUG and the new ATP Web page were recommended.

"A Spanish/Portuguese ATP forum" was the big news mentioned by Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. In E-mail dated November 15th, Mr. Hevia explained that participation *"is limited to licensed users, and it is moderated. The same rules of ATP-EMTP-L will be used, but with two differences: 1) the language (of course!); and 2) files may be attached to messages. This last point later might be changed if more of a problem than a solution."* This was the first report following an Argentine user group (CAUE) meeting *"in Buenos Aires. This bus travel is really tiresome."* Unlike the service from either Fargo or EEUG, CAUE has chosen to use someone else's mailing machine, and this does not involve Listserv software. The name eGroups was seen for the first time by your Editor, and Mr. Hevia explained that it *"is supported by Yahoo, but there is no trace of Yahoo on the Web page or within messages. There is only a small eGroups logo in the left-upper corner of the screen. The email address of the list is atp-caue@egroups.com ... and the list owner is Ing. Raul Bianchi Lastra of Universidad Nacional de La Plata."* In response, your Editor had asked: *"Yahoo is involved? Interesting. But how is this paid for? How does Yahoo make money on the deal?"* Later that same day, Mr. Hevia explained: *"I asked Bianchi Lastra ... Yahoo bought eGroups recently. You can see more of this under 'About egroups/Partners with us.' ... use of eGroups is free if one allows publicity on the Web page (not in the messages, which for now are free). If you pay 60 US \$/year, no publicity on your Web page. But the average Argentine prefers the publicity to payment!"* Right. This is comparable to Dr. Tsu-huei Liu's free E-mail from Juno (the price is right).

The Indian ATP user group (IAUG) is headed by M. V. Hariharan, Prof. Emeritus of IIT Bombay. In E-mail dated December 6th, Prof. Hariharan invited the Japanese and Can/Am user groups, and Prof. Ned Mohan at the University of Minnesota, to investigate and comment upon a prototype version of the new IAUG Web page: *"I am happy to inform you that Mr. Harish Mehta, Founder Director of a group of Power System Design & Consulting companies in the city of Bombay ... has kindly come forward to provide space in his company's website for Indian ATP activities. He, along with Dr. Rajamani, who is Chief Engineer in the same company ... uses ATP intensively for design and development. ... The website address where Indian ATP user group list will henceforth be maintained and other activities of Indian group will be posted is <http://www.powersystemconsultant.com>"* Eight days later, your Editor and Dr. Liu responded with a lot of observations. About use of a consulting company's Web site: *"Yes, this makes sense to us. If you do not yourself have direct and free access to a Web-based presence, why not seek the cooperation of someone who does? Imposition on users is minimal, it seems to us. The link is prominently seen on the home page. ... Of course, your association should be with someone who has knowledge and interest in ATP."* About color pictures of IAUG officers: *"The pictures provide a nice, personal touch. Yours may be the first user group to offer such information"* about its officers.

More about the Internet and E-mail

A virtual safe-deposit box? *"Major bank introduces online safe-deposit box"* is the unusual title of an AP story found at the Web site of ABC News. Dated October 11th, this explains that a room containing locked metal boxes is not involved. Instead, the new service offers safe storage for valuable digital documents. *"FleetBoston Financial Corp. on Tuesday launched an online safe deposit box system called fileTRUST, calling itself the first major bank in the country to offer the service. The virtual boxes are initially aimed at small business owners and will offer 24-hour access to whatever digital information a customer chooses to store inside them. ... introduction by the country's eighth-largest bank could make virtual safe deposit boxes more widely available, analysts say."*

Junk E-mail is cheap and easy to send. This according to E-mail advertising for software to do the job. *"10 Million E-Addresses, Stealth Mass Mailer & More.. 17710"* was the *"Subject:"* of a message received by Dr. Tsu-huei Liu at BPA on November 7th. MS Outlook 98 indicated that this was *"From: xs24@netease.com"* and *"To: Undisclosed. Recipients@marble.bpa.gov"* The pitch was as follows: *"Email advertising WORKS! Email Advertise your product or website to millions for only \$99. For \$99.00 you will receive the Stealth Mass Mailer Software, List Manager, Over 10 million email addresses, and as a free bonus, a Bulletproof mail server to send your mail through."*

NEVER, lose your ISP service again. For more info, just respond to this message, with '\$99 Special' in the subject line."

Grocery shopping via the Internet has troubles more fundamental than Priceline financing (see January issue). Some of these are exposed in a Kiplinger story dated November 3rd. The humorous summary is this: *"Online grocery shopping has been around for some time ... Simply register, roam the virtual shopping aisles for stuff that you need, type in your credit card number and -- voila! -- you'll have your groceries delivered within a few days. That's right -- a few days. A couple of services say they'll deliver the next day but warn that popular delivery times disappear fast. So you can forget using grocery delivery when you discover at 9 p.m. that you need milk for your cereal the next morning."* Even if time were not a problem, there is the disadvantage of price. For example, Netgrocer offers *"nationwide delivery within four days via FedEx. Delivery charges range from \$5.99 (for orders less than \$60) to \$120 (for orders more than \$1,200). Offers everything from crackers and condiments to Barbie dolls and baking tools, but delivers only nonperishable items."* Investors who expect to make a profit from **this** business model deserve to lose their money.

ICANN was mentioned without explanation in the preceding issue. Now, there is space for clarification. *"Seven more dots"* is the title of an AP story dated November 17th that was found at the Web site of ABC News. The subtitle is *"ICANN announces first new domain names since the '80s."* The story begins: *"An Internet oversight board gave the Web a new batch of domain names Thursday ... The decisions by the Internet Corp. for Assigned Names and Numbers capped a half-decade of discussion about how to relieve the crowded field of addresses ... The new suffixes could appear in use by the middle of next year. ... ICANN approved .info for general use, .biz for businesses, .name for individuals, .pro for professionals, .museum for museums, .coop for business cooperatives and .aero for the aviation industry."* But why ICANN, and why now rather than long ago? *"New suffixes have been under consideration since the mid-1990s, but there were disputes over how many, which ones and registration. ICANN was designated by the Commerce Department in 1998 as the overseer of domain names and online addresses."* Of course, big money is involved: *"Companies proposing new suffixes paid \$50,000 for the chance to become record keepers for the new names. As registry operators, they would be able to charge a few dollars per name registered, an amount that could add up to millions of dollars for the most popular suffixes. In all, 47 applications were received by the Oct. 2nd deadline."* Finally, what about some popular but losing proposals? *"Board members rejected .kids for children and .health for pre-screened health information. They also dismissed .tel for telephone numbers, .geo for Web addresses based on location and .web over concerns that it has already been unofficially registered."* A CNN story the same day

provided more information about money. About the suffix expansion: *"The action drew cheers from industries seeking the expansion and jeers from critics who said ICANN unfairly favors large corporate interests over individual Internet users."* It seems the democracy leaves something to be desired: *"ICANN has been embroiled in controversy since it was created in 1998 by the United States government to oversee the domain name system. About half of the board members were chosen on ICANN's inception, with the other half chosen by constituencies within ICANN. ... That has led to accusations of nepotism, and over-representation by corporate and big business interests instead of regular Internet users, especially outside of the United States, and calls for ICANN's abolishment. To assuage critics, ICANN earlier this year held a direct election via the Internet for five new board members, who did not start their terms until after the board meeting."* These stories followed the recent annual meeting, which was held in Marina del Rey, California. About big business, let's return to that \$50K. *"New suffix bids cost \$50,000"* is the title of a CNN story section that explains: *"companies or groups proposing new suffixes paid a nonrefundable \$50,000 fee for the chance ..."* The key word here is *non-refundable!* So, there were 7 big winners and 40 losers --- each of whom lost \$50K to a government-created, monopoly? Amazing. Maybe this is a model for the new, re-engineered BPA (beware!)?

Conversion of E-mail from HTML to plain text usually (but not always) is possible using "Reply" of Outlook 98. Of course, most E-mail is plain text, not HTML. But some persons seem to prefer the waste of HTML (typically there is no good reason for its use), and this makes reading at BPA more difficult (e.g., the font usually is smaller, and sometimes message background is white). So, your Editor normally will use "Reply" to switch to plain text. But this did not work for a November 19th message from Zhang Zhongyuan of the North China Electrical Power University, however. As your Editor summarized the preceding day (remember the international dateline): *"Your E-mail is viewed here at BPA using MS Outlook 98 under Windows NT. Rather than plain text, it is graphic (HTML). ... Somehow, your message was different. I first attempted a 'Reply' followed by a click on 'Format --> Plain text' (movement of the check mark from the HTML alternative to the text alternative). Usually, this works. Usually, the result is plain text. But for your message, the result was just 3 garbage bytes. I suppose Chinese language somehow is involved."* Fortunately, a less-convenient alternative occurred to your Editor: *"I saved your message to disk as plain text. This **did** work. Using MS-DOS EDIT, I was able to see your message (although without line breaks, which I added manually)."*

Yahoo troubles in France have been much discussed during recent weeks, and *"Joe Clancy, CNN.com Europe writer"* wrote a good summary dated November 21st, which was the day after the famous trial in Paris. The story title is: *"Web worries over French site ban."* This begins: "A

landmark ruling in France ordering Yahoo! to prevent French users from accessing sites selling Nazi memorabilia has raised fresh challenges for companies struggling with the laws of cyberspace. Web sites must now be wary of finding themselves liable to the laws of the land in all the countries able to access the material it publishes. The Internet industry fears the judgement could lead to a wider censorship of the World Wide Web by national governments." A Yahoo spokeswoman is quoted as observing: *"There are more than 180 countries in the world and if every Internet company in the world has to abide the laws of each of those countries, it is obvious how stifling that would be."* A later story section is entitled *"Legal minefield."* This begins with the explanation that *"it is not just Yahoo! that need to be vigilant."* Plenty of other businesses are affected: *"The ruling will also hit companies like Website designer Bluewave, which must now advise clients of the risks associated with operating in France."* So what did the French court consider? *"The French case against Yahoo! has turned on the issues of whether an Internet service provider (ISP) or portal is liable for distributing illegal material, and whether it should or could block access to that content."* Is the French decision a sign of larger future troubles? *"Opinions worldwide are split between those wanting to uphold the freedom of Internet speech at all costs, and those trying to find compromises that respect the open nature of the web while protecting vulnerable people. The laws of the Internet are still evolving in most countries, but the European Commission enshrined its approach with a little-noticed directive that came into force on July 17. The Electronic Commerce Directive states that a company storing Websites on its computers -- a business known as hosting -- is not liable for distributing illegal material if it is not aware of its existence. 'But if you become aware that information is illegal you must immediately remove it or bar access,' said Mike Rebeiro, an e-commerce lawyer at Norton Rose in London."* It seems that a similar law already has been tested in Britain. Although settled out of court, *"the impact of the case ... has been that ISPs are now quickly removing contentious material rather than running the risk of involvement in long legal debates. ... Other countries have taken the opposite approach. The U.S. has ruled that an ISP is not responsible for defamatory messages. And Germany took a similar stance last November, when a court overturned a conviction against the local head of CompuServe ..."*

"The Battle for China" is the title of a Reuters news story by Chee-May Chow in Hong Kong dated December 4th. This was found at the Web site of ABC News, and had subtitle: *"U.S., Chinese companies fight over domain name control."* The story begins: *"A dispute between the United States and China over the control of Chinese-scripted Internet addresses deepened today as China reiterated its claim over all Chinese language Internet domain names."* The Chinese organization is China Internet Network Information Centre (CNNIC) whereas the American company is VeriSign Inc. *"which began offering*

registrations in Chinese with .com, .net and .org extensions last month. VeriSign has identified mainland China as a key market with its rapidly growing Internet penetration. The company established itself at the top of the Web registration business through its US\$20 billion acquisition of Network Solutions Inc. in June."

Priceline was not the only Internet bubble to burst since March of 2000, and the collapse mentioned in the January issue has continued. Bob Brinker mentioned a 95% loss as of the second quarter of October, but that was far from the bottom. When your Editor checked M* during the morning of January 3rd, the 52-week high remained \$104.25 but the low had dropped from \$4.63 to \$1.06 and the current loss sat at 98.59%. Yet, such disastrous performance of a technology stock is not exclusively American, it should be emphasized. An AP story found at the Fox News website www.foxnews.com on New Year's Day has title "*Belgian boosters left speechless by spectacular collapse of Lernout & Hauspie.*" The story comes from Ieper (Ypres), and it emphasizes the difference a year can make: "*As 2000 dawned, the people of Flanders couldn't have been prouder of Jo Lernout. The former high-school science teacher's ideas about speaking to and through computers made him a player on the world's high-tech stage ... Shares in his software company soared. His neighbors fervently poured their savings into what looked to be a sure winner in the New Economy. ... Now, as the year comes to an end, these same investors in northern Belgium are sick with worry after Lernout & Hauspie Speech Products NV's spectacular crash amid accusations of financial misdeeds. Thousands of them follow the company's legal twists and turns like a soap opera on evening newscasts, desperate for hints that any of their investments can be salvaged. Some \$10 billion in market value evaporated as L&H shares sank from more than \$72 each on the Nasdaq exchange in March to less than a dollar this month on the over-the-counter market.*" Losers were not limited to small Belgian investors, either: "*Microsoft Corp. put \$45 million into the company, with Intel Corp. adding another \$30 million.*" It all sounds a lot like tulip mania in neighboring Holland during 1636 and 1637. Any reader unfamiliar with this true story about tulip bulbs is referred to Mike Dash's "*Tulipmania*," a new paperback book of 288 pages just published by Crown.

European EMTP User Group (EEUG)

The year-2000 annual meeting of EEUG was held in Poland September 25th and 26th on the campus of Wroclaw University of Technology. Most of the following summary has been drawn from the official minutes of the meeting, which were submitted to EEUG members by Chairman Mustafa Kizilcay and Secretary David Bailey (the latter with Merz and McLellan in New Castle upon Tyne, England). The local host was the Institute of Electrical Power Engineering of the university, with Dr. Marek Michalik responsible for most details.

Summary meeting statistics seem favorable. Some 36 persons were registered to attend the presentation of 14 papers at three technical sessions that occupied Monday and Tuesday morning. This was followed Tuesday afternoon by the members-only meeting, which was attended by 20 members. Finally, the following day, 33 persons attended a one-day course on frequency-dependent line and cable modeling. This was taught by Prof. Akihiro Ametani of Doshisha University in Kyoto, Japan, assisted by Dr. Yoshihiro Baba of the same school. According to the minutes, "*numerous cases of line and cable modeling applications and comparison with field measurements were illustrated.*"

Size and stability of EEUG were summarized as follows: "*As of 31 December 1999, total assets ... amounted to DEM 67893.27*" (about 33K American dollars when converted January 17th) and "*total number of members was 138. 70 members were from universities/educational institutions, 63 were from companies and 5 were honorary members.*" Among the final five was newly-appointed Gabor Furst of suburban Vancouver, B.C., Canada.

About the future, what will happen to EEUG when the present 4-year term of office of founding father Kizilcay expires in 2002? Upon accepting his second consecutive term as Chairman in 1998, Prof. Kizilcay declared that it would be his last (see the April, 1999, issue). Of course, Prof. Kizilcay lives in Germany, and he is the one who handles details required by German law (EEUG is a non-profit association). So what will happen if the next EEUG Chairman might not reside in Germany? Dr. Murari Saha of ABB in Sweden requested consideration of this important detail. The minutes explain: "*EEUG is being operated according to German law now. The Executive Board was asked to examine to change the status to become a European association within 2002 if possible.*" Needless to say, your American Editor does not understand European legal ramifications, and he wonders how many Europeans do. National law is clear enough in principle, although details will vary from country to country, naturally. But European law? If this is anything similar to United Nations law or NATO law, your Editor already is more than a little nervous. This peculiar complication of a multinational user group seems worthy of careful attention.

Membership fees remain unchanged for a year. Good news: no increase to cover inflation. "*The Executive Board that met on Sunday ... recommends ... not to increase or reduce the annual membership dues. Instead, the collected money should be spent to perform activities ... This proposal was accepted by the members unanimously.*"

Keeping track of EEUG money is important business if only as a matter of self-preservation (never forget how money vanished at K.U. Leuven in Belgium prior to the closure of LEC at the end of 1993). The minutes state: "*To inspect the bank and cash accounts of the fiscal year 2000, following auditors were elected by the members: 1) Dr.*

Lutz Hofmann, University of Hannover, ... 2) Mr. Johannes Elwardt, Sachverstaendigenbuero Prang, Berlin ..." The former continues in his role (see the April, 1999, issue) whereas the latter is new to your Editor.

ATP developers clearly share various interests with EEUG, it is noted. The minutes state: "... activities and budget for the year 2001, following projects were proposed by the Executive Board to discuss with the members:

- .. Publication of EEUG News periodically
- .. Enhancement of the EEUG Web pages
- .. Establishment of a Web file server
- .. Enhancement of the ATP Control Center
- .. Maintenance of the new ATP mailing list ...
- .. Theory Book in HTML format
- .. ATP Rule Book in PDF format
- .. ATP knowledge base/data mining
- .. Support of development of PlotXY/PCPlot
- .. Book of ATP case studies"

That previous mention of HTML is explained in more detail: "Drs. Jorge Blanes and Jorge Rodriguez from Universidad de Leon, Spain, had provided EEUG with a CD-ROM that includes EMTP Theory Book in HTML format for distribution to EEUG members. These HTML documents were not delivered to the members on the CD-ROM for 2000. It seemed necessary to edit them partly to improve legibility. Particularly, some background graphics should be replaced and equations in GIF format should be magnified. Part of the HTML documents will be put onto password-protected area of the EEUG Web site to give chance to members to review them. EEUG will ask developers of the HTML version of the EMTP Theory Book to improve them against payment." Your Editor's question: why use WWW language HTML rather than PDF-format files for free Adobe Acrobat reader? Books such as the Theory Book or the Rule Book are so big, why encourage slower on-line access rather than much-faster and reliable local access? One reason might be universality: all known modern computers are Web-compatible whereas not all might offer a free PDF reader. It would seem that members had some of the same questions. The minutes state: "ATP Rule Book available in an electronic format, i.e. Adobe Acrobat PDF format, is mostly favored by members. ... Alternatively, it has been suggested to convert the ATP Rule Book in HTML format that would be available on-line through secure Web pages. Two arguments were against HTML format: The amount of work will be higher and HTML documents cannot be formatted page-wise."

About windows and graphics: "EEUG will support the development of PCPlot or even of PlotXY, if this would be possible. PCPlot development was postponed at moment because of preference given for ATP Control Center. Both programs PCPlot and ATP Control Center for Windows 9x/NT were developed by the same person, Mr. D. Celikag." Of course, PlotXY comes from Massimo Ceraolo at the University of Pisa in Italy. About the final name, Deniz Celikag is understood to be a private

contractor in Hannover. "Enhancement of the ATP Control Center (ATPCC) has been started already, ..." although details will not be reprinted here.

"ATP knowledge base and data mining facilities using Adobe Acrobat PDF documents and indexing feature of Acrobat have been proposed by Mr. Prikler, Deputy Chairman. ... Such data mining facility has been provided on CD-ROM's of IEEE conferences, Mr. Prikler" explained. Interesting, even though your Editor knows nothing about the subject.

"An ATP case study book that will include typical ATP simulation cases is still on the to-do list of the Executive Board, Prof. Kizilcay stated. A sample document is available at the EEUG Web site. The members have confirmed that they are very interested in such a book. 10 members were ready to contribute to the case study book. This subject will be discussed in the EEUG mailing list."

Bristol, England, is to be the site of the next annual EEUG meeting. Dr. Hassan Nouri of UWE, the University of the West of England (formerly Bristol Polytechnic as explained at www.uwe.ac.uk), will be responsible locally for a meeting September, 3-4, 2001. A one-day course on FACTS modeling will follow on September 5th.

Watcom ATP for MS Windows

A 300-Mbyte paging file to link FGH-dimensioned Watcom TPBIG was mentioned in the preceding issue. Even this proved inadequate on December 12th. But other programs (WP 9, PFE, Outlook 98, and MS Word) were in use at the time, so all of these were shut down in an attempt to avoid yet another expansion. This time, it worked.

GNU Mingw32 ATP starts and stops much faster than Watcom ATP using Dr. Liu's 550-MHz Pentium III-based PC. Your Editor had speculated at the time of that memorable orphan debate (see the October, 1999, and January, 2000, issues) that Watcom could not regain its former lead in simulation speed because the fixed compiler would become increasingly non-optimal as Intel hardware evolved beyond the 200-MHz Pentium Pro-based PC then being used by Dr. Liu at BPA. Well, it would seem we did not need to wait long to observe the phenomenon. Recall RUN.BAT verifies all standard test cases DC*.DAT one after the other. In the July, 1999, issue, 3:10 and 2:51 (minutes:seconds) will be found for Watcom and Mingw32 ATP times, respectively. Of course, many test cases have been added since then (typically new subcases are appended to old disk files), so absolute times do not have much meaning. But relative times are highly revealing. Recently-created (during the past week) Watcom and Mingw32 ATP versions show the following execution times in disk files DATE.LIS : 4:45 and 3:46, respectively. Watcom did reasonably well, you think? Yes, except for one detail: Mingw32

ATP also is creating screen graphics, and each plot is being held on the screen for $D4FACT = 1.0$ seconds. There might be a couple hundred of these. Setting $NOCALC = 1$ to suppress all Mingw32 graphics except for DC-59 SPY PLOT (ignore DC-59, since not at all comparable) results in a reduction from 3:46 to 1:11 --- to be compared with 4:14 for Watcom after the subtraction of 31 seconds for DC-57 (artificially slowed by $TSTALL = 0.3$). Bottom line: Mingw32 ATP is much faster than Watcom ATP --- between 3 and 4 times --- for small data cases such as standard test cases. No question, Mingw32 ATP starts and stops much quicker using Dr. Liu's well-endowed Pentium III-based PC.

News About TACS and MODELS

Type-53 TACS devices are limited in number by fixed local storage $LOC53(40)$ of TSTACS. Unfortunately, prior to an addition on December 22nd, there was no prevention against overflow. The first victim to report trouble was Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. His E-mail dated December 18th explained the symptoms: *"I send now the data case UPLO60.DAT The case is from a Uruguayan system ... the case runs for a while, and then aborts with an access violation. This is true for all versions of GNU."* Curiously, Salford EMTP seemed to simulate correctly. In any case, the GNU ATP trouble was traced to your Editor's failure to limit Type-53 devices. Immediately, overflow is being trapped. Later, the storage might be variably dimensioned, if there is demand.

TACS2 provides the phasor interface to MODELS, and it was standardized and accelerated December 28th. First, Robert Schultz's vector zeroing (see $MOVER0$ in the January, 1994, issue) was not being used. Second, $DELTA1 / TWO$ was replaced by $DELTA2$ (why divide unnecessarily)? Third, there was lack of location at which a data error might be discovered. The familiar overlay number and nearby S.N. had been deliberately omitted by author Dube, so these were restored (change was required in $SUBR29$, too) when valid overlay and statement numbers are available. Fourth, the $DO 4010$ loop to locate inputs of MODELS wastefully was being executed on each pass of a frequency scan despite the fact that each later pass produced exactly the same answers as the first, and vector $IRFMDL$ already existed in $COMMON$ to store such results. Finally, a $CALL MAIN10$ statement was used to halt execution if an error was detected. But this involves recursion, which is not standard FORTRAN 77 (see the July, 1993, issue). So, code that did not meet ATP standards was normalized.

Lower case text in MODELS $WRITE($ statements became possible January 2nd. For years, your Editor had casually wondered why user-defined text always appeared capitalized in MODELS output. This was one of the more primitive aspects of MODELS (why should a user be

denied lower case?), and your Editor finally took the time to investigate. What he found in TREAD was not a pretty picture. Dube was converting all MODELS data to upper case. Of course, ATP has the capability of either, and an exclamation point is used to hold lower case if $KINSEN = 1$ requests a general conversion to upper (common practice). But Dube had disabled this feature in order to handle case himself, and this complicated other ATP input routines ($CIMAGE$ and $NEWCAS$) in the process. If the calendar could be turned back a dozen or so years, your Editor would simply order BPA contractor Dube to follow existing ATP rules. From what now is understood, this would have been easier and better for all concerned. But history can not be changed, and your Editor has little enthusiasm for modifications outside of MODELS after all of these years. So, only $WRITE($ statements are being intercepted within TREAD, and text is being converted back from Dube's capital letters to the user's original case. Both DCNEW-25 and DCNEW-26 illustrate this new treatment, and explain one important rule for obtaining the service: no indentation of $WRITE($.

Interpretation of MODELS data cards was improved between January 5th and the 7th. Previously, author Dube explained every line by the uniform, indented description *"MODELS data card."* But he knew more in TREAD, and could have done better. Also, your Editor certainly knows about the $WRITE($ statements that he now intercepts and processes (see preceding paragraph). So, some data cards now are explained better, and these include the first and last. Also, the fixed interpretation has been changed to emphasize the modification. About comment blocks, use of $NOCOMM = 1$ will result in the disappearance of all comment lines between (but not including) $COMMENT$ and $ENDCOMMENT$. This is not as good as the treatment of normal comment cards (use of "C " outside of MODELS) because ATP continues to be burdened by the storage and handling of the associated text. But at least the user no longer sees the text in the .LIS file, as illustrated by the 4th subcase of DC-68 (note mention of *"End destruction of comment block of 5 lines."*). Thus far, nothing is done with $ILLUSTRATION$ and $ENDILLUSTRATION$ although these, too, are recognized within TREAD. Who uses these, and can offer a suggestion about handling?

MODELS can be used to process the results of HFS or PCVP loops as explained in a separate story.

New EEUG List Server

E-mail headers could be read at BPA *"at least for a short period of time (a month or two)."* This was explained in the preceding issue. Since then, the problem of E-mail destruction by BPA's computer establishment has been solved by Dr. Tsu-huei Liu. Ralph Folkers of Schweitzer Engineering Laboratories in Pullman, Washington, USA,

first had raised the problem of two or more registration messages from the same person. An initial one was somehow incomplete or defective, so he submitted a second one. Your Editor confirmed reception of both as follows: *"Yes, one good one and one not-so-good one. Since writing you, Tsu-huei created a special folder within MS Outlook 98 for such messages, and this solves the problem of loss due to mail purges. In theory, these records now should be backed up and preserved forever by others. The time is part of the E-mail message, so order of 2 or more no longer is a possible problem."* Your Editor had noted that message content included only the date, not the time. But Prof. Mustafa Kizilcay quickly filled this gap, too, as reported in E-mail dated November 5th: *"I made a slight modification, so that server message sending you the Web licensing form data also contains as the first line Submission date and time: ... This date/time comes from the server, so it should be reliable."*

November 30th was the date of transition of the new EEUG list server, changing from insecure to secure operation. The final message prior to the change was from EEUG Deputy Chairman Laszlo Prikler. The "Subject:" of this explained that *"46% of present subscribers must re-subscribe!"* It was generally understood that some persons would procrastinate until the plug finally was pulled, but who thought the number would be this high? To your Editor, 46% represents either enormous procrastination or massive violation of Prof. Bruce Mork's suggestion (an unenforceable rule that relied on the honesty of each subscriber for compliance) that only ATP-licensed persons use his Fargo list server. Prof. Prikler explained the impending change as follows: *"This is the last message to be broadcast in 'insecure' mode of operation. As you were informed many times, the operation of the ATP-EMTP-L mailing list will change ... From now on only licensed ATP users are entitled to subscribe and the list is going to be moderated to improve the quality of communication ... Subscription will be performed manually by authorized ATP-EMTP user groups after verification of the ATP licenses of its applicants. The former subscription list has been reviewed by the regional ATP user groups and if conditions below were fulfilled, your subscription was transferred automatically (i.e., you do not need to re-subscribe) : 1) your e-mail address was locatable geographically; 2) your license status has been confirmed by a user group; 3) your ATP license has NOT been issued by the Can/Am EMTP user group. Please note that all Canadian/American ATP users, who are interested in the new subscription or continuation of their subscription, are asked to fill in a new ATP licensing form on-line at <http://www.emtp.org> whether or not they have been licensed in the past. Within an hour you will receive another message: It could be either a 'greetings' one, informing you that subscription was transferred successfully, or a 'terminated' one, informing you that ATP-EMTP messages will not be delivered to you until the user group you are licensed through will re-subscribe you to the list."*

Two hours later, program developers received at BPA a copy of Prof. Prikler's "greetings" message. This had *"Subject : !!! Secure, moderated operation of the ATP-EMTP-L mailing list has begun!!!"* Prior to re-statement of the rules, Prof. Prikler wrote: *"Dear fellow subscriber, Congratulations! You are subscribed to the new, secure, moderated mailing list of ATP users world-wide. Please read the operation rules carefully ... and follow these rules when communicating via this mailing list in the future ..."*

Archives of list server mail immediately following the transition to secure operation should be made available to licensed ATP users who failed to re-subscribe in time. This was your Editor's conclusion as first expressed in E-mail dated November 28th. This was in response to a subscriber who was about to be disconnected: *"Whether archives of missed mail later might be requested from EEUG, I do not know. What I do know is this: you are not alone. Many others have failed to supply us with the required paper. The next time I write to Laszlo, I should ask about archives of old mail, as could be requested from the Fargo list server."* Two days later, your Editor concluded: *"What is possible ... is to make available archives of early-December messages. You and many others will have missed some messages, and it is my hope that these might be downloaded from a secure ATP storage site on the Internet at some later date. If not, I probably will be sending such a file (e.g., the 1st 2 weeks of December) attached to E-mail. This would be upon request of a re-registered user."*

Missing from the printed copy of the Web licensing form is the E-mail address of a person who does not want to subscribe to the EEUG list server. This is the detail that no designer or guinea pig seemed to appreciate prior to real operation. Of course, persons who reject subscription are rare --- 3 out of 117 messages in LICENSES.TXT as checked on January 5th. In any case, the theory always was that the user group would have a piece of paper with a signature for each E-mail address. We have the signature, but the E-mail address is missing from the paper, unfortunately. So, what can be done? Unless and/or until someone can suggest a better scheme, the following is assumed: the "From:" address of the Web-form E-mail is taken as the implied E-mail address. Of course, all E-mail from the Web form have been retained, so there is a record --- on disk if not on paper.

GNU ATP Installation Dependence

December 15th, GNU ATP FORTRAN was created by translation and sent to Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. His response the following day was a reminder that developers in Portland had not incorporated all or even most of his progress this past year: "I found some old parts in the source ..." So, a second update of installation-dependent

modules GNUMODS.RUM was made --- to incorporate the rest of Mr. Hevia's changes. These were explained as follows 3 days later in attached disk file changes.txt: "1) All calls to C routine gettimec were changed to the intrinsic GNU routine fdate(text). 2) All calls to C routine getcpuc were changed to the intrinsic GNU routine second(). 3) All calls to external commands rm (Linux) and DEL (DOS) were changed to internal ERASEF (file, ierror). ERASEF is a C routine in clike.c (written by Masahiro Kan in Japan). 4) All calls to external program mv (Linux and DOS) were changed to internal RENAMEF (file, ierror). RENAMEF.F uses openpfl, readfl and writfl from clike.c, and simply reads from one file and writes to another. This internal routine can do its works between different file systems. 5) The external routine locint.c was replaced by external routine LOCINT.F which uses GNU intrinsic %LOC(var). 6) All calls to SETCLR were changed from an INTEGER*2 to an INTEGER*4 variable to avoid annoying but innocuous warning messages. 7) The logic of D4FACT was changed to allow both mouse button 2 and the <CR> key to exit a graphic screen. This is mandatory for Windows and Linux versions because the keyboard is disabled in DISLIN graphic mode. A call to WINKEY ('RETURN') immediately after CALL DISINI was inserted, too. 8) All CALL WINNFT(...) were changed to CALL HWFONT. No difference in fonts results for Linux or Windows, and a similar font (COMPLX) is used for DOS. Differences for DOS are: a) all CALL METAFL ('XW12') were changed to CALL METAFL ('CONS') and b) all CALL WINDOW were deleted to avoid a conflict between the DISLIN WINDOW routine and the grx routine of the same name."

GNU djgpp revealed a subscribing error that did not bother other versions. This according to a December 24th E-mail message from Orlando Hevia. Use of undefined KOLD at S.N. 3322 of OVER16 was the problem, and the jump to this location seems to date to June of 1995 (according to the associated UTPF ident). It is strange that no one noticed the trouble for 5.5 years. In any case, correction consisted of restoring the pre-1995 GO TO 4786 on the date mentioned.

ATP Licensing Problems

E-mail from EDF in suburban Paris, France, was summarized in the preceding issue, along with your Editor's response to this attempt to acquire ATP. As the story was interrupted three months ago, "complication of the story increased rapidly." Yes it did. The response from Robert.Jeanjean@edf.fr on October 6th follows: "I understand the confusion. My concern is more simple and it is not link with EDF. I started a private consultant job in 99, and I work during my free time. This is completely disconnected to my EDF job. for this task I need to have a PC tool to do some studies and demo to my customers, and I asked you if it would be possible to have, as private person, the last version of ATP. I don't

want to have or to open any conflict with anybody . So please forget EDF within our discussion. Please be free to answer." This text was terminated by an AOL mailbox and what appears to be a home address and telephone number.

Your Editor responded October 9th. About not being linked to EDF: "Except that you seem to work for or at EDF. Your E-mail comes from Internet domain edf.fr which we assume belongs to Electricite de France, the French electrical monopoly. According to our latest information (old), EDF is a partner in 'EMTP commerce' via EPRI, and it also sells unrelated EMTP-like program MORGAT." About work as a consultant that is unrelated to EDF: "So why not use DCG EMTP? I suppose you would need to purchase it, if your work is not for EDF. Well, yes, that sounds like a good reason (the price is absurd). There is some similarity between your situation and those guys at IREQ outside Montreal, Quebec, Canada. Each of them (I recall 3) taught at a different area school, as I recall. What were they? Concordia University was one, Ecole Polytechnique was another, and McGill University was the third. All involve distinctive names, but when I search newsletters, I find no reference. Maybe the story has not yet been told publicly. Anyway, three guys who could **not** be licensed for ATP use at their regular jobs were licensed for ATP use through the schools at which they taught courses. This was during the early to mid-90s. The user group granted organizational licenses for the 3 schools. If you are a consultant, do you have a company? If so, does that company have any business dealing with EDF? In the case of Montreal universities, there were none of which we were aware." About access to ATP "as private person," your Editor observed: "This seems to imply no company. Over here, it is easy and inexpensive to form a company, so nearly everyone who is selling something does. Maybe in France it is different. If there were a company, this could play the role of those universities in Montreal. If not, this is new ground that must be broken. We might want to discuss the matter with other user groups and cooperating developers, if no organizational isolation is possible." About ignoring EDF: "Well, if you were to be licensed for after-hours (non-EDF) work using ATP, it would be with the understanding that such work would not be performed for EDF, and that information learned about ATP would not be communicated to EDF. EDF is **not** licensed to receive ATP materials. So, just as for EPRI or AEP, there is no way to ignore EDF. The form letter makes this clear near the beginning." Later that same day, Mr. Jeanjean responded from the same EDF E-mail address: "Can you explain me the meaning of the message????? Is it related to my question?????"

What is ATPAnalyzer and who is Paul Lerley? E-mail received "From: Curtis A. Beveridge [curtis.beveridge@cmpco.com]" on December 6th mentioned both: "Paul Lerley gave me your name and email address. Paul and the Maine Section of IEEE are conducting an ATP

Tutorial tomorrow at 1:00 PM and we are having difficulty installing the ATP software on Windows 95 PC's. The CD that we have and the installation instructions are for Windows NT 4.0 and Windows 98. Can we make this run on Windows 95? Is there specific software for Windows 95? I am in a bind due the time constraints of tomorrow's class. Is there anything that you can do to help? I have installed the software (ATP, ATPDraw, and ATPAnalyzer) but get a 'Attempt to connect disk file ... startup has failed. Halt in RFUNLI' message." In reply later that same day, Co-Chairman Liu asked: "From where did you receive this CD? ATPAnalyzer is not part of the ATP programs sent out by Can/Am EMTP User Group. There are three versions of ATP which work on a PC with MicroSoft Windows: Salford ATP, Watcom ATP, and GNU Mingw32 ATP. Which version of ATP are you using?" About the specific complaint, she provided standard-enough advice: "It looks like the environment variable ATPDIR has not been set." Needless to say, there are concerns about who is involved. Are students of the class licensed? For the answer (learned only later), see the following issue. Meanwhile, your Editor was able to connect to Web page www.cmpco.com which is used by Central Maine Power Company (Maine is the most northeastern of the 48 contiguous states of the USA). To be continued.

Comings and Goings

More about Count Dracula (see preceding issue) was received from Herbert Konkel in Los Alamos, New Mexico. The envelope of a letter postmarked November 20th bears a 32-cent U.S. stamp with a large colorful portrait from Hollywood. In bold red letters (symbolic of blood, no doubt) at the bottom, one reads *DRACULA*; and immediately above this, in small white letters, *Bela Lugosi as*. Of course, this is reference to the vampire movies of a half century or more ago. Your Editor recalls seeing these on late-night television around 1970 or 71. For an interested collector, the date of the stamp is 1997.

William F. ("Bill") Tinney has been mentioned in more than one newsletter. Well, during the late morning of December 6th, this former supervisor honored software developers at BPA with a visit to Dittmer. During some two hours, Dr. Liu and your Editor joined John Walker, David Stefonek, and Walter Powell in a discussion of industry needs. For the record, your Editor downplayed ATP as a model for development of the other programs (e.g., load flow and transient stability), which seem to involve different challenges. Two days later, your Editor sent E-mail to provide a reference to ATP cooperation, however: "I mentioned the new ATP Web site, which is operated by the European user group. If interested, it is easy to learn more by connecting to www.emtp.org (note the non-commercial .org rather than .com)."

Power Company Politics and Religion

General Electric (G.E.) is unavailable as a supplier to BPA as this note is being written October 5th. Of current interest to BPA are G.E. system planning programs for load flow and transient stability computations --- programs that were licensed by WSCC (the weak western power pool) on behalf of all members including BPA. For years, BPA management has encouraged BPA planners to shift to this new, economical, WSCC-selected alternative. But for years, features familiar to BPA planners either have been missing or did not operate properly. So, BPA itself (not WSCC) had been purchasing help and/or enhancements directly from the G.E. factory. But this latest hope of management now has run into a brick wall in the form of the U. S. government. E-mail dated October 4th "From : Stroncsek, Bob - TOP Ditt/2" documents the problem. An attachment includes a message from Dr. Tsu-huei Liu which states: "... Bob Gable was informed by GE that GE will not be delivering any more software to BPA. Due to an on-going dispute between GE and the US government, all payments made to GE from any US federal government agency were taken away by the US Treasury. Without receiving payment, GE will not deliver any goods." Your Editor's conclusion: BPA reinvention has not yet extended to banking! No matter how much titles and hype might have changed to make BPA appear more business-like, it remains a government-run monopoly. Yes, BPA is self-financed, but all significant money still must pass through the U.S. Treasury, it would seem.

R.I.P. was mentioned in the preceding issue ("it commonly is used as labeling for tombstones in cartoons ..."). Of course, this is for American English. About Latin and Argentine Spanish, Orlando Hevia in Santa Fe explained in E-mail dated November 7th: "*Here the Latin R.I.P. (requiescat in pax) is used, or the Spanish equivalent Q.E.P.D. (que en paz descance).*"

Deregulation in Maine, the northeastern-most American state, was obvious when your Editor consulted the Web page of Central Maine Power Company (CMP; see mention elsewhere in this issue) in Augusta on December 9th. Clicking on "Prices" at the top, then on "Pricing information and FAQs" leads to "Questions & answers about Standard Offer service. ... The Maine law that created electric competition on March 1, 2000, provides that any customer not designating a Competitive Electricity Provider will receive Standard Offer service. CMP is now a delivery company, delivering electricity through its wires and substations. We sold our power plants to comply with the law." So how much does power cost? If not by Pacific Northwest standards, at least it seems cheap by California standards (see the January, 1995, issue): "The MPUC accepted a bid from Energy Atlantic of Presque Isle, Maine, to supply Standard Offer service for two years to residential and SGS (small business) customers at 4.089 cents per kilowatt-hour. A Standard Offer customer's total bill consists of that supply charge, plus CMP's charge to

maintain the system and deliver the electricity." For the more-expensive mid-summer season: "(June, July, August): 6.81 cents / kWh ." About future alternatives : "The competitive market for residential and small business (SGS) customers may take time to fully develop. Customers who do not choose a competitive provider will automatically be assigned to the Standard Offer. As competitive providers enter the market, customers may evaluate their offers and find terms they prefer to those of the Standard Offer. MGS, IGS, and LGS customers have every incentive to shop (especially before summer) among available Competitive Electricity Providers, or explore aggregating loads to make bulk purchases."

Portability is an advantage of ATP as engineers move from one job to another. This point was made by a user in a cover letter that accompanied re-subscription to the EEUG list server: *"If I'm going to spend time learning one program to do this type of analysis, I want to use one that I can take with me if I end up leaving."* In an E-mail response dated December 9th, your Editor wrote: *"Is this not the truth, though?! Yes, the price is right. One 33 cent stamp is all that is required to re-license. Certainly you are not alone in wondering about future employment. You make an interesting point about the portability of ATP during these restructure-troubled times of the industry."* A decade or more ago, portability was important for one of two reasons: 1) one company used one brand of computer whereas a second used another; and 2) one company might use two or more different brands to support ATP. The need to carry the same ATP version from one company to another following loss of job certainly was not as common a concern then as it is today.

Deregulation of electric power in California approached disastrous proportions by mid-January, as the two largest power companies approached bankruptcy. If there ever was proof that electricity is too important to be regulated by politicians, this would seem to be it. As this issue is being closed for publication on January 17th, the news is ominous. *"State Inches Ever Closer to Losing Control"* is the title of a long article by Los Angeles Times (www.latimes.com) staff writer Peter Gosselin. This begins with a summary: *"As California has slipped ever deeper into its electricity crisis, Gov. Gray Davis has calmly repeated a three-part mantra: Everything possible will be done to keep the state's two big utilities from going bankrupt; consumers will not pay a penny more for their power, and Sacramento will not be party to any kind of corporate bailout. But by late Tuesday, the state had moved several giant, perhaps irrevocable, steps closer to all three outcomes, and was on the verge of losing much of the control it once exercised over its energy future."* Another LA Times story had title *"Regulators order rolling blackouts."* It seems that planned *"blackouts affect 200,000 to 500,000 Pacific Gas and Electric Co. customers in the San Francisco area ..."* More next time. This clearly is an important story, and it seems to be reaching its climax.

www.emtp.org for ATP Use

E-mail address **canam@emtp.org** was mentioned in the preceding issue. Automatic forwarding is involved, as explained by Prof. Kizilcay in E-mail dated December 8th: *"I created a normal E-mail address using the domain name EMTP.ORG The type of the E-mail box also must be specified. There are two options available from the Internet provider: 1) Define a POP3 mailbox with the specification of the mail server for incoming and outgoing mail; and 2) use of that address to forward E-mails to a known existing address. I chose the second one for canam@emtp.org Mail sent to this address is forwarded automatically by the mail server to thliu@bpa.gov Such forwarding of E-mail addresses also is offered by IEEE to its members."*

Work on Pocket Calculator

.EQ. of the pocket calculator was troubled prior to correction (all POCKE* segments) on November 11th. At issue are logical variables as defined by Laurent Dube for TACS 25 years ago. These are not real LOGICAL variables of FORTRAN, but rather floating-point numeric variables that either have value zero (false) or unity (true). The first report of trouble came in E-mail dated November 7th from Prof. Juan Martinez Velasco of the Polytechnic University of Catalunya in Barcelona, Spain.. His attached disk file TEST1.DAT demonstrated erroneous treatment. What your Editor found was more serious than an isolated mistake with one operation. Each operator is associated with an index, and .EQ. is number 82. Well, beginning with number 77, there was misalignment in POCKE4. Most relational operators were affected. For example, the .EQ. desired by Prof. Martinez was being processed using code of the following .NE. To insure that such an error does not occur again, relational operators have been added to POCKET.DAT (see the eleven variables CAT1 through DUM1). Following correction, the latest Watcom TPBIG was sent to Prof. Martinez on November 13th.

Most pocket calculator operations are used by disk file POCKET.DAT as mentioned in the preceding paragraph. This began last spring, but this was set aside during June when other problems demanded your Editor's attention. The data was resurrected November 11th as a place to verify .EQ. and other logical operators (see preceding paragraph). Each row of outputs involves 10 variables, and rows are ordered alphabetically (ANG, BAL, CAT, etc.). Thus the ten CAT variables plus DUM1 are variables numbered 21 through 31. Expanded through five rows (50 variables) during the morning of November 14th, the goal is to continue until as many different operations as possible are illustrated. Type-10 sources are being used as a matter of convenience only. Your Editor began last spring using \$PARAMETER, but there was some trouble --- perhaps because then processing

occurs too early for all variables of interest to be defined. Alternatively, perhaps local storage was inadequate for the large number of variables (20 or more were being used at the time). Anyway, for a since-forgotten good reason, it was decided to move the analytical expressions from \$PARAMETER lines to Type-10 sources, and take a single time step. There is no real time variation, and only the output on step 1 is of interest. The correct answers are documented on comment cards as the following shows for the third set of ten:

```
C  CAT1  CAT2  CAT3  CAT4  CAT5  CAT6  ...
C  0.0   1.0   1.0   0.0   1.0   0.0   ...
```

Of course, this the easiest row to document because variable values are limited to zero or one. Other rows require more than 80 columns to document, and the required space has been taken. I.e., all variables are shown to full output precision (by request, column width is 11). These comment cards are **not** truncated at column 80 as was the practice a decade and a half ago. Today, where needed, comment cards that document program output are allowed to extend as far to the right as necessary (e.g., to column 132). With both Vernon Bueg's freeware LIST and MS-DOS EDIT easily able to display to the right of column 80 without confusing wrap-around, there is no practical reason to truncate comment cards that document the solutions. This is current general practice rather than a special policy for this particular data case.

Too short arguments of functions (e.g., see CC as used in DUM6 or DUM7 of POCKET.DAT) were a problem prior to correction on November 12th. If found, diagnostic output will include the word *fudge* at the time the expression is broken at the short argument, with the right portion shifted far enough right to eliminate loss of the serialization byte as the short argument is replaced by a longer TEMPx variable. Note that short variable CC was used months earlier without difficulty (see BAL1 through BAL4), but these uses were not as arguments of functions (more demanding).

The RAD function is supposed to convert degrees to radians for the pocket calculator just as it does for TACS. Prior to correction on November 12th, the answer was completely wrong for one of the two possible cases (accumulator-stored or memory-stored argument). Instead of dividing by factor 180 / Pi, the RAD function was multiplying by this conversion factor. Variable DUM8 of POCKET.DAT illustrates obviously-correct operation.

The RAN function is supposed to return the next random number for the pocket calculator just as it does for TACS. Prior to correction on November 13th, this was not happening. The wrong subscript was being checked. Following correction, POCKET.DAT provides both a believable and a repeatable EAT8 = .8134676 for Salford EMTP). Of course, this uses a fixed seed. Later (but not now), your Editor should worry about allowing the user to vary this. Recall that the October, 1998, issue treated

the problem of "Random numbers within MODELS," which was solved by the addition of REPEATABLE RANDOM NUMBERS (RRN) and TRULY RANDOM NUMBERS (TRN) requests. For Type-10 sources, that new initialization at "the top of OVER8" should apply to, and work for, the pocket calculator RAN function, too. But \$PARAMETER use of RAN represents a more complicated challenge because first execution generally will precede OVER8. Additional change will be required to ensure that all random numbers vary from one execution to another (for data involving TRN). This would be for a Monte Carlo frequency scan. Can HFS pioneer Gabor Furst envision the rolling of dice at the start of each new frequency, for some practical problem?

Variable FAT5 = -2.0 ** 2 + ... was mishandled prior to correction on November 14th. The critical detail involved a leading minus sign followed by exponentiation. According to FORTRAN rules, that leading minus sign is not part of the exponentiation (prior to correction, it was handled along with base 2.0). This case is comparable to that of a leading minus sign followed by a function name, although no function name (an English abbreviation) is involved. Exponentiation was so important to engineers that it was built into the language using special symbol ** when FORTRAN began. Exponentiation is the exception this way. All other library functions are the rule. In historical retrospect, the distinction is curious.

The term (-2.0) ** 2 of variable FAT6 was mishandled prior to correction on November 15th. It was found that the 4 non-blank bytes of the number within parentheses were too short, so more *fudge* logic (see a preceding paragraph) was required. This was the third such block, so associated code was modularized in new subroutine EXPAND (acceptable as long as it is not CALLED too many times). Two days later, to improve efficiency, this subroutine was destroyed and code was moved back within POCKET, but was placed out of line (i.e., no duplication).

A new 4th subcase of DCNEW-19 is the final destination of the data of POCKET.DAT beginning November 16th. The effort of expansion ended with 63 variables. The final one is GAS3 --- the 3rd variable within the 7th set of ten. Although no logical operator of a block-IF statement (shorthand terminology to indicate an IF-THEN-ELSE-ENDIF block) has yet been considered, just about everything else has. Ability to add unused assembly language instructions slowed to a halt just as the need to register subscribers to the new EEUG list server became acute (the November 20th deadline). So, that is the way the pocket calculator is being left until the next complaint, or until logical operators are reconsidered. It should be explained that there are two sets of logical operators, with Prof. Martinez complaining about just one of them --- the one associated with Dube-like or TACS-like logical variables. For each of these, there is an alternative associated with an IF block. Specifically,

these are operators numbered 44 through 56. In the long run, IF blocks are believed to provide a simpler, clearer way for a user to perform his operations conditionally. Recall that Dube required every TACS variable to be processed in order. Different component contributions can be turned on or off by means of logical operations such as Prof. Martinez was using. But it should be clearer for the user to employ an IF block, which Dube offered in his later MODELS (the late '80s onward). The pocket calculator already has such operations, although more work is needed to connect these to the different possible ATP uses. Each use is different. Type-10 source use is different from \$PARAMETER use, and each of these will be different from use for TACS supplemental variables. Each has its own interface, and poses its own separate challenge for implementation in ATP.

Arrays that are not yet variably dimensioned have been expanded, and overflow checks have been added. During the past week, KOLD was expanded to parallel ASSEMB (dimensioned 500), the vector of distinct variable names NAMLHS was expanded from 25 to 85, and the several numeric vectors associated with each assembly language instruction were expanded from 99 to 199. Whether code ever will be variably dimensioned for F77 is not yet obvious. One tempting idea is to leave dimensioning of the pocket calculator fixed for F77, and make it variable for F95. This would be comparable to what recently was done for Kizilcay frequency dependence. This would be the easy solution to inevitable later demands for expansion of presently-fixed storage. Why continue to struggle with limits of F77 when F95 provides an easy solution (and must in any case be considered for completeness)? This seems to be the emerging philosophy of time-short developers for any storage that does not already have a VARDIM list size assigned to it (the problem of the present limitation to 30). To paraphrase Samuel F. B. Morse (U.S. patent number 1647) in 1844, *what hath Masahiro Kan wrought?* Impact of F95 on ATP continues in ways not foreseen by your Editor during the fall of 1999 (time of the Lahey F95 compiler purchase in Portland).

Separate FORTRAN program POCKET.FTN was created to provide an independent verification and documentation of answers. For floating-point arithmetic, this is almost foolproof. For the random number of RAN (variable EAT8), it is worthless. In between are the 11 logical variables of Dube, for which coding differences are substantial, unfortunately. Conclusion: for most of the 63 variables of POCKET.DAT, the independent verification is useful.

Speed with which another, separate program can be executed from within ATP was a subject of discussion with Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. He had mentioned someone else's free pocket calculator, and your Editor had wondered whether possibly this might replace his own, thereby eliminating a

present burden. But perhaps execution would be too slow for practical use within the dT loop: *"Maybe another program can not be called quickly. Calling a subroutine within the same program is bad enough. Calling another program requires the attention of the operating system? Salford DBOS might have an efficient way because DOS is simple and Salford did good work. But for Bill G's Windows? If it sounds too good to be true, Bill G probably sold it to you!"* That was November 18th. Later that same day, Mr. Hevia observed: *"Well, a program can be called by gnu FORTRAN using DOS, Windows and Linux."* True, but how fast? Your skeptical Editor decided that an experiment was in order. So, he modified Watcom VARDIM by adding RETURN as the first executable statement. By design, this was a small program (the .EXE file is 57 Kbytes), but not a trivial one. Next, Watcom ATP was modified to call this do-nothing VARDIM 1000 times (a DO-loop) using Watcom FSYSTEM at the start of the dT loop. The same timing procedure as used by case summary statistics (Watcom clock) was added before and after this loop to produce the following result: 23.5096 seconds is the average of the best 5 of 6 trials. This was using Dr. Liu's 550-MHz Pentium III-based PC (see the October issue). Needless to say, this is awful. Except for very large data cases, one could not afford even one such call per time step; and one call for each supplemental variable of TACS would be unthinkable for even small data cases! As for Salford DBOS, Mr. Hevia supplied a real-DOS .EXE file of 31942 bytes attached to E-mail dated November 21st. Salford DBOS CISSUE requires a real DOS program, and Mr. Hevia advised that his file was *"MS 16-bit compiler binary; a more real DOS program is not possible."* At home, using your Editor's 133-MHz Pentium, Salford DBOS running under real DOS performed acceptably considering the slower hardware. But this was not nearly well enough to make a difference. For the same experiment, each call required 95.1 msec. This was the consistent time, reported by each of 5 consecutive trials. Conclusion: ATP can not afford to call a separate program of even 32 Kbytes (not big at all) within the dT loop. End of hope to use someone else's separate pocket calculator within the dT loop. Remember, hope springs eternal, but if it sounds too good to be true, ...

Publishing Programs and Viewers

"Hyperlinks are not possible for our proposed writing within WP 9 (e.g., for a PDF copy of the Rule Book or the Theory Book)." About this conclusion in the preceding issue, Laszlo Prikler observed the following in E-mail dated November 10th: "Unfortunately, this statement is true not only for WP9's own 'Publish to PDF' option, but also for the creation of PDF using Adobe's Acrobat PDFWriter printer driver. MS Word 97 / Word 2000 is better in this respect. PDFMaker is the name of the macro that converts Word links to Acrobat links. It works. I used it last year when I created the IEEE PowerTech conference CD. Maybe such a macro will be available for WP sometime?"

About alleged incompatibility of WP 9 with HP-GL, Laszlo Prikler reported success in E-mail dated November 10th: *"It works fine for me. HP-GL is one of the supported file format under Insert / Graphics / From File menu. I chose 'custom' option at WP Office 2000 install. As I remember, the HP-GL format was not offered as the default, but after checking the box under 'graphic filters' it appeared for me. You can add this option easily. Just insert the WP Office CD and select 'Corel Setup Program' under the 'Setup and Notes' menu available via Start menu --> Programs --> WP Office 2000."*

"Finally, Adobe Exchange will lock such files to prevent unauthorized modification." About this mention of Adobe Exchange in the preceding issue, Laszlo Prikler offered the following two comments in E-mail dated November 10th: *"a) You do not need Exchange to set security options. Acrobat Distiller 4 allows this feature via Settings / Security menu (calls exactly the same dialog box as in Exchange). b) Creating PDF via Distiller does not help the lack of hyperlink conversion, unfortunately. The question is: is there a Postscript printer driver that supports hyperlinks? I tried HP LJ 4P/4MP PS and Minolta Di250 PS with the same (negative) results."*

"Publishers and Mailers:" immediately below the title of the newsletter has been retained for historical reasons. The user group's E-mail address was changed, note, but the antiquated *"Publishers and Mailers:"* was deliberately retained. Of course, there no longer is publishing and mailing in the original sense. I.e., no longer is there any paper. The only remaining publishing is electronic, and this is done by your Editor using MS Word and Adobe Acrobat Distiller (the latter to produce a PDF copy). As for mailing, this, too, is electronic-only (attachments to E-mail) --- to transfer the PDF disk file to three persons who maintain aFTP storage on the Internet. If others perform the same function, and would be interested in such an original copy from Portland, they are asked to make summary details known to your Editor.

Hoidalén Improves ATPDRAW

Confusion between ATPDraw with ATP seems to be a common problem of new users. A good illustration was provided in semi-public E-mail of the EEUG list server between December 8th and December 12th. The initial inquiry stated: *"I am a bit confused by the transformer connection in the saturation transformer model. I would be grateful if somebody can tell me what is the difference between D11 and D lead. ..."* ATPDraw was not mentioned. Well, your Editor programmed the saturable TRANSFORMER in ATP more than a quarter of a century ago, but did not know how to answer this question, so did not respond. Orlando Hevia in Argentina did know the answer, and did respond, but the answer was not understood

by your Editor. Finally, Prof. Mustafa Kizilcay of FH Osnabrueck in Germany explained: *"We should clarify that you refer to the ATPDraw models of transformers. Please note that in ATP there is no specification of vector groups, if you use the saturable TRANSFORMER component. The user is responsible for specifying terminal node names in such a way that the desired vector group is realized. ATPDraw provides users with some help in modeling three-phase transformers. In order to be sure that the model is correct, check the node names of terminals as recommended by Mr. Orlando Hevia, and/or calculate steady-state phasor solution for the unloaded transformer, and examine the phase shifts."*

"ATPDraw V2.4++ now available" was the subject of list server mail dated January 11th. In this, Prof. Bruce Mork of Michigan Tech in Houghton announced that *"an update to the existing atpdraw.exe file in your ATPDraw installation is now available ..."* Attached was information from the ATPDraw author, Dr. Hans Hoidalén of SINTEF Energy Research in Trondheim, Norway, who explained: *"In ATPDraw v2.4 the node naming routine has been fundamentally changed to allow an unlimited number of nodes. Two older fixed arrays (one for atpdraw and one for user specified node names) have been replaced by a single dynamically allocated array. The new node naming procedure will be included in version 3.0 (released next autumn). Since the changes are so fundamental I would like some users to test version 2.4 and report any problems back to me. The news about version 2.4 is: 1) The restriction on the maximum number of nodes removed (but still limited by the number of components (1000) and connections (2000)). 2) The user specified nodes are visualized with black node dots independent on the drawing sequence. The node input dialog also contains a flag indicating the origin of the node name. 3) The warning windows displayed during the node naming process showing 'Same name on different nodes', and 'Different name on the same node' have a button marked 'All' so that the user can skip the warning process and accept the fixes suggested by ATPDraw. 4) An error related to \$PREFIX and \$SUFFIX and inclusion of nonlinear characteristics is fixed."*

Dr. Hans Hoidalén ended his announcement with a preview of future improvements: *"We have now started to work on version 3.0, still financed by Bonneville Power Administration. The news about version 3.0 will be: 1) Grouping: single icon replacement of group of components. Very useful for e.g. TACS control blocks. 2) \$PARAMETER and pocket calculator. Useful when changing parameters of a circuit containing several similar data values. 3) Verify. Extend the Verify module in Line/Cable modelling to allow comparison of more data. 4) CABLE CONSTANTS. Allows a more flexible grounding scheme than CP and supports Semlyen cables. 5) Transformer modelling. Include physical transformer modelling. 6) User's manual v3.0"*

Creative ATP Modeling

A servo motor can be modeled using the U.M. as illustrated by a new 3rd subcase of DCNEW-9 which was added November 3rd. For those unfamiliar with the concept, a servo motor is a 2-phase induction motor with a feedback control system that drives one of the two power coils using a signal that is proportional to the error in angular position. As PCs become cheaper and faster, and hard disks become cheaper and larger beyond belief, program developers can afford to do more testing. As mentioned in the preceding issue, your Editor recently was paging through Vol. XI *EMTP Memoranda*, and he noticed the servo motor on pages IEEE-19 through 23, which date to 17 July 1981 (date of memorandum). For simplicity, SPY has been deleted; and T-max has been shortened and dT has been increased to speed execution. A lot of other small changes have been made, as documented by extensive comments. Included are optional (presently - inactive) CALCOMP PLOT cards to produce graphics comparable to those shown on pages 22 and 23. Quite unexpected was the necessity to pass the TACS control signal to an electric network node rather than directly to the U.M. control coil itself. It seems this is a minor loss of generality since 1981. The memo clearly shows the direct connection, but this resulted in the following error message: *"UM number 1 is provided with TACS controlled sources on the power side. This is only allowed for the coils on the excitation side. TACS control of power side coils is to be done through the network, which is connected to these coils."* So, an extra electric network node named VCTACS was created, and excited by a new Type-60 TACS-controlled voltage source. Note that a conventional, 2-phase induction motor is mentioned in comments. This is easily created by removing both the TACS data and the Type-60 source, and applying normal, balanced excitation to the control coil of the servo motor. The result then is comparable to what Dr. Yin Yuexin illustrated in his UM5.DAT at Prof. Dennis Carroll's 1994 Florida ATP short course. Dr. Yin's data is specifically mentioned because it was consulted before BPA's Dr. Tsu-huei Liu and your Editor finally understood the need for the Type-60 source. Yes, U.M. data had changed since 1981, but not as much as your Editor initially had feared. Dr. Yin's UM5 involved no control signal, but at least it confirmed the basic U.M. data cards, and where these are separated by blank cards. This was a critical step in activating the 1981 data for the servo motor.

"Several million data cases may be required" according to semi-public E-mail of the EEUG list server dated November 27th. This according to Kent Smith of Florida Power Corporation in Crystal River, who explained that he is *"trying to generate a large number of training cases for development of a neural network."* The bound of several million is described as the *"worst case. ... I am trying to process the data with wavelets to reduce the size of the network but I will still require a large number of simulation runs. Does anyone have information on ways to automate the process? I need to change the location of one node in*

an ATP file and the threshold value for a voltage controlled switch." Creative user Orlando Hevia responded first, offering two alternatives later that same day: *"If the node is in some part of a transmission line, the node can be displaced using POCKET CALCULATOR VARIES PARAMETERS (PCVP) and \$PARAMETER ... PCVP can be used to change the voltage of the voltage controlled switch. Another independent procedure is to use \$INSERT ... This external program can call ATP with the same data file, but changing the values of insert_file in each run. This second solution may be more flexible, assuming you can program the location of the node of interest. All gnu FORTRAN compilers allow this second procedure."* This idea of a separate program building the data and then calling ATP to simulate using it was echoed later that same day by Dr. Wlodzimierz Kalat of Warsaw University of Technology in Poland: *"Similar problem (TRV calculations in my case) in power system with random fault-to-ground point of overhead line I solved by ATP controlled totally by external Turbo Pascal program (it was in 1993, before ATPDraw became popular). TP program was able to display the network on the screen where I could change 'by hand (=mouse)' the status of the switches and then calculate TRV repeating it thousands of times with new point of fault-to-ground each one (random process). ... TP program was responsible for 'reading' the screen, creating the proper ATP *.dat file and calling ATP from DOS (by Turbo Pascal exec command). After the sequence of calculations TP program was able to analyse final results from statistical point of view. So in my case the master program was written in Turbo Pascal (about 800 lines of code) and ATP was only used as the slave called only to calculate the generated *.dat file and produce *.pl4 file."*

Real capacitors differ from ideal capacitors of circuit theory, and transients associated with them may require complicated modeling. This is your Editor's conclusion following an E-mail discussion that was initiated by Doug Selin of Arizona Public Service in Phoenix. His EEUG list server mail dated November 30th began: *"When modeling back-to-back capacitor switching, the amount of resistance in the buswork between capacitor banks is usually very low. This produces very lightly damped, high frequency oscillations for the particular case I am modeling. When talking with equipment experts and reviewing some of the manufacturers' literature, they indicate that usually the high frequency transients in back-to-back switching damp out in a fraction of a power frequency cycle. My question is: what is the source of this damping and how is it best modeled in an EMTP case? When I model the 60 Hz resistance of the bus, the damping is very minimal and oscillations persist for many power frequency cycles. Is the higher damping due to skin effect of the bus at the high frequency of oscillation? Is the best way to model the damping to place a resistor in the bus such that the oscillations damp within a certain time period or does one try to calculate the high frequency resistance of the bus?"* Various knowledgeable subscribers provided insight and advice. This began with Ralph Folkers of Schweitzer

Engineering Laboratories (SEL) in Pullman, Washington: *"I saw the same thing (oscillations persisting for many cycles) when modeling a 69kV cap bank energization. I had the opportunity to record the actual bank energization with a commercial transient recorder, and saw the oscillations damp in less than one-half cycle. Adding lightning arrestors to my ATP model produced a result that was almost exactly the same as the recorded values. However, I still don't know if that was the source of the actual damping. I think now, the first thing I would try would be to add one or two system busses to the model and include load flow through the substation on frequency dependent lines."* Then Laszlo Prikler of Budapest Univ. of T&E in Hungary explained: *"Resistance is very low at the power frequency, but not so low in the 100 kHz region. ... Why do not you consider to represent the buswork between capacitor banks as a frequency dependent transmission line (JMARTI or Noda)? This way the frequency dependence could be modelled more precisely ... You should check the modelling of the supply side of the network. Representing it as a source in series with a RL impedance is not correct. At least the surge impedance of the transmission lines erected from the same bus should be taken into account as a resistance connected in parallel with the RL."* Next, Luis A. Giraldo V. of Ingenieria Especializada in Antioquia, Colombia, explained losses: *"The source of the damping is the capacitor losses."* There followed formulas to estimate this. Hari Singh of Cooper Power Systems in Franksville, Wisconsin, then concentrated on the bus: *"Realistic damping of the inrush current oscillations during back-to-back cap bank switching can be obtained by using a high-frequency model of the bus. Modeling the higher resistance of the bus due to skin effect at the few kHz frequency typical of inrush current is essential to limit the transient duration (~ 0.25 cycle). If obtaining the skin-effect resistance of the bus at inrush frequency is impractical, one rule of thumb is to select a value that results in the actual current peak to be 90% of the undamped (R=0) current peak."* Next, Dr Keith Walshe, the Australian user group Chairman, offered to help: *"Discharge tests of typical power capacitors exhibit a well damped oscillation at about 40th harmonic (frequency and damping will vary between manufacturers). Thus the real model for a capacitor should be a series RLC with a parallel high R and a further series R. After that you must account for busbar inductance if you want to get the inter-bank transients to mirror real life. The best thing would be for an ATP user who also makes power capacitors (ABB, Cooper, etc.) to provide some test oscillographs of short circuit tests for a range of capacitors. If any capacitor manufacturer is willing to send data to me, I am prepared to have one of my engineers spend the time to derive 'best fit' parameters to the data and ... develop a general purpose ATP model for everybody to use."* Finally, Tom Field of Southern Company Services in Birmingham, Alabama, mentioned IEEE involvement: *"One form of damping is the use of pre-insertion devices. The inductance in the buswork and leads also has to be modeled. This is actually something that I am working on with some people on*

modeling for 'power quality aspects of capacitor switching' for the next IEEE C37.12 capacitor switching application guide."

HFS and PCVP Processing

MODELS can process HARMONIC FREQUENCY SCAN (HFS) solution variables in place of \$POCKET (see mention in a separate story). This was your Editor's sudden inspiration that was made to work 2 or 3 days later, on December 27th. The 3rd subcase of DCNEW-26 provides an illustration, with both phasor voltage and phasor switch current successfully passed into MODELS for computation and display. Without alteration of the electric network, MODELS data from the 3rd subcase of DC-52 was added, adapted, and simplified. Originally, your Editor was thinking of adding a \$MODELS request, but one look at DC-52 showed that there was no need for any such new request. The linkage to MODELS already existed, following each phasor solution. Revised initialization in SUBR1 and TACS1 was a little tricky; and it was necessary to enable MODELS output in OVER11 (while other ATP output was being suppressed for loop counters KNT = 2 and higher); but these were just details that were adjusted by trial and error. With minimal effort (maybe 12 hours total work), the mother of all computational engines now is available to process the phasor solutions of an HFS loop. DC-52 has demonstrated Laurent Dube's addition of MODELS to normal FREQUENCY SCAN (FS) --- use that dates to June of 1995. Five and a half years later, this same connection has been extended to Gabor Furst's newer HFS without any known restrictions or complications.

About speed of MODELS for HFS use, it should be explained that there is not much concern, even though timing has not yet been attempted. Whereas MODELS unfortunately is too slow to be recommended for widespread use in the time-step loop (see documentation that began in the October, 1996, issue), frequency scans are different. Complaints from HFS users are **not** expected because the scale typically is quite different. How many harmonics might there be, typically? Even if there were 100 (a high number, extending to 5 or 6 kHz), the added burden should be small. This 100 is to be compared with tens or hundreds of thousands of invocations within the time step loop (common for time simulation today). Yes, one MODELS step was slow compared with the simulation of one time step of many electrical networks; but it should be fast compared with one phasor solution (substantially more involved, typically) of almost any electrical network. Although this detail might not have been discussed in years past, it is worthy of emphasis now. MODELS enjoys full endorsement as an extension of frequency scans, and these now include either Gabor Furst's HFS or a PCVP-generated loop over frequency (e.g., see the 1st subcase of DCNEW-26).

MODELS can process and display extrema of a PCVP loop over time simulations, too. Recall time simulation was your Editor's initial use of PCVP, and it is illustrated by the 5th subcase of DCNEW-25. This is simulation involving parameter variation, with extrema being the only variables that usually are of interest. Well, beginning New Year's eve, MODELS can be added to such data much as it was added to HFS data the preceding week. Of course, variable types are different, with Xmax, Tmax, Xmin, and Tmin corresponding to the 4 classes of extrema. Also, variable names are more involved. Whereas Dube was able to use a single A6 name (most commonly a node name), such simplicity no longer is possible for extrema. Instead, variables are identified just as they would be for a batch-mode ATP plot. Needs are the same. All of this and more is explained in detail by comments in a new 9th subcase of DCNEW-25, which was added January 1st.

MODELS PROCESSES EXTREMA (MPE) is the new request for the preceding extension. The need should be obvious. In the absence of such a special request, MODELS data would be read and processed for use within the time step loop. But this is not what is wanted. The user must choose one use or the other. If MODELS is to be used within the dT loop, then it is not available to process extrema; and vice versa. This is the initial restriction, anyway, until your Editor might learn more. About timing, note that speed is even less of a concern than for HFS. For MPE use, MODELS is invoked only once per simulation. This differs from once every time step (the concern during 1996 and 1997) by a factor of a thousand or more, typically. If MODELS is slower than it should be by an order of magnitude (round numbers), no user will notice. Rather, the biggest impact is expected to be on computers that are short of memory. The mother of all computational engines requires a lot of code, so each access might require paging (if inadequate memory is available). But even this is not much of a concern because simulations are relatively so few, typically. Final thought: What reader would use an extension from the PCVP loop to a STATISTICS or a SYSTEMATIC loop? After all, Monte Carlo studies have been common for a quarter of a century, and they involve the same extrema. Why not allow MODELS access at the end of each energization?

MODELS itself has not been changed by any of the preceding work, it is important to emphasize. Your Editor does not know enough about the undocumented FORTRAN from author Dube in order to modify it safely and effectively, so all changes deliberately were made outside of MODELS in the interface subroutines. The three principal ones are TACS1, TACS2, and TACS3 (remember, as originally proposed by Dube, what later became MODELS was supposed to be improved TACS), and modifications are concentrated here. The only other two modules that were changed were REQUES (to honor MPE) and MAIN20 (where extrema are accessible). Conclusion: MODELS itself could not have been

damaged because MODELS itself has not been changed.

Dynamics within MODELS data of MPE use have not yet been defined. Since there is no simulation time, your Editor can not yet see how dynamic components and/or procedures might profitably be used. This is no different than for MODELS use with any of the three different types of frequency scans. If any reader can imagine a productive use of time within MODELS for any of these cases, he is asked to explain the concept. Until then, users are advised to avoid reference to time within their data, and that includes Laplace transfer functions of which the simple integrator is a special case. Of course, the pass number of the loop is available, and should prove useful, just as the frequency is (in variable T) for frequency scans.

Year 2000 Compliance of ATP

"Y2K bug bites -- one year late" is the title of an AP story dated New Year's Day. Found at the CNN Web site, this comes from Oslo, Norway: *"Part of Norway's railways came to a standstill on New Year's Eve after the Millennium computer bug hit a year later than expected. The bug was discovered when none of the country's national railway's new 16 airport express trains or 13 high-speed, long-distance Signatur trains would start early in the morning of December 31. The computers on board the trains apparently failed to recognise the date, something not anticipated by experts who checked the systems thoroughly last year ..."* Remember all that stupid certification (of which BPA probably had more than its share, being a government agency)? It was meaningless. A representative of *"Adtranz, the German producer of the new trains,"* explained: *"we didn't think of trying out the date 31/12/00."* Clearly, the laws of Murphy and Lubarsky apply to software development! Common sense suggested easy avoidance, of course: *"Sunday's problem was solved temporarily by resetting the computers to December 1 ..."* Several days later, another AP story reported trouble in the USA. Recall 7-Eleven stores had planned to profit from the Y2K hysteria as mentioned in the October, 1999, issue. So, it is appropriate that the same company should have been bitten by the Y2K-plus-one bug. Dated January 5th, this second story, found at the ABC News Web site, began: *"A Y2K-type bug hit cash registers in 7-Eleven stores this week, reading the new year as 1901 instead of 2001 and inconveniencing customers who wanted to make credit-card purchases."*

Branch Data Input Restructured

Column-80 punches of constant-parameter, distributed branch cards were prevented for just one week. This is the happy ending to the story in the preceding issue. The trap began November 1st, and ended November 7th when BPA's

Dr. Tsu-huei Liu demonstrated correct output of current following changes to SUBTS2 (location of the most important ones). That same day, the 2nd subcase of DC-37 was converted to the more interesting and useful 1-punch to illustrate the new capability.

Blank column 79 was required prior to November 8th changes to GETBUS, IN5152, INDIST, and LABL03. Since the average user might never have been aware of the restriction, explanation is appropriate. Not all branch cards allow column-80 punches for branch output variables. The most common example of prohibition is either Pi-circuits or coupled R-L (Type 51, 52, ...) branches. For such data, floating-point numbers might end in column 80, so ATP can not extract and use the column-80 number without considering context. Three years ago, when code for branch data input was being restructured, it was convenient to set the output variable to zero if column 79 was non-blank. This was acceptable for the vast majority of cases including all standard test case. But, as Dr. Liu pointed out to your Editor during early November, a common case exists where this is inadequate. For wide-format K. C. Lee (constant-parameter distributed) branch cards, column 79 is reserved for the transposition flag (positive if untransposed). This was not an issue as long as branch current was prohibited. After all, branch voltage for a distributed line seldom is of interest. But with branch current suddenly possible, there is a lot of interest, and a conflict due to the use of column 80. To preserve K. C. Lee data, the simplified logic of 3 years ago was made more complicated. Note that more than just distinguishing positive branch type codes (1, 2, ... or 51, 52, ...) from negative type codes (-1, -2, ...) is involved. For example, the 3rd subcase of DCNEW-23 involves both a Type 51,52 branch and 1-punches in column-80. Well, the new logic produces the same old output DC*.LIS for all test cases as it should thanks to new variable MIDLPI which provides the required discrimination.

A minus sign appended to the length of wide-format, untransposed K. C. Lee branch cards was discussed with Dr. Liu on November 8th. At that time, it was decided that no change will be made, although the present status should be summarized in order that details not be forgotten. According to Dr. Liu, the appended minus sign does nothing! This is for wide-format data. For narrow-format K. C. Lee data, the minus sign is not tolerated. But for wide format, it is optional. Branch cards punched by LINE CONSTANTS include the minus sign (LCMODE defines DISTM = -DIST and uses this negative of the length) even though such practice no longer (since restructuring of 4 years ago) serves any useful purpose. But neither does the minus sign do any harm, so the practice will be allowed to continue. For historical reasons, old data must continue to be honored, so there is incentive to do nothing. "*If it ain't broke, don't fix it*" (if it is not broken, do not try to repair it). To emphasize the voluntary nature, the minus sign is retained in one of the subcases of DCNEW-24, but has been removed from another three. See subcases numbered

5, 6, 10, and 15. Comment cards in the 6th subcase mention this modification. All other DC*.DAT remain unchanged.

Uniformity of all column-80 punches of coupled, distributed branches was mentioned in the April, 1999, issue. November 9th, Dr. Liu concluded that it was practical to remove this temporary restriction. Working together, INDIST was modified to remove the control of input data. But this was the easy part. The real work was in SUBTS2, and Dr. Liu did this alone. Her enhancements entered the UTPF with file date November 28th. Two days earlier, your Editor had taken just INDIST into the UTPF in order to provide NO IMAGINARY PART service, and he found the need to reverse those column-80 punches of DC-41 and DCNEW-4 (see mention in the April, 1999, issue).

NO IMAGINARY PART is a new optional declaration for Semlyen branch cards as illustrated by DC-62 beginning November 25th. Modifications could be confined to module INDIST, fortunately. Historically, Semlyen frequency-dependent distributed branches always have required the input of complex transformation matrices [Tv] and [Ti] whereas typically all imaginary parts were identically zero. Carrying all of those zeros was wasteful in two ways. First, I/O is the weakest aspect of modern PCs, as processors themselves approach the speeds of former super-computers. Any minimization of I/O is a gain. Second and more importantly, the imaginary part occupied valuable space of crowded input data cards. It was to accommodate a 3-phase line that precision was limited to 12 columns: $6 \times 12 = 72 < 80$. This was more than a quarter of a century ago, when Semlyen-related matters were being decided in Toronto by Russ Brierley of Ontario Hydro. Unfortunately, no one in Portland looked closely at Semlyen details until recently. While one could prepare Semlyen lines for modern use by the introduction of an alternative wide format (\$VINTAGE, 1, use), this is not being done. Instead, progress will be incremental, with the first improvement affecting just real transformation matrices. Numbers that are known to be identically zero no longer need be a part of Semlyen branch data. As a result, for fixed-format data, the precision can be more than doubled; and for the most-important 3-phase case, the entire matrices are documented as part of data interpretation (previously, column 3 was missing). Finally, matrix interpretation is easier to read because unused elements have been blanked, and only the first data card for each row involves text to the left of the numbers. A new 2nd subcase of DC-61 illustrates this improved interpretation for 5-phase Semlyen data. Conclusion: one small step by your Editor on behalf of Semlyen data --- whether or not it still is much used (probably not). About motivation, it should be mentioned that, at the time, the associated extra precision of [T] was desired to improve accuracy of the Semlyen output current at time zero (Dr. Liu's ongoing great work). In retrospect (after work of the following paragraph), this reasoning may have been confused.

"*Derive [Ti] from [Tv]*" is a new request for Semlyen branch cards that was added to INDIST by Dr. Liu on

December 7th. This was the result of yet another surprise during her long project to allow selective branch-current outputs using column-80 punches. For a quarter of a century (code by Russ Brierley of Ontario Hydro dates to the mid-70s), Semlyen branch cards ended with cards of [Ti] following cards of [Tv]. It was known that the former was supposed to equal the transpose of the inverse of the latter; and for a quarter of a century, no one ever complained about lack of equality. But inconsistency of the branch current at time zero (dT loop output compared with the phasor branch flows) led to this surprising discovery. Dr. Liu showed your Editor the code of SEMLYEN SETUP that produces these matrices (in FRQDOM there is a CALL CXC line for inversion), and your Editor must agree to confused practice. Both real and imaginary parts are stored, inverted, and transposed. One certainly has equality using complex values. But then the imaginary parts, which are small (usually? hopefully?), simply seem to be ignored. It is quite amazing. What is the right remedy? Perhaps it would be appropriate to rotate [T] in order to make the admittance purely imaginary (see Section 4.1.5.3 of BPA's EMTP Theory Book) rather than simply ignore the imaginary parts of [T]. But no such significant project yet is being undertaken. Instead, consistency of the real parts has been made optional by re-derivation of [Tv], thereby ignoring values on input data cards (which remain unchanged). Not surprisingly, answers change. If not greatly, at least significantly --- enough to be seen on a printer plot! For illustration, compare the new 2nd subcase of DC-61 with the first. Limits on the PRINTER PLOT of voltage at BUSA-2 have changed from (-0.647, 2.658) to (-0.650, 2.600).

EEUG (the European user group) provided exposure of the preceding changes to many users. It was December 12th when new versions were sent by E-mail to both Chairman Kizilcay and Deputy Chairman Prikler. Timing could not have been better. As Chairman Kizilcay explained the preceding day: *"I accept your offer with pleasure. This is the right time to update the EEUG CD. Would you please create Salford, GNU Mingw32, and Watcom TPBIG files using LISTSIZE.FGH ..."* This is precisely what was used: FGH dimensioning to allow 400 coupled coils as introduced in the October, 1998, issue. In E-mail dated December 14th, Prof. Prikler documented availability: *"I updated the EEUG secure FTP storage with this latest version. I changed the file name according to the EEUG naming conventions: 1) TpbigS.zip for Salford; 2) TpbigW.zip for Watcom; and 3) TpbigM.zip for MingW32."*

Interactive Plotting Programs

COM2PL4 is a new utility program from Orlando Hevia. In E-mail dated November 5th, he explained: *"I completed my COM2PL4 program, to convert from ASCII COMTRADE (TPPLOT, GTPPLOT and TOP) to widenn .pl4 format."* The previous day, author Hevia had exposed the idea: *"All this, because I was thinking of a program*

COM2PL4, or a new option for GTPPLOT. But I don't know if the program deserves the work." Your Editor enthusiastically endorsed the concept: *"I, too, believe that a separate utility just to perform this function would have value. This would be comparable to PL42MAT. I have had the idea for years, but never pursued it."* About deserving the work: *"I think it does. KISS. Users want simplicity, and general plotting programs are complicated because of all of the options."* After learning of Mr. Hevia's selection of widexx for the output format, your Editor added: *"Interesting. I like the idea very much. My guess is that COMTRADE is not much recognized outside the power industry. But uniform columns of numbers are universal. The widexx alternative should go many places that COMTRADE does not."*

A C-like .PL4 file of Pisa-format --- supposedly created in parallel with the input data file because KTRPL4 < 0 while NEWPL4 = 2 --- was being destroyed if there was any following subcase. This was Mr. Hevia's observation in E-mail dated January 6th. There was not really any following data case, but extraneous blank lines (more than KASEND = 5 in number) at the bottom had the same effect. While Mr. Hevia observed that removal of the blanks solved the problem, your Editor agreed that code had better be corrected to make such inadvertent file destruction impossible. About symptoms, ATP for Mingw32 produced a .PL4 file of size zero whereas Salford EMTP produced no .PL4 file at all. The trouble was traced to PLTEND where a file having Pisa format escaped the protection of other types. Solution the following day involved movement of code from installation-dependent PLTEND to universal MAIN20. This represented structural progress because the minimization of installation-dependent aspects is a general goal.

Miscellaneous Intel PC Information

BPA is **not** friendly to Apple Macintosh PCs. A memorandum from the Office of the Chief Information Officer, with revision date October 10th, makes this official and ongoing: *"The OCIO recommends that MAC's only be approved on an exception basis as a special purpose computer to meet specialized and compelling business requirements that can not be satisfied with the current BPA standard workstation. This is currently the case. Apple versions of the BPA standard office automation suite should not be allowed. If installed on a client's desk, Apple Macintosh systems are to be used in addition to the standard BPA desktop computer."* This was in response to a request for reconsideration: *"Issue: The EIT Council requested that the CMA review the viability of using an Apple Macintosh computer (MAC) as an alternate standard to the current BPA standard desktop computer."* Four reasons are given for rejection of Macintosh: *"1) Security: Macintosh computers don't run a logon script utility. No automatic update of virus signature files can occur at the workstation. ... Currently Apple Computer does not*

produce and distribute periodic cyber security bulletins and patches. Other operating system vendors do. 2) Support: SMS and Visual Basic Script automated support utilities aren't designed for MACs. This incompatibility results in the new automated process to inventory workstations and validation of license products will not operate on Mac workstations. 3) Printing: MACs can only print to Postscript printers. Postscript capable printers are not universally available through out BPA. 4) Apple Talk: The Apple Talk network protocol is being phased out of use at BPA. New installations of Apple Talk will not be approved." Conclusion: today, BPA is a Wintel (MS Windows running on Intel) shop just as 25 years ago it was a CDC shop for scientific computing, and an IBM shop for business applications. The mainframe IBM presence remains, but CDC has been replaced by MS. In between, there was a decade and a half of mostly DEC VAX.

"Amdahl stops making mainframes" is the title of another of those stories that seem to mark the end of an era. The account is short, and was posted at *The Register* with date October 19th. For readers too young to remember, Amdahl once was a primary competitor of IBM. It sold computer hardware that was plug-compatible with IBM, but was cheaper (or higher in performance for comparable money) than the real thing. Historically, Amdahl's challenge to IBM's mainframe business can be likened to the current challenge by AMD to Intel's microprocessor business. In many places including K. U. Leuven in Belgium, the IBM mainframe version of EMTP was supported by Amdahl hardware rather than IBM hardware. But just as for Cray supercomputers on the scientific side (see the July, 2000, issue), the market for business-oriented IBM mainframes has shrunk so much that it no longer supports significant competition: "IBM holds 80 per cent of the \$2.5 billion market." To appreciate how small this is, Compaq's annual revenue is 15 times bigger (Fortune.com places Compaq in slot 20 with \$38.525 billion), and IBM's is more than 30 times bigger (IBM occupies Fortune slot 6 with \$87.548 billion of revenue). The mainframe market has almost disappeared. Amdahl CEO Yasushi Tajiri is quoted as saying: "This is a difficult step, given we have 30 years experience in mainframes." About present ownership, "Amdahl is 100 per cent owned by Fujitsu."

Miscellaneous Small Items

Long-term stability of the Type-59 S.M. model has been mentioned from time to time, and the subject was raised again in E-mail dated November 18th. This carried disk file TEST59.DAT from Orlando Hevia of Universidad Tecnologica Nacional in Santa Fe, Argentina. About the data, he wrote: "I send you a sample ... with voltage and speed regulators as part of a load rejection simulation. The machine is moved by a water turbine. The case runs to 15 seconds (300+ seconds in my 500 MHz Pentium), without any stability problem. The author of the data told me that

the same case was run to 60 seconds (recall you the 1 Megapoint case), without ATP instability. The case began as unstable, but when the speed regulator was added, the total load rejection was stabilized. The time step is small (10 usec), due to a relatively short distributed line. Maybe this helps stabilize the model? I translated to English all the Spanish comments."

Timing of \$DEPOSIT sometimes makes practical use difficult or impossible, it should be pointed out. The best example of the latter (impossibility of use) is the attempt to modify the .PL4 file type, which normally is specified in STARTUP. The problem is, data cards are processed only **after** the initialization of installation-dependent SYSDEP. By the time \$DEPOSIT involving PL4TYP can be processed, the PL4TYP from STARTUP already has been used within SYSDEP. \$DEPOSIT is executed too late, and may (i.e., generally will) lead to later trouble associated with use of the .PL4 disk file. Conclusion: there are limits to \$DEPOSIT use. While usually this function does an admirable job, there are exceptions. If in doubt, consult an expert.

NAMES ARE LEFT ADJUSTED (NALA) and NAMES ARE RIGHT ADJUSTED (NARA) are optional requests that became available January 11th. They allow a user to require consistency of his naming (either left-adjusted or right-adjusted six-character names). The associated controlling parameter is LEFTA6 which can be found in STARTUP. As well known, your Editor's preference is for left-adjusted names. I.e., any unused byte should be located on the right, not on the left. By means of a NALA request, the user can require ATP verification of such intended practice (see illustration in subcases 1 and 2 of DCNEW-10). The idea for NALA occurred to your Editor after discovery of an error in that huge data case from Texas A&M University (mentioned in the next issue). Three branches for shunt capacitors had all non-blank information shifted one byte too far to the right. Curiously, the capacitance value 2.E-4 was accepted by Salford EMTP, which ignored the trailing 4, giving value two. Mingw32 ATP, on the other hand, choked on the E-field number that ended in a minus sign. Unlike many ATP error traps, the new one in OVER4 documents all violations prior to halting (note that the 2nd subcase has two). A KILL = 81 error stop ends execution (see a comment card).

KCONST is the number of electrical sources, and beginning January 11th, this number is documented as part of the interpretation of the blank card that ends source data. Why it took so long remains a mystery, at this late date. Comparable documentation for branches and switches has existed since the early ATP years. But somehow the need was not previously sensed for sources. This is another modification prompted by that huge data case from Texas A&M University (see mention elsewhere). Your Editor wondered how many sources there were, but found no information on interpretation of the blank card. So, he added the documentation.