
Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Fortran 95 from Lahey Computer

Progress of free F95 compilers has been observed for some time by Orlando Hevia of UTN in Santa Fe, Argentina. E-mail dated July 5th reported news involving a translator: "I downloaded a F95 free compiler for Win32. It

is really a pre-processor that allows F95 programs to be compiled with the Mingw32 F77 compiler. I send the readme file that comes with it." Consider highlights of the attachment, which begins with the compiler name: "We are making available three versions of the F compiler -- for Linux, Solaris, and Windows. One of the Windows versions comes with the MinGW files needed to run the F compiler." Although the product remains free, a donation is being encouraged : "we are suggesting a contribution to the development ... Something like \$50 for a nonstudent academic user and \$100 for a nonacademic user would help us return some of the money to those who have invested in the development of F." About the approach being used : "The new versions are produced quite differently from the older versions: it is a modification to the NAG (Numerical Algorithms Group) compiler ..." Incompatibility with Apple seems to be a consequence: "The big downsides are that we have no way of producing a Mac version, ..." While supportive of the \$100 price, your Editor had considerable concern about a long list of exceptions that is entitled "F restrictions enforced (I think)." It appears to your Editor that compatibility of ATP with the Lahey F95 compiler would not do much good. Lahey F95 was an extension (a superset) of F77. This does not seem to be the case for F. Any one of the following should prohibit the use of F with ATP : "no fixed source form, ... only IMPLICIT is IMPLICIT NONE, ... all variables must be declared, ... no '!' form relational operators (e.g., .EQ.), ... no D exponent for reals, ... no labels except in GOTO and on CONTINUE stmt, ... no external procedures, no BLOCK DATA subprogram, ... no END=, ERR=, or EOR= spec, enforce restrictions on OPEN specifiers: STATUS must not be UNKNOWN, ... no INCLUDE" As for who did what work, the documentation file f.pdf merely states : "F is the Fortran Company / NAGWare F compiler. It translates programs written in F into executable programs, relocatable binary modules, assembler source files, or C source files."

A locked object file MAIN00.OBJ was produced by F95 Lahey compilation, curiously. After successful use of COMPILE0.BAT to compile and link without optimization, there was attempted use of COMPILE1 to optimize the compilation. Normally, this is just a mechanical operation. Of course, optimized compilation is slower. This time (July 17th), there was trouble. Compilation of MAIN00 (the biggest chunk for FORTRAN) failed due to a shortage of resources as follows :

```
Compiling program unit MAIN10 at line 5915:
f95: Insufficient system swap space.
```

Apparently too much bloatware was running at the same time. An object file was created, but it could not be accessed by the linker. Neither could it be deleted using MS-DOS DEL or freeware LIST. Neither could it be overwritten by subsequent use of the compiler. So, Dr. Liu and your Editor sought help. The advice from BPA's computer establishment was simple enough : Restart MS Windows. Yes, this did work (do not forget the trick). But why Lahey, and why just this time? Many compilations using several compilers have failed over the years, but never before has an object file been locked. Strange.

Lahey F95 ATP simulates much slower than GNU Mingw32 ATP for those 396 coupled coils of Qibin Zhou in Hong Kong (see mention elsewhere). The discrepancy of speed is substantially larger than was reported for standard test case DC-1 in the January, 2000, issue, so is worthy of note. Optimization (the -O1 qualifier of compilation) **does** produce faster simulation than no optimization (the -O0 qualifier), but simulation speed remains short by more than a factor of three. RUNTP BOTH was used for all executions on Dr. Liu's 550-MHz Pentium III-based PC with 128 Mbytes of RAM. Output did not amount to much (only 254 Kbytes) due to \$LISTOFF use, so the more usual DISK should not be much different. Mike Albert's freeware FC clearly demonstrated that all outputs KONG396.LIS were comparable. From case-summary statistics, times for the different phases of program execution are :

	1-5	6-11	12-15	dT loop	Total
Lahey O0	6.51	23.81	103.91	150.59	284.85
Lahey O1	7.23	17.10	92.01	114.03	230.49
Mingw32	14.32	14.87	5.43	34.12	68.74

Of course, simulation speed varies inversely with "dT loop" time. Finally, consider the speed of Watcom ATP (like the preceding Mingw32 figures, these figures are for optimized compilation) :

Watcom	49.67	73.52	20.15	154.31	297.74
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Presumably this poor performance is another indication of age (Watcom optimization is deficient for Pentium III) .

News from Outside USA & Canada

"America's broadband dream is alive in Korea" is the title of a *New York Times* story dated May 5th. Whereas some parts of the world may be stuck with slower communication, not Korea or Japan. The photo shows use of a home PC, and concludes : "Koreans have affordable Internet access that surpasses the quality available in America." It seems that "South Korea -- with Japan not far behind -- is racing ahead." What are summary statistics for Korea? "Since 1998, telecommunications companies here

have installed nearly 11 million broadband lines, over 5 million of those in the last year alone. High-speed lines now reach significantly more than half of all homes with Internet access. The numbers are startling, given that South Korea was among the nations hardest hit by the Asian financial crisis just half a decade ago. But rather than retrench, the country turned a disaster into an opportunity. Spending on broadband and other high-technology gear helped lead a transformation of the economy, pushing the overall information technology sector to about 13 percent of economic activity and making South Korea much less dependent on heavy industry."

Iran continues to demonstrate interest in ATP. In response to either an English-language inquiry or attempted licensing (E-mail from the Web form), your Editor rapidly sends by E-mail a form letter that consists of relevant writing from recent newsletters. Saeed Ghassemzadeh responded to this discouraging information on June 14th : "Thank you very much. You explained why we could not use EMTP. I wish I could explain the same to my students. Prof Hermann Dommel was the key note speaker for the 10th Iranian Conference on Electrical Engineering, last summer, here in University of Tabriz. Afterward we faced a great desire in our students to get more involved with EMTP. I hope that one day our students will learn from the developer of EMTP and share their knowledge, I personally think that is how EMTP is created, sharing knowledge." In response to your Editor's inquiry about status, the writer explained : "I am a lecturer since 1994, and currently also a Ph.D. candidate in power engineering. My research interests are transient analysis of power systems, modeling and application of FACTS devices (also using ATP-EMTP), custom power."

The SARS-delayed IPST 2003 conference (see the July issue) is to be held in New Orleans, Louisiana, USA, on September 28th through October 2nd. This comes from the members-only list server of EEUG to which Laszlo Prikler submitted news on June 16th. The announcement was made on behalf of Prof. Akihiro Ametani and Dr. Taku Noda, the Technical Committee Co-Chairs of IPST 2003.

The Argentine ATP short course first was mentioned in the October, 2002, issue. According to E-mail from Orlando Hevia dated June 18th, the course was given again between Tuesday, June 10th and Saturday June 14th. "This time, there was one student from Costa Rica, one from Chile, two from Peru, and 16 from Argentina. Ing. Julio Cesar Turbay and Dr. Walter Gimenez were the instructors."

Computer translation between English and Japanese was mentioned in the July, 1993, issue. EZ JapaneseWriter was the name of that expensive software. A decade later, has much improved? Consider a column entitled "Promises, Promises." Dated June 25th, this was written by John Dvorak of *PC Magazine*. It offers this discouraging assessment : "I saw better language-translation software ten years ago than the programs I'm seeing now. Current state-of-the-art software can give you a very rough English translation. If you use the software to communicate with non - English-speaking people in their languages, you end up sounding like a freak. We were promised chat-room

software that could make you seem like a native speaker. What a laugh. This whole market segment seems to have died. And you can't blame Microsoft for this one."

More about the Internet and E-mail

A possible 2-Mbyte limit on E-mail to UPC in Barcelona, Spain, has confirmed the importance of ASPack (see the July, 2002, issue). The trouble occurred February 21st when your Editor had tried to send corrected GNU Mingw32 ATP to Prof. Juan Martinez. The linker had produced TPBIG.EXE of size 5065 Kbytes, which PKZIP had reduced to 2351 Kbytes. Without thinking, your Editor had attached this to E-mail, and sent it. But the package was rejected with the explanation *"size exceeds fixed maximum message size (2000000)."* Your Editor quickly realized that he had forgotten to apply ASPack, which reduced the .EXE size to 1525 Kbytes. Informed of the trouble, Orlando Hevia, who normally supplies Prof. Martinez, was surprised. In E-mail dated February 22nd, he wrote : *"I sent the libmingw.zip file, which has size 2 165 118 bytes, and it was not refused. How is this possible? The real size would be bigger at transmission time because of encoding."* One explanation is that the 2-Mbyte limit is not at UPC itself, but rather is somewhere along the way to UPC. Some years ago, your Editor experienced such a problem involving Australia. The April, 1995, issue noted a 256-Kbyte limit due to *"incompatibility between two sites on the route of the message msg size 3185193 exceeds channel limit ..."* In the case of UPC, the rejection message is not this clear, however. But it does mention another site in Spain : *"Connection timed out with dukas.upc.es. ... while talking to mail.rediris.es"*

"AOL subscriber defections continue, top 1 million" is the title of a *Washington Post* story dated June 4th. Recall that the preceding issue had mentioned that the AOL *"subscriber base is shrinking."* This seems to be big news in the nation's capitol because AOL has its headquarters nearby: *"The Dulles-based firm is rapidly losing customers to NetZero and other lower-priced bare-bones Internet services, as well as to higher-priced high-speed cable and telephone providers. ... Customers are fleeing the \$23.90-per-month AOL service ... Meanwhile, most computer users signing up for higher-priced fast Internet connections at home are buying directly from cable and telephone companies, which continue to avoid deals to share profits with America Online. In response, America Online has launched an effort to persuade customers to keep their AOL service as they move to new high-speed providers, by offering an add-on service for a reduced monthly fee of \$9.95. ... About half of the customers leaving America Online are signing up for high-speed services, while 20 percent appear to be leaving for low-priced alternatives ... With roughly 26 million customers in the United States, America Online remains the nation's largest provider of Internet access."*

Maximum upload speed of Comcast cable suddenly is 256K bits/sec. This according to junk mail advertising with

special prices that are valid between June 11th and June 20th. Recall that the July issue clearly stated an upload limit of 128K bits/sec. Suddenly, the speed has doubled? Is this the way cable companies repair a weakness of their battle plan against DSL telephone access --- by removing some arbitrary internal limit? Interesting. No question, a doubling of upload speed at no extra cost should interest a program developer. Of course, nothing is guaranteed : *"Actual speeds may vary, and are not guaranteed."* For the record, the *"maximum download speed is 1.5M bps."*

Expensive, high-speed Yahoo seems to be the next alternative to what once was free Yahoo. Recall that service began as *"free email for life"* as mentioned in the January, 2000, issue. Next, the July, 2001, issue mentioned *"personalized email addresses from Yahoo! Mail - only \$35 a year!"* That was relatively small money compared with the latest option. At the bottom of E-mail dated June 29th, Yahoo advertising offers broadband : *"SBC Yahoo! DSL - Now only \$29.95 per month!"*

Why would a Korean use American Yahoo E-mail rather than Korean Yahoo E-mail? This was your Editor's question of Prof. Chul-Hwan Kim at Sung Kyun Kwan University in South Korea. The KEUG Chairman explained on June 30th : *"I use the American branch of the Yahoo family ... for communication with foreigners. Yes, there is a Korean branch of Yahoo, and it offers mailboxes. Also, I have an e-mail account at my university."* But the Korean mailboxes involve Korean language. July 27th, Prof. Kim documented the three mailboxes that he uses by sending the same message from all three. One service is named Daum (www.daum.net), and it seems to involve Oriental language at the bottom that is not being properly displayed at BPA. But part is graphic, and its advertising appeal is universal: the famous Coca-Cola signature!

European EMTP User Group (EEUG)

Remember *Copenhagen Coup* in 1994? As described in the April, 1994, issue, this was a meeting where *"powerful and obscure forces in Europe seemed not to want an ATP user group."* Well, the Bugbear-spread message mentioned Copenhagen and your Editor as follows : *"But ... but I only blame WSM. This was a painful story in Copenhagen ... when only WSM stand behind Mustafa neglecting all of us who have been associated long time back with ATP / EMTP."* Your Editor's private response on June 6th was as follows : *"This perspective is a surprise. Until now, I had no idea that you were among those who wanted no ATP user group in Europe. ... If you wanted an association that was not limited to either ATP or EMTP or even digital simulation, then yes, I abandoned you. I remain proud of this opposition. If you disagree with any writing about Copenhagen in the April, 1994, newsletter, let me know. Note later mention of the use of the Fargo list server, and the fact that Prof. Kizilcay's opponents seemed to avoid public discussion ... If any of this is in error, I want to know how and where and why. Your view of Copenhagen seems quite different from mine."*

A response was received June 10th, but it was not specific enough to shed further light on present or past ATP politics : *"I am extremely sorry and shocked ... My personal correspondence with Gabor was not meant to 'hurt any person' nor to 'destroy the image of EEUG'. On the contrary, we both wish the best of 'ATP & EEUG' and have been working for that since long time back. It was a terrible mistake and I hereby extend my humble apology to YOU for that."*

The term "charity organization" was used in the complaint about EEUG operation, and your Editor rapidly concluded that this involved faulty thinking. To Prof. Mustafa Kizilcay as well as list server moderators and the embarrassed author, your Editor observed the following on June 7th : *"My guess is that XXXX simply exaggerated without thinking, in what he thought was a private message. For example, consider 'charity organization.' As best I can recall, you have never used this term to describe EEUG. Neither have I. Also, I find no trace in newsletters. So, if XXXX believed that EEUG was supposed to be a charity, it is not difficult for me to imagine how he might be concerned about EEUG operation during recent years."* Writing to Gabor Furst two days later, your Editor amplified on this thought : *"Where does 'charity' enter the discussion? I am baffled. I do not doubt that Mustafa would point out precisely what I already have twice: EEUG is not a charity. For your information, I found the following in E-mail from Mustafa dated Sun, 25 Sep 1994 ... This matched my search for 'charit'. Note that charitable and religious are alternatives to what EEUG is."* There followed the next paragraph, which was written by Prof. Kizilcay in September of 1994 :

"I had applied in April 1994 to local tax office for checking the charter, whether it can be accepted as a 'non-profit' corporation (non-profit is not the exact translation of the German word 'gemeinnuetzig'. It means 'on a public benefit and cooperative basis'. Two other activity fields to be recognized as a tax-favoured association are charitable and religious purposes. An association working 'on a public benefit and cooperative basis' should support scientific researches and/or education, or art and culture.). I received recently the reply from the tax office, proposing some modifications in the charter to be recognized as 'gemeinnuetzig'. I implemented these modifications and submitted the German translation of the charter to the local court and tax office, again."

Bernd Stein and FGH would seem to provide proof positive that charity is not a requirement. On June 6th, your Editor observed to Gabor Furst and XXXX : *"My understanding is that it is non-commercial; but that does not make it a charity. Nor does it mean that employees are poorly paid. I believe that FGH in Mannheim is a 2nd such organization. I have no reason to believe that our old friend Bernd Stein was poorly paid."* Later informed of this thinking, Prof. Kizilcay confirmed as follows on June 18th: *"EEUG is a non-profit scientific association like VDE (the Association of German Electrical Engineers) and FGH (Power Research Institute in Germany, where B. Stein was employed)." About difficulty of translation of the name*

FGH, Prof. Kizilcay clarified as follows on July 2nd : *"No, it is not direct translation. A direct translation might be 'Research Association for Electric Power Systems and Electricity Market'. Maybe we should use this translation. I am not sure how to translate Stromwirtschaft (which I translated as 'Electricity Market'). Strom means current, and can be used also as electric power supply. Wirtschaft means trade, economics."*

Public exposure is believed to be healthy and useful. Prof. Kizilcay had written : *"I wished that Gabor and XXXX had contacted me directly and asked, when they heard such rumour."* Your Editor concurred : *"Really. A lot of grief could have been saved. Misinformation has a way of disappearing rapidly when it is subjected to the light of public scrutiny."* If any reader can document additional facts related to this incident, and is willing to have such details published, he is encouraged to supply details for consideration by your Editor. Facts that can be confirmed will be published ; rumor will not be.

Prof. Kizilcay seemed to have the final word. In mail to the 1000+ subscribers of the EEUG list server, he wrote the following on June 13th (but not published until June 17th) : *"Dear ATP users and EEUG members, that private communication from Gabor Furst's mailbox was delivered to me, too. Referring to Gabor's explanation dated June 11th, 2003, I assume that the claims in that message about EEUG seem to be invalid or already clarified. Since those claims are related to my term of office as EEUG chairman, I kindly ask these gentlemen to discuss with me either publicly or privately, if they have any doubt about the points mentioned in that communication."*

Watcom ATP for MS Windows

Possible free DISLIN graphics for Watcom ATP were mentioned in the July issue. As part of pre-publication review, Orlando Hevia observed the following on May 29th: *"There are more free DISLIN packages, as a visit to the DISLIN Web site shows. I asked Dr. Helmut Michels about Open Watcom."* A response was received June 4th, and it was not discouraging: *"Thank you for the hint. If I have a little bit of time, I will give it a try."* So, this detail of possible free batch-mode graphics for Watcom ATP is worth watching. Certainly the price (zero) is right.

Web Surfing & Publishing at Home

This is a continuation of the story that began in the July issue. The struggle continues at home.

That \$20 Corel Office 2002 CD (see the July issue) was an OEM version, not a retail version, it should be explained. So, for example, there is no printed user's manual. The logo in the upper right corner of the jacket of the CD reads "COREL OEM" and fine print below explains : *"Not for sale or resale unless bundled with original equipment. Please contact Corel at ... if you*

have purchased this product without original equipment." Presumably this explains the extraneous hardware (16 memory chips mounted on a mini expansion card) that accompanied the CD within the Fed Ex envelope! This would seem to be yet another indication of continuing financial problems at Canadian Corel. Some organization that purchased the software no longer is installing it on new computers? Instead, it might have liquidated its investment by sale to a discount retailer, who in turn sells to individual consumers at very low prices. Well, as your Editor wrote about WP to three others on May 21st : *"I would not be surprised by news of bankruptcy. Yet, Bill G needs Corel as part of his argument that MS is not a monopoly. Maybe MS will continue to support Corel. But I would not count on it. I am purchasing under the assumption that this is the end of the line for WP."*

Does Pacifier still really exist? Your Editor submitted a question about E-mail to support@pacifier.com during the morning of May 22nd. Quickly, an automated response was received from *"Infinity Internet [318709--9fae896]"* Maybe original Pacifier has been purchased or merged out of existence? Maybe this is the secret to dramatic expansion since 1994? The Web reference at the bottom of the E-mail is www.infinityinternet.com

But why use WP 10? Is WP 10 really needed for our work? Laszlo Prikler had written: *"After disappearance of Corel, the work could proceed using MS Word, because these programs read each other quite well."* But your Editor and Dr. Tsu-huei Liu are not yet convinced. On May 22nd, your Editor wrote: *"If I thought that MS Word could do tables as well as WP 10, I would not be considering WP. Here I am thinking of those 80-column rulers that show which columns are for what data. First Canan and then Tsu-huei have shown me how to do these using WP. If a satisfactory alternative could be found using Word 7 (my Win 95 version), I might drop my plan to use WP. ... If you could show us how to do tables for 80-column rulers using MS Word, my guess is that both Tsu-huei and I would be happy to forget about WP. But until I see and understand the table as compact text (we do not want graphics, as Guido used with Lotus Manuscript at LEC prior to 1993), I suspect that we will continue using WP."*

HyperTerminal of Win95 was used to connect to Agora as mentioned in the October, 1996, issue. Such simple, fast (see the July issue) connection no longer is available? Consider this response from Pedro Sena of Infinity Internet dated May 22nd: *"The problem is that there are no more connections you can make through Hyper Terminal ... it's all PPP now, and that means W98 and Dial-Up Networking on your machine."* Your Editor had mentioned his use with Agora six years ago, when he was in Portland, and Mr. Sena had observed : *"Six years ago, unfortunately, is gone, and in Internet terms, is long dead. ... Without a W98 disk, you are asking for more hassles than it is worth, since these will not improve as time goes by."* This is progress? No wonder narrow band is losing to broadband.

Laszlo Prikler **did** show how to display an 80-column ruler using MS Word. Not only that, he did it using Word 7 of Windows 95 (as used by your Editor at home) as well as newer Word. In E-mail dated May 26th, Laszlo Prikler wrote: *"Lack of good tools ... can be compensated for by human talent. Let me show you what I prepared this weekend. Please find attached 3 PDF file, 2 DOC file and one WPD file. The file names identify the content. ... I am really proud of myself :>).... Even Word 7 is not bad, if one can survive without vertical text in a table cell. ... Software is unimportant. WP 9/10, Word 7, or Word 2000 could be used for this project. I myself would choose Word 2K, but WP 10 has identical capabilities. But the latter is much less stable on this Win2K machine."*

"WordPerfect's new version is no improvement" is the title of a negative review of WP 11 by Rob Pegoraro of the *Washington Post*. Dated May 25th, this provides little incentive to upgrade beyond your Editor's present WP 10 : *"The new WordPerfect Office 11 ... isn't about to win any more converts. It offers few major changes (and fewer still that are relevant to home users) while leaving long-standing flaws. If you get a copy free on your next computer, you won't be terribly disappointed, but I can't recommend buying it ..."* About price, Office 11 is described as *"the \$300 program -- a \$150 upgrade from earlier versions."* As your Editor wrote, WP 10 looks great as an end-of-the-line tool for \$20. Yet, there might be a free alternative : *"OpenOffice (www.openoffice.org), an open-source productivity suite for Windows and Linux, does everything that WordPerfect does and then some -- especially as a writing tool -- free."* But can it handle 80-column rulers for data and 132-column .LIS files (see preceding paragraphs) ?

"Will your Editor tolerate 56 Kbit / sec for 90 days?" This rhetorical question in the preceding issue was answered in an informative way by Orlando Hevia as part of pre-publication review. On May 29th, he observed: *"It all depends on what you want to do. For email without attached files, 56 Kbit / sec is sufficient. To receive big files such as ATP, may be, too. But the problem is to send files. You cannot send more than 33 Kbit / sec using your 56 Kbit / sec modem. I changed to ADSL for this reason. Now I can send files at 128 Kbits / sec, and receive at 256 Kbits / sec."*

Lack of memory causes WP 10 to lock (i.e., hang) during pasting from either MS Notepad or a second window within WP 10 itself. This was your Editor's discouraging discovery and conclusion during late May while working with the two large initial segments of Chapter II of the Rule Book (disk files CHAP2A.WPD and CHAP2B, which currently contain 21 and 36 pages, respectively). Rather than isolated and rare behavior, the trouble is frequent enough (50% probability or higher) to prevent such use. Even locking while pasting within a single window has been demonstrated three times in a row. Neither Notepad nor a second window within WP is required, it would seem, if the block being copied is big enough or complex enough (e.g., the data ruler for COMPILED TACS USE within CHAP2B) . As an

alternative to pasting, your Editor copies text of interest to a separate file, and then uses the "Insert" command on the disk file --- a procedure that seems reliable. At least Win98 itself seems stable, and termination of the locked program is easy using the "Close Program" window, which is the response of Win 98 to **Ctrl-Alt-Del**. This tool clearly indicates WP 10 as the process that is "[Not responding]." Such disability has even been observed due to nothing more than a lot of scrolling of unmodified CHAP2B. Of course, having learned the precarious nature of such work, your Editor frequently uses "Save" (actually, he uses the equivalent **Ctrl-S**) to protect intermediate progress. Curiously, even **Ctrl-S** sometimes fails. A small error window entitled "WordPerfect" sometimes will open, and display the message: "The file can not be found." So, your Editor simply clicks on "OK" and tries a second time, or a third time, and this always seems to work. Eventually, in the border at the top of the window, "[unmodified]" will be appended to the file name. In conclusion, your Editor certainly is glad that he purchased a second computer. If 32 Mbytes is marginal for WP 10, can any reader imagine operation within the 16 Mbytes of your Editor's older PC? Well, Laszlo Prikler did warn of the problem. About your Editor's hope that 32 Mbytes would be plenty, he wrote as follows on May 21st: "I am skeptical. ... I fear that your half size RAM and nearly half speed CPU will be insufficient. ... The problem is that WP will run many processes internally. E.g., spell checking, graphic editor, equation editor. If RAM is limited, switching between these semi-independent tasks will be very slow, or worse, the machine will simply halt, I expect. But I will stop abusing the colour of my friend's new car. You will have experiences of your own soon." Indeed.

Recall that MSN 8 is the name used by MS for commercial (non-free) access to the Internet. This was mentioned in the April issue. Well, when MS Internet Explorer is started on your Editor's PC, it connects to the MSN home page. Clicking on "From MSN / MSN 8 Software" under "MSN Links and Resources" leads to explanation of "System requirements for MSN 8 Internet Service." Minima are stated to be : Windows 98, a multimedia PC with 233 MHz processor or faster (500 MHz is recommended), 64 MB of RAM (128 MB recommended), 320 MB of hard disk space to install, etc. Bill G. is trying to frighten away potential customers? Alternatively, was this recommendation written by Intel or AMD (i.e., designed to encourage the purchase of a new PC)? Of course, a new PC would include the purchase of another copy of MS Windows. Maybe the answer is that simple.

Even the operating system can be corrupted by WP 10, although this phenomenon is less common. Usually, WP 10 merely can be killed, and work can be restarted. Of course, WP 10 itself always can be restarted, but what sometimes would occur next was more serious : WP 10 sometimes would lock during the attempt to "Open" the same document. The document never would be seen on the screen. Of course, the attempt would be repeated (kill WP 10, restart WP 10, and re-Open the file), but with no

better result. So, your Editor would give up. Eventually, he would power off his PC following "Shut Down" in the Start menu. Upon the resumption of power and WP 10, the trouble would have vanished (the file could be connected without difficulty).

A ruler font was conceived and constructed by Orlando Hevia in Santa Fe, Argentina This was over the weekend of June 21-22, in response to your Editor's continuing trouble using tables of WP 10. First, Mr. Hevia's idea : "I down-loaded a trial version of Wordperfect 11. ... I was trying another way: I edited Courier font (fixed space) with an old font editor, to enclose each character in a rectangle. It is not easy work, but it is possible. Too small or too big, the rectangle size must be found by trial and error." That was Saturday. The following day, Mr. Hevia reported success: "I send you a sample of what I wrote: a font with fixed size and each character enclosed in a rectangle. It is not perfect, but it works. ... The font was created using a trial version of a font editor, starting with Courier font (this font has fixed spacing). I named this font table3.ttf. Yes, it is my third trial ... The document was created with trial version of Wordperfect 11." The attached archive included SAMPLE1.PDF and .WPD files, which have been saved at BPA within c:\wp51

WP 9 is not a viable alternative to WP 10 because disk files are too large, for some unknown reason. As no reference to this problem can be located in past newsletters, the detail now will be summarized by an example. At BPA, using WP 9, Dr. Liu and your Editor modified the 2.7 pages of CHAP2B4 in cosmetic ways (e.g., changing a font or two). The file then was saved, producing the .004 entry below. Your Editor took this file home, made a trivial change, and saved to disk. Note the much smaller size as produced at home (the 2nd row) :

06/05/2003	06:19a	57,560	chap2b4.004
06/04/2003	09:47p	21,827	CHAP2B4.WPD

Although there is no reason to believe that later PDF output would be affected, there is concern about size of the storage of WP files. The following segment provides a second, independent illustration. Once again, consider the WP 9 and WP 10 sizes, respectively :

06/02/2003	05:29a	64,001	CHAP2B5.wpd
06/03/2003	10:14p	32,804	CHAP2B5.wpd

This expansion is not a new discovery, however, it should be explained. To Messrs. Prikler and Kizilcay, your Editor had observed the following in E-mail dated 18 September 2002 : "The biggest surprise is file size, which is growing unreasonably. I began with Chapter V :

05/05/1998	07:58p	217,600	CHAP_5.WPD
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After adding a couple of sections for Type 94, text might now be 10% larger. But look at file size :

09/18/2002	06:37a	1,448,448	WSM5.WPD"
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Prof. Kizilcay then recommended an update involving Corel service packs, and your Editor understands that Dr. Liu did this. The trouble may have been reduced, but it obviously has not been eliminated.

WP 10 running under Win 98 has replaced Word 7 of Win 95 for writing of this newsletter. This sudden change followed discussion with BPA's Dr. Tsu-huei Liu during the

morning of June 13th. A mistake (about the size of PDF output of WP 9) was made. Had there been no mistake, no doubt your Editor still would be keying this newsletter inside Word 7 at home. But the mistake was made, and the change was made. Later, when the error was discovered following Laszlo Prikler's skepticism, there simply was not sufficient incentive to change back to Word 7. For the July issue, storage is about 30% bigger : 198 Kbytes for WP 10 vs. 152 Kbytes for Word 7. No question, this is regression. But before one is too critical, consider what an upgrade using MS Word would produce. Under Windows 2000, saving as a current Word document produces a file of 297 Kbytes! About length of text, Dr. Liu's experiment showed a partial page 21, which might have been 40% filled. So, each 20-page issue henceforth might contain about 2% less information. Of course, stability was the final requirement, and this has been demonstrated using the full July issue. The final story was copied 7 times to produce a 30-page document. Text was moved, copied, etc. without any crashing or other obvious sign of troubled performance. Presumably the simple structure (plain text) of newsletters allows larger files than was the case with the Rule Book (experiments with those CHAP2* segments) .

Brain - Damaged MS Windows

MS has agreed to pay AOL \$750 million dollars to end AOL litigation about the Netscape Web browser. "*Whither Netscape?*" is the title of a story dated June 11th that documents the end of *Browser Wars*. Found at the Web site of *PC Magazine*, this begins : "*The longstanding battle between Netscape and Microsoft has finally come to an end. On May 29, AOL Time Warner, which now owns Netscape, agreed to settle a 2002 antitrust suit. AOL had charged Microsoft with illegally using its power in the operating system market to overtake Netscape in the market for Web browsing software. Microsoft will pay AOL \$750 million, and over the next seven years, AOL will license the Microsoft Internet Explorer Web browser for use with the AOL online service ...*" Once again (remember how litigation involving Stacker or Caldera ended; for the latter, see the July, 2000, issue), Bill G's bank account has prevailed. Companies with complaints take his money and run. About history, Netscape was "*purchased by AOL for \$4.2 billion in 1999*" prior to the crash of technology stocks (see mention of the declining NASDAQ in the July, 2000, issue). Who still uses the Netscape browser? One study shows that "*Netscape accounts for only 3.4 percent of the browser market as of August 2003, down from 13 percent in 2001. The browser has fallen a long way since it's heyday in the early years of the Web, when it controlled 90 percent of the market.*" Some Netscape use will remain. This will be for "*the Macintosh version of the AOL service and on the CompuServe online service, which AOL purchased in 1998. Netscape is down, but not necessarily out.*"

MS-DOS EDIT of Win95 can not handle arbitrarily large files, as already explained. The October, 2002, issue summarizes failure using a 16-Mbyte file. But there seem to be more serious limits. On June 12th, your Editor failed to

Edit the data file KONG385.DAT from Dr. Patrick Du at Hong Kong Polytechnic University in China (see separate story). File size is a mere 5.577 Mbytes, although there are plenty of lines (74352). MS-DOS EDIT complained as follows : "*This file is too large for Edit to completely load, but you will be able to view the first 65280 lines.*" Conclusion : Win 95 MS-DOS EDIT is more limited than your Editor had realized previously. Not good, as ATP data files continue to increase beyond any obvious bound. Yet, the use in Hong Kong seems a little artificial. For such high-order data, it would be more efficient to abandon formatted I/O (see mention of C-like HOPC in the July, 2002, issue) .

New EEUG List Server

E-mail addresses that include unusual characters (including blanks) are not recommended. This is yet another unforeseen problem of online licensing. Consider the tale of a gentleman in Dalton, Georgia. E-mail from the Web form was received on April 8th, and it included two blank characters within a Hotmail address. Immediately, your Editor was suspicious, so he looked at the "*From:*" address as reported by MS Outlook. No blanks there. In place of each blank, a period was noted. So, the subscription line was modified accordingly. This was on April 15th. Shortly thereafter, the modified address was sent to Michael Havekost in Osnabrueck, and it also was used to address a form letter of notification. From BPA, there was no indication of trouble (the notification was not rejected). Yet, the notification seems not to have reached the new licensee. Coincidentally, the guy telephoned the following day to learn why licensing was taking so long. Dr. Tsu-huei Liu answered the call, noted your Editor's change in the address, and learned that the two blanks should simply have been removed (rather than replaced by periods). So, she quickly sent this correction to Osnabrueck, and also forwarded a copy of the form letter from the previous day to the new, shortened address. Strange, this incompatibility in the handling of unusual characters in mailbox names. Details should have been standardized years ago, but apparently they were not. Alternatively, note that MS was involved (could this be yet another of Bill G's brain-damaged modifications ?) .

Explanation of violations of list server rules might be ending. Remember that subscribers do not see many submissions because some rule of operation frequently is violated. Moderation prevents the publication. The most common mistake might be inclusion of the entire message to which a "*Reply*" is being made. Another common mistake is failure to terminate writing with a full name, an organization name (if applicable), and a geographical location (city, state or province, and country). For years, moderators who have rejected such deficient messages have been specific. But June 9th, your Editor noted that Laszlo Prikler provided no detail while rejecting a submission from Tucker, Georgia: "*Unfortunately the message you were posting to the listserv is not compatible with the operation rules. ...*" Writing to the author privately on June 10th, your

Editor had speculated: *"Laszlo was not specific. No doubt he was in a hurry."* But this speculation was in error, as Laszlo explained later that same day: *"Not at all. I wanted him to figure out the problem by himself. This is an indirect way to encourage new subscribers to check the rules published at www.emtp.org at least once. Learning by doing is an effective teaching method :>)." True. Whether the average contributor ever has looked at the rules is not known. Rejection is so common, your Editor has his doubts. In this particular case, however, it is not obvious that study of the rules would help. A free Yahoo mailbox was being used, and Yahoo was appending prohibited advertising at the end. Your Editor noted: "Do not forget premium service. My guess is that many Yahoo and Hotmail users now are paying. It no longer is right to associate all Yahoo or all Hotmail users with free E-mail. Many subscribers have been forced to pay relatively small amounts of money (by AOL standards) to improve their once-free service. The question now is: by paying, does the user avoid the former advertising?"*

EPRIweb seems to be the name used by EPRI for Internet access to its information. The EEUG list server is not the only service that has trouble removing invalid or inactive addresses (see *"probe"* in the April issue). E-mail dated June 8th from ewebnews@epri.com informed BPA's Dr. Tsu-huei Liu that her *"EPRIweb User name has been inactivated ... because you have not responded to 3 previous e-mail requests from the EPRI 'electronic Customer Update Process' (eCUP). Because you have not completed this mandatory update process ... you have now lost downloading privileges to access EPRI products your company has purchased. ... You may click on this link ... and provide the required information to have your User name reactivated."* Is this not more user-friendly than the "probe" process of the EEUG list server?

Michael Havekost could reject submissions that are structurally deficient. This was the important idea from Laszlo Prikler. E-mail dated June 11th began with a clever explanation about the end of his own specific advice: *"The lecture period has ended. But a self-study course is still open to anybody. Alternatively, we could ask Michael to prepare some typical templates and handle these things (complete copy of the original at the end, Yahoo, Hotmail advertisement etc.). This way other moderators like you and me could gain some minutes a week."* Of course, Michael is Manager of the ATP-EMTP list server at FH Osnabrueck. Your Editor enthusiastically approved the following day: *"I like the idea. You are absolutely right, Michael could become an active moderator in probably 25% of the cases or more, if he wanted to be one. This would help. Too many moderators already have retired. In addition to saving our time, Laszlo, this should provide better coverage (faster service). I like the idea."*

More than 1000 subscribers now are informed via the EEUG list server, it should be reported. *"New milestone!"* was the "Subject:" of E-mail from Laszlo Prikler dated June 12th. Your Editor had inquired about the 900+ barrier, but it was too late: *"Sorry! We have missed this milestone. But there is an even bigger stone on the road. Just look ..."*

Laszlo Prikler included E-mail from the list server that indicated: *"Total number of users subscribed to the list: 1001."* Your Editor attributes the stunning continued growth to moderation --- control of the noise, too simple questions, wrong answers, insults, etc. The day before, your Editor had compared the EEUG list server with Prof. Bruce Mork's unmoderated Fargo list server: *"I certainly do see the value of moderation. Why Bruce Mork did not, I am unsure. My guess is that the Fargo list server might never have broken the barrier of 700. After exceeding 600, as many subscribers may have been fleeing as were being added."* This final point is consistent with published totals. A total of 505 subscribers was mentioned in the October, 1997, issue whereas 3 years later a total of 607 is mentioned. As your Editor observed June 13th: *"No question, the Fargo list server was approaching saturation whereas the EEUG list server obviously is not. This, itself, is a story. All of us were right to insist on moderation. That much is very clear today."*

Anti-virus advertising is the second type of auto-appended advertising that might prevent a contribution to the list server. Since the start of service late in year 2000, advertising of free mailboxes (e.g., Hotmail) has been a recognized problem. Suddenly, there is advertising for anti-virus software as first rejected by Laszlo Prikler on June 16th. The appendage in question was this:

```
##### ...
This e-mail message has been scanned for Viruses and
Content and cleared by MailMarshal
For more information please visit www.marshalsoftware.com
##### ...
```

Yes, the first sentence seems almost informational. But the second clearly is advertising. Your Editor visited the Web page, and it does not provide details of the virus protection. Instead, it sells several products related to the Internet. The title is *"NetIQ Marshal Solutions: Internet Content Security."* One of the buttons on the left is labeled *"How to buy."* Key words include spam, encryption and data security, pornography and offensive content, and reducing legal liability. But why the advertising? Is the protection free if auto-append advertising is allowed? If not, why would a user tolerate it? The submission came from Harare, Zimbabwe in Africa, and it asked about possible use of PTI load flow data (see mention elsewhere). Your Editor had observed: *"data for conventional load flow and transient stability computation is inherently single-phase and steady-state. At best, a Pi-circuit or a constant-parameter, transposed, distributed line might be produced by any conversion using phasor data."*

Computer Viruses and Worms

The Bugbear virus became common knowledge due to list server mail dated June 6th (but not distributed until June 9th). In this, Gabor Furst of suburban Vancouver, B.C., Canada, summarized the attack on his PC: *"During the morning of June 5 I was struck by a new virus, detected only the previous night by McAfee and not yet included in the automatic email scan. The virus is a mutation of BUGBEAR called BUGBEAR.b.....MM and classified by McAfee as a dangerous one. The unfortunate insult was*

that an email in my files was picked and distributed to addresses in my Address Book. Some of you gained therefore access to a private confidential correspondence, I am very sorry and embarrassed about it. McAfee has now included this virus in their email scan. Due to the nature of the incident ... I will not comment on it or on the email any more, as this would now be an intentional violation of confidentiality on my behalf."

Once again, MS software was involved. Found June 7th at the CNN Web site was an article entitled "More aggressive virus spreads. Bugbear virus returns in variant." About the new threat : "BugBear.B, which is a variant of the 'BugBear' virus that struck in late September 2002, installs a hidden file that can allow hackers to access infected machines ..." So, the potential damage could be more than just embarrassment, note. Dated June 5th, *The Register* had a story about viruses that explained: "the two most prolific viruses on the Net at present -- Bugbear-B and -C -- are variants of previously released viruses." Yes, an *IDG News Service* story dated 2 October 2002 documents the original outbreak as follows : "The Bugbear virus is rapidly spreading around the world ... It is sent as an e-mail attachment ... Code in the virus generates random attachment names and subject lines to avoid easy detection by antivirus software and assigns multiple file extensions to the virus to disguise the fact that it is an executable file. ... The virus appears to be able to forward copies of itself randomly as attachments to old e-mail messages on the computers it infects ... Recipients are randomly selected third parties ... In addition to propagating the virus, this feature discloses otherwise personal E-mail correspondence to third parties." According to a Reuters news story dated June 6th, Stanford University was a prominent victim. "Bugbear virus shut down Stanford University e-mail" is the title of a story found at the *New York Times* Web site. This begins : "The Bugbear worm, which resurfaced this week after initially infecting computers last October, on Thursday shut the e-mail system at Stanford University for nine hours ... Stanford said it disabled all outgoing e-mail on Thursday due to a large volume of messages infected with the Bugbear.B virus. The worm targets personal computers, and is automatically activated on Microsoft Corp.'s Internet Explorer as soon as the e-mail is read, even if the attachment is not opened." The *New York Times* also pointed to a *CNET News.com* story that reported a rapid spread and probable long life. A Symantec expert is quoted as saying: "it could be out there for months and years." The infection occurs "when the user opens up an e-mail attachment containing the virus, or when a version of Microsoft's Outlook e-mail client is present on the system and hasn't been updated to patch a two-year-old flaw. The virus installs a 'back door' onto a victim's system to allow an intruder access in the future; runs a program to record and store what the user types on the keyboard ..."

BPA blocked an incoming .ZIP file on August 2nd. This seems to be a return of the Y2K paranoia. Any reader who has forgotten is referred to a story entitled "The millennium award for Y2K stupidity" in the April, 2000, issue. Orlando Hevia was the victim this time, and the BPA post office noted its destruction in E-mail having "Subject : Spam mail

warning notification! (Attachment Removal)." The following summary explained : "Policy: Attachment Removal ... eManager has removed a sensitive attachment file in the email." Why? This time BPA's action seems to be paranoia about a worm named Mimail. Your Editor first found news of it at the CNN Web site. Dated August 3rd, a story was entitled "Disguised worm evades antivirus software." Once again, MS contributes to the vandalism, of course : "Computer experts have warned of a computer worm that takes advantage of a flaw in Microsoft's Internet Explorer browser. The latest problem is called worm / MiMail.A, also known as W32.Mimail.A@mm. It's a mass-mailing Internet worm that started spreading late Friday afternoon ... This worm disguises itself by arriving as a zip file ... If a user clicks on the attachment, the worm is launched and creates a mass-mailing of itself ..." So, whereas others "began blocking e-mails that contained the 'message.zip' attachment," BPA would seem to have blocked all .ZIP attachments. Even this policy would not be so bad if it involved any intelligence. But it seems not to have. How is this deduced? Mr. Hevia remembered the Y2K hysteria, and he avoided the BPA destruction simply by renaming his .ZIP file. He successfully sent the same file as a .DOC file! Amazing. Only the name of the file type, not the file type itself, seems to be checked. BPA's Y2K stupidity seems to have survived the past three and a half years, and it remains as strong as ever.

Four Mimail messages were blocked by BPA's post office on August 6th. The header provides no hint as to the real source. The "From: admin@bpa.gov" obviously is bogus, and your Editor sees no other indication of the real source in the full header as revealed by MS Outlook. For those who have never made such an inspection, click the right mouse button on the message, then the left button on "Options," and finally copy content from the small window entitled "Internet headers:" .

LovSan or Blaster is yet another worm that MS Windows users have needed to worry about. Dated August 13th, an *ABC News* story summarized : "Security experts are warning that the latest online threat, dubbed MSBlaster or LovSan, is rapidly infecting thousands of computers around the globe." The vandals are becoming increasingly dangerous: "Like previous Internet worms such as Code Red or Slammer, LovSan doesn't need a user to open a suspect e-mail that contains the malicious virus code. Instead, it infects computers by exploiting a vulnerability in so-called remote procedure call, or RPC, found in Microsoft's Windows XP, Windows 2000, and Windows NT software. RPC allows one computer to access another ... Once LovSan has access to a computer, it will install a program called MSBlast.exe. That program then goes on to search systematically for other unprotected computers on the Net and infect them with LovSan." The name Blaster is preferred by *PC Magazine*, which provided a *Security Alert* entitled "How to avoid Blaster infection." Dated August 13th, this confirms that "Windows ME, 98 and 95 are not affected." Once again, note the economy of boycotting Bill G. Finally, the danger : "Blaster does not spread via e-mail ..." Finally, a *Wired News* story dated August 12th included this curious detail: "The worm, christened Blaster ...

carried a message for Microsoft's chairman: 'Billy Gates why do you make this possible? Stop making money and fix your software!!' ..."

The SoBig virus quickly followed LovSan or Blaster, and some suspect a connection to spam. "Sobig virus could be spam ploy" is the title of a *Washington Post* story dated August 21st. This begins: "The quickly spreading virus that stormed the Internet this week could allow spammers to hijack hundreds of thousands of computers worldwide and use them to launch barrages of unwanted junk e-mail." Although not necessarily the source of the virus or worm, "spammers are taking advantage of the inroads that viruses like Sobig provide. ... Owners of computers infected with Sobig can expect to find 'proxy servers' installed on their machines, which is where spam messages would be generated ... Proxy servers ... also can disguise a user's Internet address, offering hackers and spammers an enticing way to take over a computer and use it to anonymously send junk e-mail and launch network attacks. Spammers often hijack other users' computers as they engage in a cat-and-mouse game with Internet service providers and security experts. As ISPs identify and block spam being delivered by a specific computer, spammers jump to other PCs. Viruses like Sobig can offer spammers thousands of alternate computers from which they can send e-mail."

Traces of Sobig have been seen at BPA. During the morning of August 23rd as this newsletter is being frozen for publication, Dr. Liu's mailbox at BPA contains several allegedly-returned messages. Among the more informative of these seems to come from Norton_AntiVirus_Gateways@acconline.com and it has "Subject: Your message contained a virus." Relevant statistics are stated to be:

Virus Name: W32.Sobig.F@mm
File Attachment: your_details.pif

Supposedly the rejected message was:

From: <thliu@bpa.gov>
To: <aldhafara@accmil.com>
Date: Sat, 23 Aug 2003 18:56:36 --0700

But that time is in the future! Also, there is no trace of such a message having been sent from BPA, and the name of the attachment is not one that we would use. Once again, a bogus address (Dr. Liu's) seems to have been applied to a message that was created using someone else's infected computer. This looks serious. The Internet is becoming an increasingly hostile place.

What about the brain-damaged complicity of MS in all of this? Curiously, the average story about Sobig does not mention MS at all. Is it just assumed that, by now, everyone knows? MS **was** mentioned weakly and imprecisely in a story found at the *New York Times* with date August 20th. This had title "Old virus has a new trick: mailing itself in quantity." E-mail, too, might be involved: "Like most rogue programs, this latest virus affects computers running versions of Microsoft operating systems. With SoBig, many computer users whose machines become infected often bring the problem upon themselves by trying to open the attachment that comes with the e-mail message." Finally, at the *Washington Post*, your Editor found details of MS

involvement. "Microsoft Windows: insecure by design" is the title of a column by Rob Pegoraro dated August 24th. This accuses MS in no uncertain terms: "Between the Blaster worm and the Sobig virus, it's been a long two weeks for Windows users. But nobody with a Mac or a Linux PC has had to lose a moment of sleep over these outbreaks ... The usual theory has been that Windows gets all the attacks because almost everybody uses it. But millions of people do use Mac OS X and Linux ... so why do the authors of viruses and worms rarely take aim at either system? In its default setup, Windows XP on the Internet amounts to a car parked in a bad part of town, with the doors unlocked, the key in the ignition and a Post-It note on the dashboard saying, 'Please don't steal this.' ... Security starts with closing doors that don't need to be open. On a PC, these doors are called 'ports' ... These ports are what network worms like Blaster crawl in through ... It's canonical among security experts that unneeded ports should be closed. Windows XP Home Edition, however, ships with five ports open ... In comparison, Mac OS X ships with zero ports open to the Internet." Etc. (on to "the firewall that's down," and other problems of MS Windows).

GNU ATP for Mingw32

Optimizing Mingw32 compilation for his Pentium 4, Orlando Hevia has demonstrated substantial improvement in speed. Recall that the July issue compared Mingw32 ATP speed with free Watcom ATP speed. Now compare that old Mingw32 ATP speed with new Mingw32 ATP speed. The following times in seconds for time spent in the dT loop, are taken from Mr. Hevia's summary in E-mail dated May 26th:

#	File name	default	optimized	% gain
1.	BENCH1.DAT	3.778	3.391	11.41
2.	BENCH22E.DAT	2.310	2.234	3.40
3.	BENCH47.DAT	1.740	1.650	5.45
4.	BENCHN18.DAT	1.628	1.191	36.69

The following morning, your Editor observed: "that march=pentium4 switch is the one that would cause trouble for others. ... But for someone such as Prof. Juan Martinez, who might spend days simulating on the fastest PC, the use of such a specific switch would be profitable. ... Recall N18 was the one test for which free Watcom ATP beat Mingw32 ATP (but only by less than 1%). Now you have just gained 37%!"

ATP Licensing Problems

Tom McDermott no longer works for Electrotek Concepts (see mention in the July, 2002, issue). E-mail from him on May 29th began: "I'm back at Ansoft working on the Simplorer product, and we need to hire some developers. Anybody who has worked on EMTP / ATP development is probably a good fit technically. The positions are all in Pittsburgh, the programming is all in C++ for Microsoft platforms, and the starting date could be ASAP. If you know anyone who might be interested ..." Your Editor knew nothing about the product, which was described this way: "Simplorer competes mainly with

Pspice and Saber, and most of our customers are now in the automotive, aerospace, and power electronics industries. Down the road, it is possible we could be more competitive at electric utilities, so I don't know if that would make a difference to you. But there is no code in Simplorer that came from EMTP." About the desire to hire, your Editor began as follows on June 1st: *"I see similarity between your inquiry and the one from an employment agency in Chapel Hill, NC" (mentioned in the July, 2002, newsletter). Once again, a copy was sent to moderators of the EEUG list server. Your Editor observed: "News of a job might well attract considerable interest, if it were to be E-mailed by the EEUG list server to the 800+ subscribers. But how many interested subscribers could now legally work within the USA? Of those, how many would be program developers? Of those, how many work with C (ATP basically is a FORTRAN program)?" About Simplorer not being derived from EMTP: "You are right to recognize that the original trouble came from DCG and EPRI, which attempted to end free EMTP simulation at the same time they slightly modified EMTP. But, in the licensing agreement, there is nothing in the definition of 'EMTP commerce' that relates to whether or not code might have been copied from BPA's EMTP."*

ATP licensing for UBC (the University of British Columbia in Vancouver) was of interest to a doctoral student, Mishal I. AlSharidah, who wrote from the Power Electronics Lab of the Department of Electrical Engineering. The following day, your Editor explained the problem: *"Location poses a potential problem for free ATP licensing due to the presence of Prof. Hermann Dommel and collaborators on campus. As you may or may not be aware, Prof. Dommel and certain associates (e.g., Dr. Jose Marti) have been actively involved with the DCG/EPRI project to sell EMTP. ... No question, Dommel and Marti were in the Electrical Engineering Department. But the Power Electronics Lab? Is there any associated organization? If just a room in a building, this lab will not help much. But if there is a formal organization that controls access to the lab, this might provide the isolation that would be required for free ATP licensing. Let me show you what was done to solve a comparable problem at the University of Wisconsin -- Madison : ... Excerpt from July, 1995, newsletter: ... But, a critically-important question: would your proposed use have nothing to do with persons on campus who have been involved with EMTP commerce? For example, if Prof. Dommel were an advisor of yours, or had access to the lab in question, I can not imagine effective isolation from the ATP information of interest."*

EPRI must be accused of deliberately attempting to convince potential customers that it knows about, and uses, ATP. Yet, it has no legal right to either ATP itself or any significant ATP information other than newsletters (which are available to anyone). Consider this paragraph from EPRI : *"Analysis of electrical transients is critical to equipment trouble-shooting, insulation coordination, equipment insulation design, and system protection. EPRIolutions has state of the art electromagnetic*

transient programs, such as EPRI / EMTP and ATP-EMTP to model various complex T&D systems and simulate electrical transients. More importantly, EPRIolutions has a team of experts with substantial experience using these tools and interpreting the results." Your Editor first learned of this in E-mail from Tom Field of Alabama Power Company in Birmingham on August 7th. Mr. Field was confused, of course; he was seeking clarification : *"I was searching for something and came across an EPRI advertisement that surprised me. ... The address of this advertisement is ... www.epri.com/destinations/dynamic/dilbert.asp?product_id=2915. ... This is in one of their 'Destinations' 2003 pages. I was surprised to see it because I wasn't aware of any ATP agreements with EPRI."* Yes, Mr. Field had a right to be surprised. The EPRI statement is deceptive at best. It also is educational, however. Your Editor notes two aspects. First, the EPRI statement sheds some light on what EPRIolutions (see the July, 2002, issue) is, or is trying to become : an engineering consulting company. Second, the writing shows just how large and important the community of ATP users must be, if EPRI is trying to convince potential clients that it knows about ATP. It shows either that or perhaps how desperate EPRI might have become as it tries to adapt to the new, hostile, deregulated world of American utilities.

Comings and Goings

The federal government's regulation of traditional pension plans for workers is a growing subject of debate and political contention. Recall that explanation of the *cash balance plan* for IBM workers in the January, 2000, issue. A more descriptive name for such newer plans is *defined contribution*. This is instead of *defined benefit* of traditional pensions (which have fixed benefits). Well, three consecutive down years for the stock market have resulted in funding problems at many companies that have defined-benefit retirement plans. *"Discord over efforts at valuing pensions"* is the title of a *New York Times* story dated May 1st. A lot of money is at stake : *"The question of how best to calculate pension obligations is of tremendous importance to the companies that sponsor pension plans, as well as to their employees and investors. The value of a company's pension obligations dictates the amount it must set aside each year to make sure it can fulfill its obligations to retirees in the future."* Many companies have been unable to fund pensions as required, and the Pension Benefit Guaranty Corporation (PBGC), the federal agency that oversees pensions, has suffered huge losses: *"The agency's deficit has grown ... to \$5.4 billion --- an enormous \$13.1 billion slide from the \$7.7 billion surplus the agency showed at the end of its 2001 fiscal year."* If private, any such organization would be bankrupt. But of course the government plays by its own rules, changing those rules as necessary. How big were losses? The PBGC director is quoted as follows: *"Pension claims for 2002 alone were greater than the total claims for all previous years combined"* (through establishment in 1974). Where are the biggest current

problems? The airline and automotive sectors. Why not steel? *"Most of the pension plans in the steel sector have already defaulted."* If the American economy does not recover soon, the consequences could be serious. About inadequacy of present rules governing the federal insurance : *"At current premium levels, it would take about 12 years of premiums to cover just the claims from 2002."* Fortunately, if short of money, the government always can print more (a frightening thought).

Stonewall Jackson McMurray, III (SJM3) has been heard from after many years. Last mentioned in the April, 1995, issue, Stoney sent E-mail via EEUG's Web site on June 23rd. Curiously, Apple Computer seemed to be the catalyst: *"the new Apple G5 machines ... In thinking of a good test, I naturally looked to such 'monsters' as EMTP and NASTRAN. So a quick Google search turned up your website for ATP."* Around 06:30 AM two days later, your Editor connected to Google.com and tried the same "Google Search" of the Web for "EMTP" without qualification. The summary result was returned quickly: *"Results 1-10 of about 7,780. Search took 0.15 seconds."* The first listing seems to be JAUG: *"Category: World > Japanese > ?????? > ??????"* where those strings of question marks presumably indicate Japanese language. The second reference listed is EEUG : *"World-wide mostly used transients program ATP-EMTP."* The third entry is this : *"About Alternative Transients Program (ATP-EMTP)."* The next line begins : *"W. Scott Meyer and Tsu-huei Liu, the Co-Chairmen ..."* Yes, Google makes location of Dr. Liu and your Editor very easy. It also subordinates commercial alternatives! Plenty of effort seems to have been performed: Google searches *"more than 3 billion web pages."* In his reply, your Editor naturally asked about Mr. McMurray's former workplace: *"Was Ebasco still in WTC 2 on 9-11?"* The answer arrived the following day. In addition to an explanation about the former World Trade Center, it provides insight into the consulting-company side of the power industry: *"Ebasco had totally moved its staff out, first to northern New Jersey; then, as it shrank, it got sold to Raytheon (and we thought Haliburton was bad when they owned us), which also bought United Engineers and Constructors in Philadelphia, and merged the little that was left of either into an office in the Princeton area (1/2 way between NY and Phila.). Then it was sold to TXU in Dallas, which ironically was one of Ebasco's old 'captive clients' back in 1966 when I first came to Ebasco. ... Some of my former colleagues were still there and trapped for several hours during the 1993 attack. ... The 2nd plane hit exactly on the floors where Ebasco had been. Once in a while, I am happy that I lost my job there. 9/11/2001 was one of those days."*

Power Company Politics and Religion

"Lists of exempted Internet sites" was the "Subject:" of E-mail dated May 21st. This was a message forwarded from BPA's Chief Information Security Officer, Kevin Dorning. Recall Web surfing had been largely prohibited under the

guise of security as explained in the July issue. Well, Mr. Dorning provided context for this latest information: *"We have not yet published this list on the Web. I will be giving it to Corporate Communications for publication in BPA ThisWeek."* The list is revealing. It is not surprising that *"all .gov sites are approved"* (i.e., government approves of itself). But the list of news sites is shockingly short. None that your Editor has used during recent years has been approved for use by BPA employees. Not the *New York Times*, not the *Washington Post*, etc. Your Editor sees just two approved news sites: www.npr.org and www.opb.org For readers who are unfamiliar with the acronyms, NPR indicates *National Public Radio* and OPB indicates *Oregon Public Broadcasting*.

Before leaving Dittmer, BPA's Dr. Tsu-huei Liu has been given a second temporary assignment, and this involves yet another move. Her E-mail dated May 30th states : *"I will be asked to move to cubical #2356. Pam is trying to find out where this 2356 is. I will start to box my things now."* The turmoil (a euphemism for managerial insanity; if not understood, read Dilbert) at BPA continues.

Some 50 million Americans and Canadians lost electricity for a day or so beginning during mid-afternoon of Thursday, August 14th. Two days later, most electric service is back to normal, although potable water remains a problem in Detroit and Cleveland ; and news services now offer reasonable accounts of what happened. About scope, the *Washington Times* describes this trouble as *"the largest blackout in the nation's history, which shut down airports, nuclear-power plants, subways, elevators and traffic signals from New York City to Toronto and Detroit."* Yes, massive inconvenience, but negligible impact on safety, amazingly: *"at least one person died in the United States, and possibly two in Canada."* As expected, politicians were quick to try to exploit the event. Republican President *"Bush yesterday declared the blackout a 'wake-up call' to enact the sort of reforms contained in his comprehensive energy plan, which he said recognized the fact that the grid and the delivery systems need to be modernized."* Opposition Democrats disagreed. They *"blamed Mr. Bush."* House Minority Leader Nancy Pelosi said that Bush had put *"the interests of the energy companies before the interests of the American people."* About the cause, *"Ohio lines failed before blackout"* is the title of a story found at the Web site of the *New York Times*. It seems that *"investigators have traced the events ... to the failure of several high-voltage transmission lines near Cleveland."* There is some similarity to the great West Coast blackout of 1996 (see *blackout* in the October, 1996, issue). Once again (see the April, 1997, issue), will God be blamed for making trees grow too fast? The great blackout began *"at 3:06 p.m., when a 345-kilovolt transmission line west of Cleveland shut down ... Ordinarily, that would have no effect on service because the load would be transferred to other lines nearby. But adding power to a line makes it heat up, expand and sag. Twenty-six minutes after the first line failed, ... a second 345-kilovolt line in the same area, probably one helping to carry the load from the first failed line, sagged into a tree, causing it to shut down. ... With the remaining lines in the Cleveland area becoming more strained, three*

more failed over the next 34 minutes, the last at 4:06 p.m. Over the next few minutes, systems throughout the Eastern United States and Canada began to see huge swings in voltage and in the direction of power flow. More lines went down, and power plants shut themselves off. At 4:11, the blackout began." In the end, there remains the problem of relaying, of course. An ABC News story has a section entitled "Spread too far." How did a local problem become a regional problem? "The Ohio power company failed to separate from the national electric grid, as it was supposed to and as Michigan did." According to Michehl Gent of the North American Electric Reliability Council, "the system is designed to isolate itself to protect that area, to have the area go down and have the rest of the system survive. And instead it spread further and longer than it should have." BPA's reaction was found in the August 15th issue of its *Hot Issues* newsletter. Satellite photographs show that "seven hours after Thursday's blackout began, New York was dim. Toronto, Ottawa, Buffalo, (plus Cleveland, Columbus and Detroit) were out entirely." Spokesman Mark Maher stated: "We believe the West Coast system is more reliable than the East Coast" if only because the West Coast was the more recently burned: "After 1996, we derated the system -- lowered the capacity of the Western grid -- thereby increasing the margin of safety." BPA Administrator Steve Wright seemed to call for more federal regulation: "We need to make the reliability standards for market participants mandatory."

Stu Cook Uses Apple Macintosh

"Apple - Power Mac G5" is the title of the main advertising that was found at www.apple.com (the Web site recommended by Stoney McMurray as mentioned elsewhere). Consulted June 27th, Apple computer makes substantial claims about its latest offering: "The Power Mac G5 is the world's fastest personal computer and the first with a 64-bit processor; which means it breaks the 4 gigabyte barrier ... available at speeds up to dual 2 GHz with a new ultrahigh - bandwidth system architecture ... makes the Power Mac G5 a breakthrough in desktop processing power. And models start at just \$1999." About Intel, this is Apples claim: "The new Power Mac G5 throttles past both the fastest Pentium 4 and a dual-processor Xeon workstation when tested using industry standard SPEC CPU 2000 benchmarks ..." About the source of the G5 microprocessor, "Jointly developed by Apple and IBM" is the way Apple allocates the credit. It would seem that Apple does not want to mention PowerPC.

Stu Cook of JUST Services in Rideau Ferry, Ontario, Canada, should be the person who first experiments with the new 64-bit Apple PC using ATP. Informed of Mr. McMurray's interest, Mr. Cook responded as follows on July 2nd: "Yes, this is the machine I have been waiting for. It has been in the rumour mills for a while now. The sort of compute power and memory bandwidth on these beasts should suit our type of computing very well. See the excerpts below: '... The PowerPC G5 ... can virtually address 18 exabytes (18 billion billion bytes) of memory.

The next generation PowerPC architecture is based on a completely new execution core that features massively parallel computation ... two double precision floating point units ...' Now on to the compiler. I contacted AbSoft and they are working on a Fortran (F77/F95) compiler for this platform but won't give a release date for it. The following url gives good marks to the AbSoft compilers ... There is also a 64-bit compiler for AMD/Linus so maybe this will help getting one out for the 64-bit G5 -- only time will tell." As this issue goes to press, deliveries have begun. "Apple ships first Power Mac G5s" is the title of a story found at *The Register* with date August 18th. The subtitle explains: "100,000-plus preordered." But more precisely, what is being shipped? "Initially, only the single-processor boxes, based on 1.6 GHz and 1.8 Ghz IBM PowerPC 970 chips, have begun shipping -- dual 2 GHz systems will be dispatched 'late this month'."

Rotating Machinery Modeling

Two induction motors that use compensation, yet are **not** isolated from each other in separate subnetworks. This is the subject of a new 7th subcase of DCNEW-1, which was added May 15th. As far as your Editor can determine, correct simulation should **not** be possible. Yet, it seems to be occurring. Not only does your Editor believe this, so does the data author, Gabor Furst. Your Editor's initial incredulous inquiry about the data had "Subject: Compensation separated by small resistors?" Mr. Furst replied as follows on April 25th: "I have known this for a long time. Maybe I should have told you about it. I even showed it at the Wroclaw EEUG meeting. Don't change the program. It is quite clever. Actually, I did not think that it was peculiar. I thought that UM compensation only checked for two motors on the same bus. May be there are useful bugs." Prior to becoming a standard test case, the data was TC2RES.DAT as kept at home within f:\data. If and whenever your Editor understands enough, an error termination should be provided. However, logic of subnetwork checking is both complicated and fragile, so should not be casually modified. At the very least, days of study and documentation probably would be required.

396 Coupled Coils in Hong Kong

FGH dimensioning should have allowed 400 coupled coils as explained in the October, 1999, issue. But details of trouble using GNU Mingw32 ATP were received on June 11th from Dr. Patrick Du at Hong Kong Polytechnic University in China. Redimensioning solved the problem for Salford EMTP, but not Mingw32 or Watcom ATP, as the following writing will summarize.

First, let's document the two data files with which your editor began struggling on June 13th:

```
05/24/2003 11:34a 5,576,786 kong385.dat
05/24/2003 09:41a 5,899,543 kong396.dat
```

These involve 385 and 396 coupled coils, respectively.

Yes, some ATP tables required expansion, but it was possible to shrink others nearly to zero. Whereas FGH dimensioning resulted in "Total size of LABCOM tables = 9768332 INTEGER words," your Editor reported: "You easily can cut this in half. I did this using the following replacement for LISTSIZE.FGH ... I did need to expand List 23 (to 350K) and List 41 (to 650K). But I reduced a lot of others. The resulting total table size is 4743K words. Of course, the blank data fields are requests for default dimensioning, which is close to nothing by modern-day standards."

Need to set UNIXON = 1.0 in STARTUP was the biggest surprise to your Editor. Data was Unix-like rather than an MS-DOS EDIT file. Each line ended with just <LF> whereas MS-DOS expects <CR><LF>. Of course, Vernon Buerg's great freeware LIST provided this diagnosis after Salford EMTP choked quickly. But this problem was recognized, and corrected, years ago (see the April, 1998, issue).

More virtual memory was needed. Your Editor's PC has 16 Mbytes of RAM, and a 16-Mbyte paging file was being used. But this was inadequate for the KONG* data. Execution died in LAST14 of overlay 14 with Salford DBOS complaining about something such as 'page memory exhausted.' An extra 16 Mbytes was more than enough, however.

So, Salford EMTP handled the KONG* data easily enough, but Mingw32 ATP was more of a challenge, surprisingly. Dr. Du reported as follows in E-mail dated July 6th: "Unfortunately ATP/Mingw32 generated the same error message. We doubt whether it has an inherent limit of 400." The following day, your Editor confirmed the problem by work at BPA. Execution ended quickly, with no output file. But your Editor did note a message on the screen: "STOP memory allocation failure in writ10 statement executed." He reported to Mr. Du: "You may be the first person in the world to have required more than 150K card images. Your input data is more than 75K, and one needs twice as much space because of sorting. For Salford, this is not an issue because we have virtual scratch files. But for GNU, the space must be created dynamically."

Both Watcom and GNU ATP have the same problem. But details differ: "My recollection is that we used Bob Meredith's Watcom procedure ... No doubt Meredith thought that 150K cards would last forever. ... Yes, Meredith provided increments of 10K, 20K, 30K, 40K, and 50K. Added together, these equal 150K. If we maintain the concept, we should add a block of 60K, which would raise the total to 210K data cards. Unfortunately, C was used ... What Meredith did using Watcom FORTRAN, Masahiro Kan seems to have done in C."

Rapid expansion of the C was provided by Masahiro Kan of TMT&D Corp. in Japan (see the January issue). Later that same day, he explained the origin of his code: "I converted rd_wr10.f to rd_wr10.c using f2c (Fortran to

C converter) and then modified the result to use the dynamic memory allocation function of C. ... I have to go to a business trip to Korea tomorrow and will come back this Saturday. ... I will work on it this Sunday." But in the interim, avoidance was recommended by your Editor. On July 8th, he wrote: "Avoidance might be easier. Note that you have no problem if you remove the '/' cards of sorting. They are what double the demand for storage of card images. If you remove the /BRANCH, etc. cards (do the sorting manually using a powerful editor such as pfe), you will have almost twice as much space as you need. Another idea: leave the '/' cards but remove the transformer to a separate file. Use \$INSERT on it. Recall \$INSERT is a dynamic \$INCLUDE, so would avoid processing at the start of execution. Of course, for such huge data, FORMATTED input is inefficient. You certainly could speed input by a change to C-like HOPC. See newsletters for discussion. This 3rd alternative also would avoid the need to store card images. This, too, would solve your existing problem of overflow."

Expansion to 360K input data cards was the progress reported by Masahiro Kan in E-mail dated July 13th. Some 2 days later, Watcom FORTRAN was comparably extended. As for F95 Lahey, it followed older VAX / VMS code that used virtual memory. This, too, was comparably expanded just to prove that it was possible (it was). The burden is huge: 360K * 80 = 28.8 Mbytes. Yet, MS Win 2K and the Lahey compiler withstood the burden. Good. To be continued.

CIM of EPRI Explained By PTI

EPRI's Common Information Model (CIM) first was mentioned in the January issue. Finally, an explanation and evaluation of it for possible ATP use has been received from a knowledgeable source. In E-mail of the EEUG list server dated June 17th, Daniel Durbak of Power Technologies, Inc. in Schenectady, New York, provided the following insight (next 7 paragraphs):

"This is ... with regard to conversion of PSS/E data to ATP and the Common Information Model (CIM).

The comments below are from Stephen Mauser, a PTI manager who is very familiar with PTI's PSS/E data formats, CIM and EMTP.

The short answer is that the CIM does not generally accommodate the data definitions required by ATP.

To date, the use of the CIM of which I am aware has been limited primarily to a single-phase and three-phase network representations suitable for load flow and short-circuit analyses. However, the CIM does contain the capability to accommodate line geometries (e.g. conductor type and configuration, spacing, height above ground, etc.), but I do not believe that this part of the CIM has been exercised so there may be some touch-up in the CIM that would be necessary.

There are limited machine characteristics available in the CIM. The machine parameters presently included in the CIM are also generally for steady-state or short-circuit analyses. But, PTI being a strong proponent of the CIM, we are in the process of extending the CIM to include transient stability models for machines, and excitation and governor systems.

From the ATP perspective, PTI feels the CIM is too young for immediate use in representing all the parameters for ATP studies. However, as the need continues to arise the CIM will continue to grow to eventually contain suitable models for ATP.

In the meantime, PTI would use the CIM as a central definition of that data that is common to ATP and other applications, and would use the native ATP data definitions to define those parameters that are ATP-specific."

End of explanation from PTI, which is to be thanked heartily for its useful opinion. About context, the previous day there had been a question from Nompumelelo Bofu of Zimbabwe Electricity Supply Authority in Harare. He had asked: "I ... have a database of equipment that I am using with PSS/E for stability and loadflow studies. How do I convert this equipment database for use with ATP?" In his moderator's appendage, your Editor had generalized the question: "But should interest be limited to phasor (50- or 60-Hz) data? Also, is the question not bigger than PTI? Remember that inquiry ... about CIM by EPRI. ... Data might be complete in the sense that it would include line geometry? If so, that could be fed into JMARTI SETUP to produce a better transient model (assuming the line is long)."

Publishing Programs and Viewers

Problems using Adobe Acrobat Distiller to create a PDF-format copy of the newsletter were mentioned in the July issue. As part of pre-publication review, Orlando Hevia in Santa Fe, Argentina, made this observation on May 29th: "I have comments about PDF generation. You can use a free PDF writer at www.pdf995.com I send you two samples from the same Word document." Later that same day, he added: "As I wrote, pdf995 works as a printer. A small price (advertising on your screen) must be paid, but the PDF output has no such advertising (other 'free' pdf writers add advertising on the last page of PDF documents)." Connecting to pdf995.com, your Editor learned more on May 31st. It would seem that 995 is the number of pennies that one must pay to remove advertising from the screen. I.e., this is a \$10 product in its commercial form: "The free versions display a sponsor page in your web browser each time you run the software. If you would prefer not to see sponsor pages, you may upgrade by obtaining individual license keys for each product at any time for \$9.95 each. ... Licensing also entitles you to technical support (response within 24-hours) via e-mail." Note that unlike Adobe Distiller, PostScript is not the input of Pdf995, which is executed "by simply selecting the 'print' command from any

application." A dominant advantage would seem to be the preservation of dynamic links. Recall how the loss of these for WP 9 was lamented in the January, 2001, issue. Well, a feature of Pdf995 is said to be "automatic insertion of embedded links."

But pdf995 does have some disadvantages, and an important one would seem to be size of the PDF output. Without modification, the April newsletter was used as a test on June 8th. WP 10 imported the MS Word 7 disk file apr03.doc without difficulty, and your Editor then *printed* the result. He also PKZIP-ped this, to see whether substantial compression might be possible. The DOS DIR inventory of these two files follows:

```
06/08/2003 07:47a 491,065 APR03.PDF
06/08/2003 07:50a 380,727 APR03.ZIP
```

As shown in the July newsletter, this is not good by Adobe Distiller standards. The old Distiller should produce output of about 152 Kbytes whereas newer Distiller produced the 236-Kbyte .PDF file that now is being used (until it can be replaced by a more compact one).

Need for an Internet connection is another disadvantage of pdf995. At least this is a disadvantage of the freeware version. Perhaps the need would disappear if the \$10 royalty had been paid? If the user of pdf995 has a broadband connection, the inconvenience is minimal since then the advertising should appear, and could be dismissed, rapidly enough. Note that the advertising is remote, and presumably dynamic; it is not local and static. Understand the ramifications of this: advertising might be changed on a daily basis, and could increase in volume later. It would seem that pdf995 refuses to create its PDF output unless the Internet connection exists at the time of requested PDF creation. For this, your Editor's slow dial-up service using Pacifier is a considerable handicap; and this need to connect represents an extra step of PDF printing that must not be forgotten. Presumably lack of an Internet connection to your Editor's Win 95 PC explains why the installation of pdf995 failed on that machine. The 4431-Kbyte .EXE archive was transferred in 4 pieces without difficulty using freeware SPLIT by Mike Johnson. What a great old program (it dates to 1989). Decompression then seemed normal. During perhaps 20 seconds, files were named as they were extracted from the archive. But your Editor could find no trace of the files after the Winzip window closed on its own, and no directory \pdf995 seemed to be created.

Imperfect display is another disadvantage of pdf995. Paging through the Acrobat display of that 491-Kbyte April newsletter, your Editor notices a common distortion: some lines protrude into the right margin. The most common cause of this problem is mishandling of the apostrophe character: an extraneous blank byte is inserted after each. Since the apostrophe is commonly used in English, the blemish is far from rare. The less-frequent cause for line extension is superscripts on numbers (most commonly a date such as March 15th), which typically are positioned poorly. The superscript often is not separated horizontally from the number by an appropriate amount of space. Usually there is too much space, and frequently more than one extra blank byte is involved. But sometimes too little separation seems

to occur. It is to be emphasized that the problem seems to be in pdf995. No line extension (into the right margin) was observed in the WP 10 window, either in edit mode or Print Preview mode.

Line extension should affect document length, of course. But it was difficult to judge how much because of the use of WP 10 as an intermediary. I.e., WP 10 did not have the matching fonts, so even before PDF creation, the length was excessive (page 21 was more than half full). It is unfortunate that the PDF could not be created from your Editor's Win 95 PC where the document is a perfect 20 pages within MS Word 7.

A bad font for Greek letters was noted by consideration of the ATP Rule Book segment CHAP2B4. Consider Prof. Mustafa Kizilcay's Sect. II-A.33.3 (new number) about frequency scan. Impedance is involved, and is indicated by a capital omega (within WP 10). Unfortunately, this appeared as a capital sigma in the Acrobat display of the pdf995-produced output. Another error involved the raised dot that indicates multiplication. Prof. Kizilcay has $U = Z \cdot I$ where the period used here is raised to half the font height. Acrobat displays this as what appears to be an "approximately equal" sign (an equal sign with a squiggle on top of it). Yet, it is hard to be sure because of overprinting (positioning is poor). So, bad news. But there is some good news : no sign of the line extension that plagued the newsletter. Perhaps this trouble might be confined to the use of 2 or more columns. Or, perhaps the lack of an apostrophe protected the small sample.

GNU Ghostscript is a part of pdf995, it should be mentioned. The disclaimer at the bottom of an information file states : *"pdf995 comes with absolutely no warranty. This software contains a partial version of GNU Ghostscript 7.05, Copyright 2001 artecode LLC installed in c:\pdf995\res\convert. GNU Ghostscript comes with absolutely no warranty. ..."* So is this the secret of the \$10 price? In fact, is pdf995 basically just repackaged freeware?

Use of pdf995 ended July 3rd when your Editor disconnected it following the advice of Laszlo Prikler. Your Editor had objected to the mention of PDF995 (in a window, when a document is opened) when in fact PDF995 had not been used: *"I wish I knew enough to un-install (and trash) this free software."* June 23rd, Laszlo Prikler had advised : *"Start menu | Settings | Control Panel | Add remove programs. If you see the PDF995 in the list, you can remove it."* It worked. But the technique did not work on the Pacifier icon. At the end of July, as your Editor's 90-day subscription expired, your Editor did not note Pacifier among the list provided by MS. The installation procedure of Pacifier seems to have been trickier.

Type - 91 or 93 TACS Source

The UNIQUE TACS SWITCH (UTS) request, if added to data that produces the just-mentioned warning, will result in an error message of the form: *"KILL = 42. ... the*

TACS source that is defined by a switch touching node ... is not unique ... so execution is being halted."

The first report of trouble that was traced to ambiguous switch specification was made by Francisco Javier Peñaloza Sánchez of CFE LAPEM in Morelia, Michoacan, Mexico. His E-mail dated April 21st had *"Subject: TACS calculation problem."* Note that this summary description turned out to be right. Because wrong switches (probably 3 or more) were being specified, TACS sources were wrong, so TACS control signals for thyristors would be wrong. The trouble was described this way: *"Several months ago, I experienced inconsistent calculations with some TACS-based Data Base Modules (DBM), and at that time I was unable due to the constraints of time to learn the cause. ... Now I again have had that experience in a new case ... This time, I was able to isolate the condition that seems to yield the inconsistencies: \$INCLUDE calls of DBMs -- pure reclosing switches -- in the BRANCH section. ... Would you please confirm this finding?"* Your Editor did quickly confirm the trouble. But data BUENO and MALO were large, and a day or two of experimentation was required to understand that ambiguity about switches was responsible for the trouble. Modules REQUES and SSTACS were modified for the last time on April 29th.

ATPDraw was involved, but only indirectly. In E-mail dated May 7th, your Editor opined: *"I agree with you, this error has nothing particular or special to do with ATPDraw. The misunderstanding could exist with or without ATPDraw. However, ATPDraw does allow the user to ignore the data file. Yes, he can look in it, but he is not forced to do so. As a result, the average ATPDraw user is less aware of data order, I suspect. ATPDraw adds to the abstraction ... My guess is that the average ATPDraw user hopes to read the Rule Book less. If an ATP user is not forced to read the Rule Book to learn column numbers for data, probably he will not read it as often to learn other details, either. My guess is that this is human nature. ... Now that we know the danger, it is unfortunate that Hoidalén did not force the ATPDraw user to name his switches. Not every switch, but a switch that serves as input to TACS (Type-91 or 93 source). Maybe it is not too late. ... Whereas now ATP issues a warning message, this is too late to correct the simulation. This is because ATP execution is batch-mode. But ATPDraw use is interactive. I can imagine that Hoidalén could issue the same warning message interactively, giving the user a chance to name his switch -- to correct his error prior to the first simulation. This is where ATPDraw has the advantage. It is more like interactive SPY this way. But maybe the added check would be too complicated for Hoidalén. He can not do everything, and it is not trivial to check the BUS1 and BUS2 names of all switches. Anyway, it is an interesting thought."*

Secrets of ATP Modeling

That discussion of how to keep modeling secrets (see the preceding issue) was joined by Prof. Mustafa Kizilcay of FH Osnabrueck in Germany. In E-mail dated May 30th, he

wrote: *"Your article ... is very interesting to me. I think this is an important issue within the ATP community, to share models that are not implemented in ATP code. This is the case for new models, especially models of new electronic devices such as FACTS, dynamic voltage restorer, control of wind generators and photo voltaic generators, etc. I see two main advantages of hiding the source code of certain models ... If it would be possible to encode certain part of the input data (generally MODELS and/or TACS) by a user-defined password, this might be sufficient. My idea is to extend DATA BASE MODULE ... Unfortunately, I have no idea about the encoding/decoding algorithms, but I can ask a professor at our school ... Another important point is that such encoding feature should be compatible to ATPDraw."* In his response June 2nd, your Editor was supportive. About the need for guidance: *"I suspect that we would need to rely upon the judgment of some expert. The subject is too involved, and the consequences of a misunderstanding are too great, for one of us to assume responsibility."* About ATPDraw: *"Hans Hoidal's job is hopeless. The target continues to move. Yet, I do not disagree with you. Today, the average ATP user seems to rely on ATPDraw. So, this is one more complication of the proposal."*

Secrets in data can not easily be made secure, however. This is your Editor's conclusion following considerable discussion and thinking together with Orlando Hevia of UTN in Santa Fe, Argentina. The fundamental problem is this : as now structured, ATP data exists as a file of card images. Whether stored on disk or in RAM, the input data file exists, and this existence is what makes security difficult. Consider the two possibilities :

If input data is stored on disk, there is no known way to prevent the user from looking at it using a standard tool such as Vernon Bueg's freeware LIST. Yes, the file could be made temporary, and in theory such files might cease to exist once ATP execution ends. But in practice, such files are left somewhere on the hard disk when execution terminates abnormally. This is dangerous because there is no way to prevent a user from terminating execution abnormally. For Wintel PCs, **Ctrl-Alt-Del** through the keyboard should do the job. Timing would be no problem for an intelligent thief because execution could be suspended in any module of user-supplied source code. A symbolic debugger would allow such interception, at which point the user could terminate execution abnormally. Then, the user would merely look in whatever directory the OS uses to store scratch files (Mr. Hevia claims to have found them for every program version that he uses).

If input data instead were stored in RAM (as is the case for VAX/VMS ATP), it certainly would disappear upon the completion of program execution. However, it would exist during execution, and might be available through a symbolic debugger. Again, it probably would be impossible to deny access to an intelligent thief. For example, consider variable dimensioning, which would be a practical necessity (see the story about 396 coupled coils in Hong Kong). If done as for existing numerical vectors, COMMON would be used, and block names could be learned from commands to the linker for some versions (e.g., F77 Salford). Once again,

user-supplied source code is the Achilles heel. The intelligent thief has access to any COMMON block that he wants via the symbolic debugger. Even if fixed, local storage were used for input data, it might be accessed using any COMMON block with an out-of-bounds subscript. What reader can assure the owner of the secret that this is not possible? None, your Editor suspects.

TACS Definition of Series R - L - C

Orlando Hevia's TACSCAPA.DAT was the first semi-realistic use of the new TACS control, and it has been added as a new 5th subcase to DC-38 beginning December 30th. This is for corona modeling of a single-phase transmission line. As explained on comments, both the time-step size dT and the ending time have been adjusted to speed the simulation. Yet, resulting waveforms are not much affected, even though the number of steps has been reduced from 4000 to 200. Mr. Hevia wrote a program to build such data, and the first sample output that was seen in Portland involved 200 cascaded line sections, each with a TACS-controlled capacitor. But the 5th subcase is a much smaller illustration involving just two line sections and a single TACS-controlled capacitor. Note the comment cards that automatically document the cascaded connection :

FIRST STEP CAPACITY	3.000000E-06	uF/KM
SLOPE	3.000000E-12	uF/KVKM
CORONA INCEPTION VOLTAGE	3.600000E+05	V
LENGTH OF LINE SEGMENT	1.000000E+00	KM
NUMBER OF SEGMENTS	2.000000E+00	

The surge is lightning, and this is fast, so very high frequencies are involved (note the use of JMARTI frequency-dependent line modeling). Constant-parameter modeling by K. C. Lee also has been used.

TACS control of the turns ratio of an ideal transformer is yet another idea that has occurred to your Editor. The series R-L-C branch was controlled first because it was simplest. But it is just one of many different branch types. Why not another branch? The IDEAL TRANSFORMER first was described in the April, 1994, issue, and is illustrated by BENCHMARK DC-25. In theory, this is what your Editor is thinking of. In practice, it would be 2-winding USE AR representation that probably would be controlled because IDEAL TRANSFORMER is less reliable and less general due to reliance upon the Type-18 source. Allowing TACS to control the turns ratio of a transformer would allow the adjustment of the tap of an LTC (Load Tap-Changing) transformer, would it not? What ATP user can foresee the utility of this or some other such relatively simple TACS control?

MODELS control, too, is permitted. Although your Editor prefers TACS because of its greater compactness, simplicity, and simulation speed, any control signal can be defined in MODELS rather than in TACS. Several components of the electric network can be controlled by either TACS or MODELS, and the series R-L-C branch is yet another of these. Recall MODELS author Dube cleverly generalized his definition of a TACS signal to mean *The Alien Control Signal*. This applies to the present use with

series R-L-C just as it does to rotating machine models. Just be forewarned that TACS takes precedence. I.e., if both TACS and MODELS have a variable of the same name, it is the TACS alternative that will be used.

Courses : Is Licensing Required ?

For a course that involves ATP, is it necessary for all students to be licensed? The need for judgment was discussed by the Japanese (JAUG) and Can/Am user groups in E-mail dated May 1st and 3rd. Masahiro Kan, the Vice Chairman of JAUG, had begun the discussion by explaining recent concern : *"Some teachers at a University in Japan plan to open an EMTP course using ATP. They plan to do a lecture and let all the students do exercises using ATP program. These teachers asked JAUG if it is permissible."*

Mr. Kan continued: *"We JAUG discussed this, and have some differences of opinion. The points upon which we have a consensus are: a) Each teacher must apply for an ATP license and be approved by JAUG; and b) The password information for the secure sites is not available to students. This restriction to students is necessary because they are less reliable. The point upon which we don't have a consensus is: c) Each student must apply for a license, and be approved by JAUG. Some secretary thinks this is a comparable situation to a department license, where the responsible teacher signs the license and takes care of the management of ATP secrets in the department. So, he thinks students do not need to apply for a license. Another secretary believes differently. He believes that, in a laboratory, a responsible teacher can manage students because the number is limited. On the other hand, the number in the course is practically unlimited, so the management of the students would be difficult. He also notices the paragraph about education in the form letter, and this requires a student's signature."*

Two days later, your Editor did not disagree. He emphasized the need for judgment : *"It depends on details. That is what we decided during the late '80s when an ATP version for IBM - standard PCs first became available."* Certainly *"teachers would be handling ATP information, so they should have such access only if they are licensed."* Internet storage would not be available *"assuming that a student is not licensed."* About students being less reliable : *"Seems to be the same problem around the world."*

But must each student be licensed? *"This is where details become important. In this country, typically students want to leave the course with a copy of important ATP materials (e.g., TPBIG). In this case, the student must be licensed. But there are cases where all students could be licensed free of charge, but have not yet been. As long as no important ATP information is removed from the course by the student, at this late date it probably is not reasonable to require that all students be licensed."*

There simply are too many cases where this situation has occurred in the past. Of course, there always is ambiguity (how important is 'important' in the previous statement?). Note the condition 'could be licensed free of charge.' The preceding ... does not apply to a person who has been engaged in EMTP commerce, or who presently works for such an organization ..."

About a class being comparable to a departmental license, your Editor observed: *"I agree. But what teacher wants to take that responsibility? Certainly Prof. Dennis Carroll at the University of Florida did not. For him, it was easier and clearer to require that every individual (typically a graduate student) that he worked with using ATP have his own license."* So is it possible that a student not be licensed? *"Yes, provided no student wants his own copy of ATP information on magnetic, paper, or other mass-storage medium for later use, provided he **could** be ATP-licensed free of charge, etc. The answer is yes, subject to some important restrictions."*

About the difference between a laboratory and a lecture: *"This seems reasonable. But if the student is not licensed, the teacher accepts responsibility that valuable ATP information will not be copied and removed for use outside the course. Also, the student must be capable of being licensed free of charge (e.g., a CRIEPI employee would not be)."*

About that paragraph in form letters, it was written during the spring of 1988 prior to the 2-week ATP short course at Cal Poly in San Luis Obispo, California. There were concerns about advertising and licensing for that course. Note that such short courses are fundamentally different from normal, longer courses within a university. For one thing, these American ATP short course (first Cal Poly, then the University of Minnesota) were heavily advertised to unknown persons via mass mailing of course brochures. Typically IEEE and other mailing lists were used, and thousands of unknown persons in industry were solicited. Included certainly would be employees of organizations that could not be ATP licensed free of charge. How could an instructor take responsibility for each member of such an unknown group? The answer seems obvious: he could not.

About the need for all faculty to be licensed: *"Recall this is the provision that caused cancellation of the EEUG short course in Sopron last December. Read about **former** ATP developer Dube in the April newsletter."* In this case, it did seem that there was a deliberate attempt by a proposed instructor to avoid licensing. This by itself seemed suspicious. Why would an instructor not be willing to sign a licensing agreement?

Your Editor concluded with agreement about the importance of mutual understanding of such matters: *"If you have any more questions, simply ask. It always should be better to have consensus than misunderstanding or differences of interpretation."*

Rule Book in PDF Format

This is a continuation of the story that began in the July issue. Although not yet high quality or compact or current, a complete PDF copy of the Rule Book is available on the Internet. This is important progress.

Yet, with a fast connection to the Internet, downloading seems doable. Next, Ashok Parsotam in New Zealand requested advice about how most easily to download such a large family of files. Following discussion in which two subscribers had recommended use of wget, Prof. Funaki decided to create a single file. This seemed to satisfy Mr. Parsotam, who wrote on May 8th: *"I decided to download the single file containing all chapters. I am currently downloading the 59.4 MB of bulk.tar.gz file from the above site. Our IT staff has estimated a download time of about 30 - 40 minutes ..."* A little less optimistic, although still encouraging, was a report from Dr. Kiril Tagarov of Energy Institute JSC in Sofia, Bulgaria: *"I downloaded it using the free software Go!zilla (www.gozilla.com), which permits automatic reconnect. The download took more than 2 hours and has been reconnected and restarted automatically 3 times without any additional action on my part."*

Laszlo Prikler explained his perspective to subscribers in list server mail dated May 9th: *"It seems that the topic has excited many of you. Moderators received many more messages ... I was encouraged to share my private opinion in order to inform you better about the complexity of this issue. Let me start with an historic overview:"* Paragraphs have the following beginnings: *"1) Before 1993 many chapters were re-edited by LEC staff using Lotus Manuscript software. ... 2) Around 1994, Martin S. Jones, then with Nottingham University, UK initiated a 'share the workload among users' project. ... 3) Around 1995-2000, in cooperation with program developers, EEUG was able to donate manpower that resulted in some new, updated, revised chapters (e.g. I-L, III, V, XVIII) ... 4) Around 1996, program developers in Portland themselves were able to devote some time for program documentation. ... 5) Around April 2001, I experimented with several OCR software using paper copy of chapter X ... 6) In 2002, Mr. Gabor Furst was working hard with Can/Am News and presented a paper ..."* That was the past. About the present: *"Latin Americans selected a different method ... They have chosen the 'brute force' method: scanning the ATP Rule Book page by page. The output first was made available to local ATP users on CD-ROM ... Finally, I show you the message I sent privately to listserver moderators yesterday."* This letter begins with a concern shared by your Editor: *"It seems that a 'me too' epidemic is growing fast after Dr. Funaki's message. Do we have enough time to reply to each one separately?"*

Finally, to moderators, Orlando Hevia explained his thinking about the "brute force" approach of optical scanning: *"After working with photocopies of photocopies of ..., some Rule Books that I saw are worse than our PDF*

files. We (Latin American users) had serious difficulties to obtain ATP materials. Years ago, it was necessary to wait months for a magnetic tape (VAX or IBM times) or diskettes (later PC times). The Internet eliminated the problem of ATP distribution, but the Rule Book continued (and continues) to be a problem for us." About date of the PDF information: *"The scanned Rule Book is dated 1987/1995."* So, no apology about age or quality of the PDF output. It was a choice between *"our bad quality Rule Book and the darkness."* As for the future: *"An updated Rule Book (only the updated chapters is sufficient), will be very welcome here."*

Combined photocopy and PDF output? This was the revolutionary progress summarized by Ashok Parsotam in Auckland, New Zealand. Dated May 14th, he wrote: *"At Vector Ltd we now have a photocopy machine which also acts as a document scanner. It scans individual sheets of a paper (at 400 dpi resolution), converts it into a PDF file and emails it to a given email address. At 600 dpi resolution, the PDF file increases from 3 MB to 8 MB. On my screen there is little difference between the two images. I am attaching a sample scanned image of the April 2003 Can/Am Newsletter for your information. Scanning 20 pages of the newsletter took less than 60 seconds."* Of course, thinking was about the Rule Book, for which Mr. Parsotam offered this marvelous machine: *"I am making myself available to scan by chapters whole of ATP Rule book and send PDF softcopy ... I checked and there is no issue of cost at our end. However, I need a good copy of the original document."*

A 100-page PDF copy of Chapter II of the Rule Book is available in draft form as this issue of the newsletter goes to print on September 2nd. File size is 489 Kbytes.

Interactive Plotting Programs

The unbundling of huge archives is important for persons who rely upon weaker and / or less reliable connections to the Internet. This point was made by Laszlo Prikler in list server mail dated May 6th. About ATP Analyzer (see the April issue), he wrote: *"Some of you reported troubles with downloading the quite fat (17 MB) install kit of ATP Analyzer. From a recent private communication with program developer Mr. Glen Fortner, I learned that it is unnecessary to uninstall the previous version and install the new one each time a new 3.xx version is launched. ... So anyone upgrading to 3.09 from an earlier version 3.xx should be able to simply replace the older ATPAnalyzer.exe file with the latest one. ... ATPAnalyzer309EXE.zip (1.4 MB)"*

Miscellaneous Intel PC Information

MRAM is a new memory alternative from IBM and German Infineon as explained in a Reuters story dated June 10th. Found at the CNN Web site, this explains that the M indicates *magnetic*, which has the advantage of

being non-volatile. This could allow *"computers to boot up instantaneously. IBM said that the magnetic random access memory technology ... could replace existing forms of dynamic random access memory, or DRAM ... as early as 2005."* Of course, magnetic storage is old, not new. When your Editor began during the middle '60s, all fast memory was *core*. Those CDC mainframe computers that were used at BPA through the '70s had 131K words of core storage plus extra ECS (Extended Core Storage) memory. So, an old phenomenon (magnetic storage) seems to have been exploited in a quite different way. Integrated circuits have replaced the old miniature toroids. *"IBM ... has been working on developing MRAM since the 1970s ... It said it hopes to have some demo products that use the chips out next year."* About the new technology: *"IBM's memory cell is 1.4 microns ... IBM is presenting the development at the VLSI Symposia in Kyoto, Japan on Tuesday."*

Miscellaneous Small Items

\$ABORT has existed since the mid-'80s, and is illustrated by BENCHMARK DC-42 and DC-64. Prior to a small addition to SUBR29 on May 9th, a KILL = 88 error message was used to end execution. But why? What did the error message add to understanding? Thinking about the matter, your Editor concluded that the error message not only wasted space, it actually confused the situation. After all, there was no error. Instead of reporting an error, the program simply was aborting execution in response to a command in the user's data. So, the KILL = 88 error message and all of its associated framework ("ERROR ERROR ...", etc.) has been removed.. But the interpretation of the \$ABORT card remains, and this should be adequate to explain the end of program output for the data subcase in question. Another small detail is worthy of note. The data of DC42.DAT immediately following \$ABORT orders a change to narrow output. Yet, this was not being honored. Now, following the modification, it is. It will be noted that the following nonexistent subcase begins as 80-column rather than 132-column output.

Bound IPST conference proceedings are increasingly unavailable to the general public, it would seem. Marta Val Escudero of ESBI in Dublin, Ireland, had sought a paper dating to 1997, and had observed the following to EEUG list server moderators on July 31st: *"Unfortunately the conference proceedings are sold out ..."* In a response later that same day, Laszlo Prikler confirmed the problem: *"Yes, this is the case with IPST '99 proceedings, too. I was not forward looking enough and the last volume was sold a year ago."*

A zero subscript NITROM troubled the simulation of BENCHMARK DCNEW-1 prior to a correction to SOLUM2 on July 25th. That 3rd subcase deliberately illustrates a KILL = 91 error termination as mentioned in the July issue. Vector VOLTK had been introduced to save previous speeds (available in the diagnostic file as

shown on comment cards of the data). The July, 2000, issue documents 3 separate discoveries of bad subscripts, but those were cases where the cause of trouble was visible. The present trouble more resembles a paragraph in the October, 2000, issue which begins as follows: *"An illegal subscript of a dynamically-allocated vector is not always appropriately prevented by the Lahey F95 compiler, it was discovered. This frightening conclusion ..."* This time, recollection of the vector that was being violated seems to have been lost. Later, it was impossible to DEALLOCATE vector VOLTK as required to service NEW LIST SIZES in the following (4th) subcase. Your Editor had hoped to demonstrate the phenomenon using the following 4-line program ZERO.F95 :

```
REAL*8, POINTER :: VOLTK (:)
ALLOCATE ( VOLTK(50) )
VOLTK(0) = 1.0
DEALLOCATE ( VOLTK )
```

But no such luck when compiled by LF95 -nco. In any case, the ATP error message that started the investigation was : *"A DEALLOCATE statement cannot be executed for a pointer <i-th argument: VOKTK> whose target was not created by an ALLOCATE statement."* The following traceback did point precisely to the DEALLOCATE statement for VOLTK, and the trouble disappeared when non-positive storage in it was prevented. So, no question about the reliability of F95 Lahey. The conclusion is this: inability to overflow from one vector to another represents a significant loss of flexibility compared with F77. Alternatively, if such overflow seems to damage the program, why did F95 not prevent it? Your Editor is not appreciative. He prefers the flexibility of F77 where the location of a COMMON block can be defined by the programmer using a good compiler such as F77 Salford.

Triacs, which are Type-12 switches that also are called spark gaps, were limited in number to 50 prior to a modification to OVER16 on August 4th. The request for expansion came from Orlando Hevia of UTN in Santa Fe, Argentina. His E-mail dated August 2nd documented the need : *"I found a limit on triacs using data that was sent to me by a German user. ... I increased the 50 to 500, and the case runs now."* It should be explained that table dumping and restoring (e.g., for START AGAIN) was not previously included, and this shortcoming will remain if PARTIAL TABLE DUMPING (PTD) is used. But the former shortcoming should be corrected if PTD is **not** used. There also was a weakness associated with the appearance of a triac in two or more subcases: only the first use was being properly initialized by a DATA statement involving SWCOLD. This weakness remains, although details differ (the DATA statement no longer exists). As a result, it is recommended that data involving a triac not be stacked (i.e., it is safer to isolate it in a separate disk file). As for space, List 6 (switches) must not be full since unused space at the end of a switch vector is used to store SWCOLD. Protection against overflow should continue to be rigorously enforced. As for an illustration, test cases are weak. Only DCNEW-28 involves a triac, and the use is trivial (see Dube's BOOLFUN.DAT which is subcase number 88).