Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Fortran 95 from Lahey Computer

The 5th subcase of BENCHMARK DCNEW-1 was corrected August 7th by modifications to SUBR1 (which uses new variable KCONUM) and UMRENU (which defines new variable KCONUM) . Once again, F95 prompted realization of the problem. For the 5th subcase, Lahey ATP produced .LIS output that differed from those of the three F77 alternatives. The vote was 3 to 1, and once again, the three were wrong. Lack of initialization of some ATP vector was the problem. F77 versions do this only selectively (near the start of SUBR1) ; they lack the methodical initialization that accompanies dynamic creation. In the case of DCNEW-1, all 4 solutions agreed when the 5th subcase was removed and simulated separately. But if the 2nd subcase was added before the 5th, the 5th became wrong because it did not erase history of the 2nd that was being retained in COMMON. The error was small. Before it was understood, Dr. Liu had offered the opinion that it looked as though there might be one time step of difference. Yes, although there was no difference in the switching. The small difference arose during one or more of the phasor solutions, and then seemed to be carried along from time step to time step. Curiously, DCNEW-16 also was affected, although only in a very inconspicuous way. For the 11th and final subcase, only 3 lines differed: the final 3 of 4 *"Total network loss ..."* lines. For example, the first difference, which was for the 2nd phasor solution, involved the change of P-loss from 5.065E-01 to 5.003E-01. But note that this 11th subcase is exceptional in that it illustrates a termination of execution upon ATP recognition of the illegal use of compensation. Presumably if simulation had followed, it, too, would have been wrong.

News from Outside USA & Canada

Credit cards continue **not** to be honored by any user group (see mention in the July, 1997, and January, 2000, issues). However, the subject has not been forgotten. In response to a recent inquiry, Laszlo Prikler explained on August 1st : *"We were talking about this during that meeting ... in Osnabrueck in January. Recollection was that an inquiry was made when EEUG was new, and the bank rejected the request because of lack of credit history. Now EEUG has 8-9 years of good credit history, so Harald*

(EEUG deputy chairman) promised to check with the bank once more." Note that this is a little different from, and more encouraging than, the mention in the July, 1997, issue.

"Easy ATP Installer: version 1.14" was the *"Subject:"* of (EEUG deputy chairman)E-mail from the EEUG list server. Dated November 8th, and from the JAUG Chairman, Dr. Hiroshi Arita of Hitachi in Japan, this message communicated an announcement of several improvements to the automated installation routine that has been written by Hajime Urai of Hitachi, Ltd. Power and Industrial Systems R&D Laboratory. The following improvements were listed :

"1) enable to change default directories, work and ATP-Draw directories et. al.

2) convert the pl4 file to csv (text base) file. This function is realized with relay command of GTPPLOT.

3) enable to deal with new listsize for 8-Oct-2003 version of ATP / mingw."

More about the Internet and E-mail

"Diverging estimates of the costs of spam" is the title of a *New York Times* story dated July 28th. The story begins with a picture of two young men *"working at America Online, in Reston, Va., which estimates that 80 percent of its e-mail is spam."* The story was filed from Bloomington, Indiana, where the university (IU) is said to be struggling with a *"rising volume of spam, which accounts for nearly 45 percent of the three million e-mail messages the university receives each day."* As a third example, Orlando Hevia wrote from Argentina on August 19th : *"I received nearly 30 messages this morning, and more than 10 were spam."* No question, spam is a dominant problem for many readers. If not for you, count your blessings; but do not deny seriousness of the problem. About prevention, Mr. Hevia wrote: *"Spectrum of IEEE describes a lot of such programs. I tried two or three, and found mailwasher to be the more adequate because it does not interfere with my mail program."* A message the previous day documented the free product : *"I installed the free program mailwasher www.mailwasher.net/main.php It allows a user to see mail* ***before*** *it is downloaded. The user can delete and/or bounce and/or add to a black list. It works independently of your email program. I am using it with Pegasus, but all programs (Outlook, Eudora, etc) should be compatible with it."*

Origin of the name *spam* is explained in an *ABC News* story dated August 1st. Entitled *"Hormel moves to protect image of Spam,"* this explained that first there was the canned luncheon meat from packer Hormel : *"The meat got its start in 1937 after a naming contest came up with the shorthand for spiced ham."* That was Spam (note the capital letter; this name is trademarked). Use of the word for junk E-mail is much newer, and is traced to television comedy : *"In the 1980s ... change began with Monty Python's Flying Circus and what would become the infamous Spam sketch. ... Word sleuths agree that the skit led to that simple, fun word we all use to talk about junk mail. Usenet groups apparently included many Monty Python fans ..."* Is there a conflict of meanings? Might Hormel lose its trademark? *"Words such as aspirin, zipper, and corn flakes were once trademarked, but now their brand identities are lost. ... the demise of their trademarks proves how colloquial use can take away a name that companies spent millions protecting."*

Internet telephony and VoIP were summarized in the January, 2000, issue (see the paragraph that begins with the title *"Talk forever for free"*) . The promises of rapid expansion are coming to pass. Whereas the story 4 years ago was about installation and use by individuals, the technology seems even better suited for sizable businesses. *"More companies are routing calls via Internet"* is the title of a *New York Times* story dated September 1st. As a primary illustration, the authors chose the U.S. Department of Commerce, which selected *"a setup made by Cisco Systems that uses Internet Protocol, or I.P., technology. The system routes internal voice communications over the same lines as e-mail messages and other data traffic. It also has a function that allows an emergency message to be broadcast to all phones. The department is saving many of the fees tied to conventional phone service between employees, and it is saving maintenance and support costs on the 132 older telephone systems that the new Internet-based system has replaced."* According to a spokesman, more than 25% of the 40K employees at Commerce are using the new system. About quality: *"Internet telephony ... has matured to the point that voice quality is virtually indistinguishable from that of a conventional phone call."* Not only is operation cheaper, so is the initial installation: *"A company with 100 employees, for example, would spend about $600 a phone to buy a conventional PBX system, but $500 a phone for an Internet setup"* according to one consultant. About the rate of the ongoing revolution, a Cisco manager stated that his company is *"now replacing more than 5,000 traditional phones a day with I.P. phones. ... it is just a matter of time before I.P. telephony extends itself to the consumer market as well."* A second illustration : *"SouthTrust, which has nearly 700 bank branches in the Southeast, has almost completely replaced its PBX systems with Internet telephony, all controlled from a switch in Birmingham ... SouthTrust saves money because it no longer needs on-site support at each bank branch ..."* Of course, this is easy for calls within a company. But the monopoly phone companies can not yet be excluded entirely : *"Calls to parties outside the company often must still use the conventional public network for at least part of the call."* Who are the main players in this market? *"Besides Cisco and Avaya (a Lucent Technologies spinoff) companies that produce Internet telephony gear include Alcatel, Mitel, Nortel, Siemens and 3Com."* How large is the business? *"Cisco predicts that the market for such systems will reach $15 billion within four years."*

AOL continues its downward spiral. The name itself has come to be recognized as a liability. *"AOL Time Warner drops 'AOL' from its name"* is the title of a story found at TBO.com which is *Tampa Bay Online*. From New York City, this story dated September 19th begins : *"Acknowledging the failures of the largest merger in U. S. history, the board of AOL Time Warner Inc. voted*

Thursday to remove the letters 'AOL' from the company's name. The largest media and entertainment company in the world will now be called Time Warner Inc., as it was before the merger announced on Jan. 10, 2000 that was billed as a way to jump-start a media revolution by combining 'old' and 'new' media companies." There seemed to be no way to spin the story positively : *"With hopes for a media revolution now a distant memory, the company will continue to focus on simplifying its tangled corporate structure, cleaning up its balance sheet and selling off businesses not central to its core media operations."* One analyst is quoted as saying: *"AOL is a very unattractive tail on a beautiful dog ... It's the best possible thing for a shareholder — admit your mistake and move on."* Other recent name changes were mentioned in the story : *"The company once known as WorldCom Inc. announced in April that it would change its name to MCI, the name of its long-distance carrier, as it moved to distance itself from a major accounting scandal, and cigarette maker Philip Morris Cos. Inc. changed its name to Altria Group Inc."*

Google is a financial success of amazing proportions as explained in a *Financial Times* (FT.com) story that was published October 24th. *"Google said to consider online auction of I.P.O. shares"* is the title as found at the Web site of the *New York Times* (a *"Partner site"* of the British FT). The story begins: *"Google is considering holding a massive online auction of shares early next year in an initial public offering that investment bankers predict could value the internet search-engine company at more than $15bn."* I.e., 15 billion (1.5E+10) dollars. Google is relatively new, and clearly an exception that escaped the crash of technology stocks that began in March of year 2000 : *"Though only five years old, the search-engine company has avoided the traps that caught many early dotcom companies."* So how big is the search business? *"Profits are growing rapidly and are reckoned to be running at an annual rate of about $150m on revenues of $500m."* But why consider an online auction (which is unusual)? Because *"Wall Street's existing method of selling shares allowed banks to set the prices of dotcom stock issues deliberately low, then hand them to favoured investment clients."*

Organization UTOPIA has proposed affordable fiber-optic telecommunications --- including the Internet --- to homes in cities of Utah. For non-American readers, Utah is a western American state best known for its Great Salt Lake and early Mormon settlers. UTOPIA is an acronym that indicates Utah Telecommunication OPen Infrastructure Agency, and this operation already has received national attention because of the size and cost of its proposed venture. *"In Utah, public works project in digital"* is the title of a *New York Times* story that was published November 17th. Below the opening picture is this caption: *"Salt Lake City and 17 other cities in Utah are planning to construct the largest ultrahigh-speed data network in the country, using fiber optic cables, at a cost of $470 million."* When? *"Construction on the project is scheduled to start next spring - if the cities can raise the money to pull it off."* How fast? *"The network would be capable of delivering data over the Internet to homes and businesses at speeds 100 times faster than current commercial residential offerings."* How about other communications? *"It would also offer digital television and telephone services through the Internet."* No question, government is venturing onto what traditionally has been the territory of private industry. Of course, greater public good is the justification: *"The cities involved argue that reliable access to high-speed data is so important to their goals of improving education and advancing economic growth that the project should be seen as no more controversial than the traditional public role in building roads, bridges, sewers and schools -- as well as electric power systems, which are often municipally owned in the Western United States."* Your Editor agrees that proposed rates should attract consumers : *"The network is expected to be available to 723,000 residents in 248,000 households and 34,500 businesses. ... basic high-speed Internet access is expected to cost about $28 a month."* But is this really a free lunch for taxpayers? *"Private sector competitors and taxpayer groups assert that the cities and their residents face a high level of financial risk for a network that may far exceed their needs. Telephone and cable companies nationwide are scrambling to build networks relying on less expensive, less advanced technology that they argue will be perfectly adequate for many years to come."* A Qwest critic is quoted as asking: *"Why provide a Rolls-Royce when a Chevrolet will do?"* In one sentence, how is UTOPIA different? *"It is an attempt to complete a direct fiber optic connection to the home."* For Americans, how radical an idea is this? Very. *"As of October, only 180,300 homes had direct access to fiber optic lines; 64,700 were actually connected."*

Line and Cable Constants

A blank line to separate adjacent rows of a matrix in CABLE PARAMETERS (CP) printout was explained in the April, 2003, issue. For order 20 or more, an indented row number was applied to this otherwise blank separator line. However, once again, Ashok Parsotam of Vector Ltd. in Auckland, New Zealand, had a better idea: identify the row using the SC cable number and the conductor type (core, sheath, armor, or pipe). At the time, BPA's Dr. Tsu-huei Liu agreed that the proposed change seemed doable. Your Editor procrastinated, however, because required programming seemed to be far from simple. But then the CP author, Prof. Akihiro Ametani of Doshisha University in Kyoto, Japan, approved of the concept during his September visit. At that time, your Editor promised work that would be guided by Dr. Liu's understanding of the code.

As this summary of row labeling of CP begins on October 23rd, complexity of the task has been confirmed. More than once, Dr. Liu and your Editor have changed the changes significantly. A new concept is to begin today: location of the new labeling is to be shifted upward from the otherwise-blank line to the end of the preceding row. This is if there is room on the right, at the end of the row of numbers. Note that there always will be room for order 9 or lower since each 132-column row holds 10 columns. DC-27 illustrates both alternatives since there are a couple

of subcases having three 3-conductor cables within a pipe (3 * 3 + 1 = 10 meaning that there is no room for labeling on the right). Another change that will be noted is removal of blank column one. This presumably was a holdover from the carriage control character of line printers. But the concept has no use with ATP which appends a carriage control character automatically if requested by the user (see JCOLU1 within STARTUP). So, when comparing old and new solutions of DC-27, remember the -w option of Mike Albert's freeware FC (to ignore white space within any line). Of standard test cases, only BENCHMARK DC-27, 28, and DCNEW-29 are changed. But the changes are numerous. To see these easily, Mike Albert's highlighting is of great value.

Work ended Friday, October 24th when Dr. Liu agreed that overhead lines will not be supported by the initial implementation. Unfortunately, overhead lines were found to be structurally incompatible with the logic that your Editor had devised for cables. Cables have a small and fixed number of conductor classes (e.g., sheath). Within each such class, code will serialize the conductors. But for lines, not only must phases be serialized (a, b, c, etc.), but so must the circuits. This is for high-level labeling that would be appreciated by humans. Unfortunately, the total number of either phases or circuits could be large (e.g., 100 or more). Whereas a single circuit could have been handled within the present framework without difficulty, Dr. Liu believed that it was better to ignore all overhead lines until such time as we might be prepared to handle all of them properly. So a resting point has been reached.

Pictures are worth many words. Consider the following illustrative output from the 3rd subcase of BENCHMARK DCNEW-29 :

```
6.34866E-03  6.34866E-03  6.34866E-03
3.12515E-02  3.12515E-02  3.12515E-02  Core 1

6.34866E-03  6.34866E-03  6.34866E-03
3.12515E-02  3.12515E-02  3.12515E-02  Sheath 1

6.34866E-03  6.34866E-03  6.34866E-03
3.12515E-02  3.12515E-02  3.12515E-02  Pipe
```

Additional restrictions on the new naming of matrix rows should be remembered. First, CABLE CONSTANTS (CC) is **not** affected. Only the newer (and Prof. Ametani's favorite) CP is being augmented with row labeling. Second, numbering should be perfect if and only if SC cables are 999 or fewer in number (this should be adequate for our lifetime, anyway) . Third, all E-field matrix output will be labeled whereas no F-field matrix output will be labeled. Specifically, impedance and admittance matrices will be labeled whereas transformation matrices [T] will not. If any knowledgeable user questions the desirability of this quite arbitrary decision, discussion with the authors is advised.

Complexity of the extension is summarized by the number of non-comment and non-blank lines of UTPF segment NEWCBL that have been serialized with idents WSM03OCT. This number is 112 . Finally, there was a change to AKIKOM (the COMMON blocks dedicated to CP) that eliminated one argument of CPRINT. New NOEFLD eliminates the need for the previously-constant 3rd argument.

"Cable Parameters -- discrepancy between Pi section and distributed parameter models" was the *"Subject:"* of E-mail of the EEUG list server dated October 15th. The author was Steve Nurse of British Short-Circuit Testing Station Limited (BSCTS) in Hebburn, Tyne & Wear, UK. The test involved *"a 3 phase 11-kV cable ... I obtained both the PI model and the distributed parameter model for a length of 1m at a frequency of 50Hz. ... I then set up a simple test circuit to measure the positive sequence impedance of the cable ... The PI model gave almost exactly the R and X values supplied by the manufacturer for both sheath earthing conditions. However, the distributed parameter model gave an inductive reactance value about 55% greater than the PI model! ... Can anyone explain this discrepancy or could there be an error in the program."* CABLE PARAMETERS (CP) data was included, and BPA's Dr. Tsu-huei Liu **did** rapidly confirm the problem as well as propose a solution. The following day, she wrote to CP author Akihiro Ametani : *"I believe I found the bug in SUBROUTINE CDATOU ... Let me paste part of the code here ... ZO is the characteristic impedance. The real part of ZO is not the surge impedance. I think it should be changed to the following ... Please review to see whether this change is correct."* Prof. Ametani did confirm the change in a single page of FAX dated October 27th, and the UTPF was updated the following day. Finally, Dr. Liu informed list server subscribers of this progress as well as other changes by Prof. Ametani in list server mail dated October 30th. This included explanation of the confusion : *"On October 16th, I wrote to Prof. Akihiro Ametani ... My message suggested a change of the source code to calculate surge impedance as the square root of L/C as theory defines it. Prof. Ametani reviewed and approved of my suggested change in FAX dated October 27."* As quoted by Dr. Liu, a slightly-reworded conclusion from Prof. Ametani was this : *"The real part of the characteristic impedance is, in general, nearly the same as the surge impedance. Occasionally it may differ noticeably from surge impedance at low frequency."* Yes, Mr. Nurse's 50 Hz was low for this cable. Typically the user of a distributed model desires branch cards for the dominant transient frequency, which would be much higher (in the kilohertz range). Readers are advised to remember that Prof. Aki Ametani's concept of critical frequency Fc remains. Replacement of the real part of the characteristic impedance by the surge impedance should not much affect this fundamental limitation. At issue is the assumed-constant diagonalizing transformation matrix [T], which can be quite different at and above Fc from what it is below Fc. If Fc exceeds the power frequency, a model that is derived for the power frequency can be quite inaccurate for transients, and vice versa.

Standard ATP test cases BENCHMARK DC-XX and DCNEW-XX involve 6 independent illustrations of older CABLE CONSTANTS (CC) and 53 illustrations of newer CABLE PARAMETERS (CP) . This was the count of Dr. Tsu-huei Liu on November 12th. Your Editor knew that

there were many CP illustrations, but he was quite unsure what the total was. It is huge.

Mechanical improvements to CABLE CONSTANTS (CC) and CABLE PARAMETERS (CP) were still underway on November 21st as this January issue is being frozen for publication. The work began 14 days earlier when some overlapping variables of CC and CP were removed by BPA's Dr. Tsu-huei Liu. The separate INCLUDE file of CP was AKIKOM, and this has been eliminated. Affected were three other UTPF segments : MAIN27, NEWCBL, and LABL27. But this was far from the end. This work led to the realization that single precision had not yet been methodically removed. Recall that Prof. Ametani's own separate Cable Parameters program uses 32-bit floating-point computation whereas commonly available ATP versions use 64 bits. There also was realization that local constants such as Pi or the square root of 2 could be replaced by standard values that are used elsewhere within ATP. Roundoff differences of double precision, as might be produced by a symbolic debugger, are bad enough. Single-precision changes to constants result in substantially greater changes to the output. For example, they typically will affect the eigenvalue iteration, so will lead to many, many small differences of printed output (changes to standard CP test cases BENCHMARK DC-27, 28, 52, 60, NEW-6 & 29). Computation magnifies the discrepancies. As an illustration, consider the first table of *"Modal components"* of DC27.LIS that is changed. This is for an overhead line in the 3rd subcase (the 1st CP subcase) of the data file. Only the first column differs (i.e., is highlighted by Mike Albert's freeware FC). The 4 values of attenuation in (db/km) compare as follows (4 old values precede 4 new ones for modes 1 through 4) :

```
  5.74605E+00  3.60799E-01  2.70957E-01  2.39123E-01
  5.74597E+00  3.60795E-01  2.70954E-01  2.39120E-01
```

The most conspicuous change probably is to the documentation of SC input data. Previously, resistivity of the armor was close to 1.E-8 in many case, but was just short of this input data value. Now, the printed confirmation agrees. For example (first old, then new) :

```
  Resistivity(ohm-m): Core ...  Armor 9.99999994E-09
  Resistivity(ohm-m): Core ...  Armor 1.00000000E-08
```

Important for programmers was the removal of substantial numbers of comment cards --- typically former code --- that no longer had much value. Real DOS (not Windows) continues to be used on the 486 DX2-based PC that supports the F77 Salford compiler, and this limits the file size of EDIT. On October 29th, NEWCBL.SPL had reached 287 Kbytes, and was un-EDIT-able. Dr. Liu forced the size down to 253 Kbytes, which EDIT tolerates easily provided DBOS has been halted using KILL_DBO (a minor inconvenience). Yet, even more progress is imminent. Dr. Liu is consolidating utility routines of CC and CP, eliminating overlap. This should save substantial additional code. With luck, KILL_DBO no longer will be needed !

European EMTP User Group (EEUG)

Graz, Austria, is to host the annual EEUG meeting for year 2003 during mid-December. *"EEUG Annual Meeting 2003, Announcement"* was the *"Subject:"* of October 9th E-mail of the EEUG list server for EEUG members only. Issued by Laszlo Prikler, this invitation calls for a meeting barely more than a year after the previous one. Monday and Tuesday, December 15th and 16th, are reserved for the usual technical sessions (two mornings and one afternoon) as well as the member-only meeting (afternoon of Tuesday, December 16th). The preliminary program reserves all day Wednesday, December 17th, for *"EEUG Course ... details will be published at http://www.eeug.org."* About the location : *"The Meeting will be hosted by the Department of High Voltage Engineering, Technical University Graz (Austria). Prof. Dr. Stephan Pack <pack@hspt.tu-graz.ac.at> will coordinate the local organizing committee and serve as conference chairman."* About the location: *"Graz is a beautiful city in the heart of Europe and capitol of ... Styria. ... located on the south-eastern area of the Alps. ... Graz is the Cultural Capitol of Europe 2003 and hotels may be occupied by foreign travel agencies. Therefore please make your hotel reservations as soon as possible according to the deadline mentioned above."*

Web Surfing & Publishing at Home

Juno is among the oldest of free E-mail services (see mention in the October, 1997, issue), and BPA's Dr. Tsu-huei Liu long has been a user of Juno at home (see mention in the October, 2000, issue). Yet, times change. Dot-com stocks began their downward spiral in March of 2000, and Juno seems to have been adversely affected along with all other free Internet providers. What once was free and superb remained free, but it became difficult and / or impractical to use. Each free Internet provider seems to have its own special way of extracting money from its users. For MS Hotmail, this may be Spam and mailbox limits (see the April issue). For Juno, Dr. Liu reported difficulty with busy signals on telephone lines. So, Dr. Liu paid the $10 per month for *"Juno Platinum, Juno's premium service."* According to the FAQ file found at **juno.com** : *"With Juno Platinum, ... you will get all the benefits of our free basic service, plus great additional features. You will enjoy reliable access to the Internet with up to 10 MB of e-mail storage space and online account management. Plus no pop-ups and fewer advertisements. ... You'll enjoy priority dial-up access to make it easier for you to get online, longer surfing time, more e-mail storage space ..."* So, there clearly are two classes of service, and free is not the better one. But it should be adequate to assess compatibility. As an alternative to Pacifier, your Editor decided to examine free Juno. June 19th, he mailed a check for $9.95 to a P.O. box in Terre Haute, Indiana, for *"a CD-ROM of the Juno Software."* It is expected that a Juno mail program will be included. It is hoped that this will be a part of the good news : an alternative to virus-prone MS Outlook. Why not a new mail program? Under CompuServe, your Editor used CIM. Next, with Agora, he used either PINE or ELM (both were used). At the time, such change seemed like a pain. But times change. If such non-MS programs offer protection against viruses and worms, this seems to be a small price to pay.

Registration for free Juno access to the Internet finally was completed July 3rd. This was the third try, on the third different day. Juno registration involves automatic use of MS Internet Explorer (IE) for an online connection, and for the first two tries, the software had attempted an Internet connection that failed (*"The page cannot be displayed"*). But the third time it succeeded. Your Editor quickly entered Juno E-mail and sent Dr. Liu a short message, to which she promptly replied from BPA. Without any study, the Juno mail program was usable (it seems intuitive enough); and after 6 connections during the 4th of July weekend, your Editor is pleased to observe reasonable speed of access. The delay for the initial dialing and verifying phases might be comparable to that for Pacifier. However, there is no subsequent, annoyingly-slow connection to some network. Instead, MS IE is started automatically (use of Pacifier required manual execution); and the initial connection is to the Juno home page rather than the MSN home page (more progress: there is reduced advertising) . Connection speed might have doubled while the price has dropped to zero. A final advantage is this: Juno appends no advertising line to E-mail that is sent. Although known for years, this detail somehow was not mentioned previously. As advertising of competitors increases (for Hotmail, see the April issue), this becomes more important. It also should be important to persons who want to contribute to the EEUG list server (which has banned advertising) .

But does Juno really exist? Since the question was asked about Pacifier, fairness requires that the same test be applied to Juno. The CD arrived in a nicely-printed Juno CD mailing envelope. At the bottom, on the back side, is this explanation beside another (not a Juno) logo : *"Juno is a United Online company."* But then, Juno is not alone. Recall Netzero was mentioned by Tom Field in the October, 2000, issue. Well, still considering alternatives, your Editor connected to www.netzero.com on July 16th and he was struck by similarity of the premium offers of Netzero to those of Juno. Not only were product names the same, so were prices. Scrolling to the bottom, your Editor learned that Netzero, too, now is a United Online company. The second alternative mentioned by Tom Field was Bluelight. Attempting to connect to www.bluelight.com resulted in display of the Kmart home page www.kmart .com which, at the very top states : *"Juno Internet Service, only $9.95 / month."* Farther down the right side is separate advertising for Juno. This seems to be the legacy of the crash of dot-com stocks : the end of free E-mail. One company (United Online) has picked up the pieces, and converted them into a low-priced (compared with AOL) business. The business model clearly has changed.

"Corel Application Recovery Manager (CARM)" was the title of a window first seen late on June 26th. Usually, when there is trouble, WP 10 simply freezes. But this time a window opened and it explained: *"The application you are using has become unstable. This wizard will guide you through a series to steps to help resolve this problem ... As well, you can send a report to Corel documenting this problem in order that we may better serve you."* Your Editor did not try. Instead, he just exited, and Win98 killed WP (the window closed automatically). No complaint (this certainly was better than having execution hang). At least WP 10 finally realized it was in trouble.

Lack of uniqueness of the minus sign or hyphen, "-", was perhaps the most surprising and confusing problem. There are 100 subsections to the special request words of Section II-A, and the numbering of most of these involved the keyboard character at BPA, which was displayed as "hyphen" (the 6-letter English word) within *Reveal Codes*, accessed by **Alt-F3**, using WP 9 at BPA. But perhaps a third of the uses did not. Instead of "hyphen", Dr. Liu and your Editor observed just one byte: the minus sign itself. Without Reveal Codes, neither Dr. Liu nor your Editor could see any difference. But the *"Find"* function of WP obviously knew the difference, and this represented a serious problem (inability to locate all uses of a section number such as II-A-32). So, August 19th, the 99-page CHAP2.WPD was purified by replacement of all "-" that were noted visually by "hyphen". Where did the "-" come from? At first your Editor's different keyboard and/or newer WP 10 as used at home were suspect. But a simple test within this newsletter demonstrated that "hyphen" is the result of pressing the minus sign --- at home just as is the case at BPA. The difference somehow seemed to be in the files, with Rule Book files sometimes having traces of German language. At first, lacking any other explanation, your Editor and Dr. Liu were suspicious of the language. At BPA, the WP warning message about missing German language was frequently seen for a while, whereas at home it was not (presumably because your Editor had approved the installation of German to avoid distraction by the warnings). But in fact, eventually it was learned that neither German language nor the Rule Book had anything to do with the problem. These merely were coincidences. September 22nd, the same problem was observed while working with the January issue of this newsletter. Your Editor had attempted to search for "dc-3" within WP 10, and the search had failed. Yet, DC-3 already had been written about because of work on C-like HOPC. When the reference was located by other means, it was noted that the minus sign did not appear as "hyphen" within Reveal Codes. So where was the text originally keyed? Almost certainly within MS-DOS EDIT of one of the 3 Windows PCs that regularly is used by your Editor. Text is created using EDIT and then pasted into WP 10 via a Notepad window. Why this leads to use of a different minus sign, your Editor does not know, but that seems to be the case. This is terrible. Years of reliance upon the procedure caused no trouble using Win95 and MS Word. Why should WP 10 under Win 98 be different? Why should WP not be compatible with DOS for a common keyboard character?

A third variation of the minus sign also was being used occasionally --- a longer horizontal line, perhaps twice the width of the keyboard minus sign. This, too, would cause a computer search to fail, of course, so it was replaced by the conventional "hyphen" wherever and whenever it was noted. Precisely because this third alternative was significantly longer, it could be noted without reliance upon Reveal Codes (within which it appeared as "I: 4,33" where the "I" was bold) , fortunately.

Adobe Acrobat Reader required an update to display the PDF output of WP 9 for Chapter II properly. This was another unexpected complication. Dr. Liu noted that some vertical lines of some tables (those rulers for input data) were missing in the screen display using Acrobat Reader 4.0 even though the paper copy, produced by printing the same file using the same Reader 4.0, looked normal. This was for disk file CHAP2.PDF as produced on August 19th using *"Publish to PDF"* within the *"File"* menu. Following help from the computer establishment (ordinary engineers at BPA no longer have the power to download files from the Internet), Reader version 5.0 was acquired, and this repaired the screen display.

PDF output of CHAP2 is encouragingly small. Consider Dr. Liu's initial experiment on August 19th using WP 9 at BPA. The input file for 99-page Chapter II was 1230-Kbyte CHAP2.WPD Surprisingly, the WP 9 output file was substantially smaller. CHAP2.PDF had size 489 Kbytes. This was without imbedded fonts, however. If fonts had been included, size would increase by about 150 Kbytes. But why embed fonts if the standard, free Adobe Reader 5.0 has all that are being used? This is Dr. Liu's reasoning, and it remains the user group philosophy until someone can point out some advantage of embedded fonts. As for the .WPD file size, recall this is inconsistent using WP 9. Three days later, after minor editing, CHAP2.WPD had shrunk to 639 Kbytes, and this could be PKZIP-ped to 177 Kbytes. The associated .PDF file had barely changed: 488 Kbytes. PKZIP-ping this does not gain much, either (the saving was just 9%) .

Margins should be understood. Paper size has been set to the American standard 8.5 x 11-inches; the left and right margins are 0.7 inch; the top margin is 0.6 inch and the bottom margin is 0.3 inches. Page numbering is at the bottom, in the center, and it is generated automatically. The pages begin with Page 2A-1 and end with 2C-5, with Section II-A having 89 pages. A single file was used in order that, independent of content and margins, this numbering would be automatic. Inability to satisfy both American and European (i.e., DIN A4) paper sizes simultaneously is one of the less-satisfying aspects of the work, however. No matter which paper size is chosen, page breaks will not be optimum for the other alternative. Unfortunately, human intelligence is required to determine page breaks optimally just as is the case for this newsletter (e.g., to avoid an isolated line at the top or bottom of a column). Later insight into the problem of margins was contained in E-mail from Laszlo Prikler dated September 8th : *"Thanks to the 'shrink to fit' option of Acrobat Reader, which allows automatic reformatting from US Letter to A4 and vice versa. IPST'03 papers now are accessible via a secure web site. I printed several papers and even I do not know which of them was originally formatted for A4 and which for Letter size. The printed A4 copies look fine for all. I think that the ~10% rescaling of width and height will remain mostly invisible. Maybe a circle will not be very geometric after rescaling, but who does care about it? The text surely is unaffected."* The following day, your Editor agreed, for use with the Rule Book: *"Fortunately we do not much rely upon shapes this way. The cross-sections of cables are a dominant exception."* If separate horizontal and vertical shrinking (or stretching) factors could map our pages into theirs, or vice versa, that should solve the problem of page size.

Use of MS Excel spreadsheets with Word to produce those rulers for input data card images is an idea from David Francis of TransGrid in Sydney, Australia. E-mail dated September 18th included an illustration. Mr. Francis wrote : *"Has anyone tried Excel spreadsheets embedded in Word? This approach takes up some memory but is convenient to use. I have attached an example in Word and the resulting pdf file. < atp_ruler.pdf > < atp_ruler.doc > The key to the layout in Excel is to select 'centre across selection' in the cells layout. To obtain a series of blank cells, just place a single space in the first blank cell."* The following is the left half of the 80-column .doc file as displayed by WP 10. Mr. Francis had a horizontal line at the bottom, but somehow this was lost in the conversion :

More precisely, the bottom line was missing at home using WP 10, both with and without Print Preview. But when the file was taken to BPA, the bottom line was visible using WP 9. Will it stay visible in the PDF output? We will see.

Higher - Order Pi Circuits

The C-like alternative of HIGH ORDER PI CIRCUIT (HOPC) underwent testing and reform in preparation for industrial-strength need in Hong Kong. September 16th, UTPF segment SUBR3 was changed in two ways in order to improve the treatment of the 3rd subcase of DC-3. Two problems were recognized on that and the previous day. First, that request for C-like output (see the extreme right of the HOPC declaration) was not being recognized because it extended beyond column 80. Second, the use of [] called for location parallel to the input data file, but this feature was not being supported for .CLK (i.e., C-like) output. Lack of maintenance was at fault. HOPC had come first (the April, 1998, issue), and when data was upgraded for use of [] (first mentioned in the October, 2001, issue), it seems that there must have been no verification of the C-like output. None was being produced, and no one bothered to notice, it would seem. Data of the 3rd subcase of DC-3 remains unchanged, although there once again is C-like output as documented by the response to MS-DOS DIR DC3HIGH* :

```
DC3HIGH  CLK     180   09-15-03  7:17p
DC3HIGH  DAT   1,431   02-26-98  3:19a
```

To make sure the .CLK output is not overlooked again, a 4th subcase that uses this file was appended to DC-3. The only other difference from the 3rd subcase is shortened T-max : 100 time steps are plenty to verify that the solution is unchanged. The most-used GNU version of ATP supports such C-like input thanks to reliance upon Masahiro Kan's C-language utilities within GNU CC5152. I.e., as

verified September 20th, the C-like output is created using Mr. Kan's same proven code that has supported GNU C-like .PL4 files for years (see first mention in the October, 1998, issue). Lahey ATP also allows use as proven two days later. For Wintel versions, only Watcom ATP will ignore the C-like alternative in the 4th subcase --- easy since DC-3 already is installation-dependent for Watcom. This is because real C is not yet being used to create .PL4 files and the FORTRAN compiler itself is less flexible than the Salford and Lahey compilers (which provide easy support using FORTRAN). A final complication of the 4th subcase was EATS use, which required work on UTPF segment ESTIMA in and around the code related to CC5151. Prior to such work (completed for Salford on September 17th), there was a clean error termination (*"Halt in dummy (missing) ..."*). But this lasted just a day.

Case sensitivity of the HOPC data file name was a final concern. Your Editor had forgotten this detail, but Orlando Hevia's use of Linux never forgets. So, within DC3.DAT, the initial capitalized name DC3HIGH.CLK was converted to lower case dc3high.clk which should be tolerated by any operating system and compiler provided KINSEN = 1 as set within STARTUP. This was beginning September 27th.

Two or more input cards for the HOPC request became possible October 8th. The original, single request card simply did not have adequate space for expansion (see later explanation of REAL*4 and $UNITS options). For an illustration, see the 3rd and 5th subcases of DC-3. When using two or more cards, the location of attributes is arbitrary except for this simple rule : matrix order and the file name must appear on the final card of the group.

REAL*4 is an optional tag that indicates C-like HOPC data that is single-precision (i.e., 32 bits). See separate writing about use of this in Hong Kong. The 5th subcase of DC-3 illustrates use beginning October 10th. Final approval of the use of REAL*4 data for HOPC came in E-mail dated October 15th. In this, Zhou Qibin reported : *"I have tried a case with more than 1000 coupled branches ... The calculation result is almost the same as that of REAL*8 HOPC."*

$UNITS is an optional tag that indicates C-like HOPC data with units that conform to floating-point misc. data parameters XOPT and COPT (which can be defined by a $UNITS card) . In the absence of such a declaration, MKS units (i.e., Henries and Farads) are assumed for C-like input data of HOPC. The 5th subcase of DC-3 illustrates use beginning October 10th.

New EEUG List Server

"ieee.org is a popular E-mail address that prevents contributions to the EEUG list server. Any such subscriber will receive messages from the list server, but he can not send messages to the list server; he can not participate in any discussion." Thus began a short paragraph in the April, 2003, issue. For months, this remained the accepted explanation of trouble that has plagued a substantial number of subscribers. But then, in list server mail dated September 19th, the same Laszlo Prikler offered hope of resolution, or at least circumvention of the trouble. His contribution had *"Subject : Duplex connection to the list via @IEEE.ORG alias."* It explained the following : *"As you know this mailinglist is closed meaning that the LISTSERV software accepts messages only from registered e-mail addresses. i.e. the e-mail address specified in the From: field of your messages for the list must be identical with the registered e-mail address in the listserver database. Earlier some of you reported difficulties saying that messages were being delivered to you, but that you can not post messages. I myself confirmed this rumour once or twice here and in Can/Am EMTP News stating that persons who register an @IEEE.ORG alias have purchased a one way ticket to the mailinglist. But, as you see in the header, the present message is posted with my l.prikler@ieee.org alias in the From: location, and the message goes through (after moderation) and is delivered to you. The credit goes to Prof. Ferley Castro-Aranda from Columbia, now a visiting scholar at Uni Poli Catalunya in Barcelona, Spain. He also preferred to register his @IEEE.ORG alias, and has shown to me how to send an outgoing e-mail with From: myname@ieee.org. The trick is rather simple: specify a new identity in your mailer program (Tools | Identities... in WinPmail) and set the @IEEE.ORG alias in the 'My Internet e-mail address' dialog. If you read and send e-mails via POP3 and SMTP, your existing SMTP server hopefully will accept the message for deliver. It depends on how strict the spam control is. If your message would be refused by the SMTP server with some explanation such as 'sorry, mail relay is not allowed,' try another SMTP server. This problem happened to me as well: the nearby SMTP server running on our Novell server refused because I myself had set spam control to be strict :>). But the central mail server of the university accepted the message because it arrived from an 'internal' IP address and has been considered not to be spam. If you have a direct Internet connection, set up a new account and configure the mailer software so that ATP-EMTP-L contributions are delivered by the specified SMTP server. I.e., queue them first and send them manually. I am not an MS Outlook fan, but in the 'Tools | Accounts | Add' menu it is easy to create a separate account for listserver communication with the required POP3, SMTP and e-mail address settings."* This advice was signed by *"Laszlo Prikler, member IEEE; Budapest University of Tec & Eco."* Subsequent discussion with the author revealed further details of interest. For the public good, parts are being omitted deliberately so as not to jeopardize security. But parts seem harmless enough : *"Of course you need an SMTP server which accepts the mail for delivery. For those who use Dial-up connection (like me at home), this should not be an issue, they must have an active SMTP server settings and the mail will use this machine. If no dial-up is used (i.e., if permanently connected), 'my e-mail address' is generated by the server to which one is connected by default. But it can be overriden easily as I wrote in the listserver message. So this IEEE alias trouble probably appears only for those who ask us to register this address, but use an office machine to post contributions to the list. An office machine is generally connected to a*

network server and e-mails are sent at once without accumulating in some mail queue."

Digital signatures last were mentioned in the January, 2003, issue. They first were mentioned in the January, 2001, issue. The subject seemed rather abstract and hypothetical until September 22nd when Laszlo Prikler seems to have used a digital signature for EEUG business. His E-mail to Andrea Surace states : *"This document has been digitally signed. Please print this PDF file and keep a copy in your files. The original with your signature is kept in our files. ... is an Acrobat Certificate Exchange File. This file contains a copy of a certificate that you can use to verify the validity of my signature, if you wish to do so. This feature requires Adobe Acrobat 5.0 (will not work with free Acrobat Reader). ... Your application is the first one that has been processed by me electronically, so I send a copy of this e-mail to the EEUG Executive Board members and Can/Am EMTP User Group co-chairpersons to inform them how it really looks like."*

More than 1100 subscribers to the EEUG list server existed on October 31st. That 1000+ milestone that was noted in the October issue did not last long. Just as the 900+ milestone passed without notice, so the 1100+ barrier also has. Laszlo Prikler ended his otherwise-unrelated private E-mail message as follows : *"BTW, before I forget: Total number of subscribers was 1157 today."* Once again, the recent explosive growth would not have been possible without moderation (to improve the signal-to-noise ratio), and Laszlo Prikler must be recognized as the hardest working of the moderators. Michael Havekost, too, has added significant value by rejecting messages that are structurally deficient (see the October issue). This has become increasingly important as the number of moderators who handle rejections has declined. There is plenty of such work. Your Editor estimates that half or more of all submissions are **not** approved for publication.

Ametani and Nagaoka Visit BPA

Profs. Akihiro Ametani and Naoto Nagaoka of Doshisha University in Kyoto, Japan, honored BPA by spending a day to discuss transient-related matters of common interest. This was Friday, September 26th --- a stop along their long trip to IPST 2003 in New Orleans, Louisiana. This story emphasizes the subject of greatest interest to your Editor : a possible new program to assemble ATP data.

emtped is the name of the new data assembler --- an EMTP data editor --- that is described in a 4-page IPST paper by the visitors. *"Development of data editor for Electro-Magnetic Transients Program"* is the title; the authors are Naoto Nagaoka, Daisuke Tatsuda, and Akihiro Ametani. The program was demonstrated by Prof. Nagaoka using his own 866-MHz Toshiba notebook PC (a story in and of itself; that thin and light little device includes 512 Mbytes of RAM !) .

ATPDraw from Dr. Hans Hoidalen in Trondheim, Norway, is quite different, your Editor rapidly concluded. Connections are established in ATPDraw by means of a schematic diagram of the network of interest. I.e., ATP-Draw is graphical, and the user builds his network by interconnecting graphical components. Not so for emtped, which is text-based. This distinction is fundamental, and it makes the two programs quite different even though the end result (an ATP data file) is comparable. Without the graphics, programming must be much simpler, of course. Also, operation is tied dynamically to the data file rather than to a schematic diagram of the network. If the user wants or needs the picture, he is advised to forget about emtped. But if the user is willing to forego the picture, and in exchange is willing to work with real ATP data cards, emtped has considerable attraction. Perhaps the reduced abstraction is compensated for by a closer association with ATP and its data requirements. I.e., whereas some ATPDraw users seem almost unaware of the resulting file of ATP data cards (the .ATP file), the user of emtped works directly with the card images at every step of the assembly. The user of emtped is continuously made aware of the existence of the ATP data file.

Java is the programming language that Prof. Nagaoka used to write emtped. This is significant because it results in universality in two senses. First, the resulting program is platform (both hardware and operating system) independent. Second, the user interface is somewhat independent of human language (e.g., English). These two very important aspects might be discussed in more detail later.

Java is a relatively-simple object-oriented language that was created from complicated and full-powered C++ by Sun Microsystems. The original goal was the control of consumer electronics, although application to Web pages (WWW; the World-Wide Web) is what has made Java famous, and a great success. The IPST authors provide several references to Sun's Web site **java.sun.com** (see the References section at the end). Because Java seems ideal for use with the Web, and the Web now is virtually everywhere, so the support for Java is virtually everywhere. The source code of any Java program such as emtped is compiled to produce a file of *"byte-codes"* (Sun terminology) that is independent of both computer hardware and operating system. This is what makes Java universal (needed for the Web, which interconnects all varieties of hardware and software) .

How efficient is a Java program, and who should care? For typical Web pages, probably there is little concern about execution speed. But for the handling of ATP data files, which sometimes are huge, your Editor can imagine potential concern. This might be a yet-unanswered question: how is performance for huge data files (e.g., 75K or more card images)? A great, free, general-purpose text editor such as pfe (explained in the October, 1997, issue) performs very well on such huge files provided a Wintel PC is being used, and it has plenty of RAM. But pfe is Wintel - specific ; emtped is not. If there is no free lunch in such matters, how much performance is lost because of the use of universal Java? For how large a file does this begin to become an issue for how fast a computer? Your Editor

would like to perform such experiments himself, but he has been informed that downloading of missing tools from Sun's Java Web site would require special permission from BPA's computer establishment.

Why use PDF format rather than HTML format for ATP-related text? Prof. Nagaoka's use of Java prompts this question. Either Java interpreters or Web browsers will display HTML - formatted text, so HTML is a second practically - universal alternative. So, your Editor asks himself, why has HTML not seriously been considered for ATP-related text during years past? Without much thinking about an alternative, PDF format was adopted for newsletters and the Rule Book as first explained in the October, 1996, issue (see story entitled *"Free Adobe Acrobat shows PDF files"*). Recall Glenn Wrate inspired the switch from WP 5.1. However, WP 10 as currently used at home can *"Publish to HTML"* (which has detailed explanation *"Save a copy of the current document in HTML format"*) just as well as it will *"Publish to PDF."* Each is an option of the "File" menu. This is what your Editor noted after taking home a more complicated recipe that had been worked out by Dr. Liu using WP 9. The difference is a clear indication that HTML output is new for WP. What was difficult to use in WP 9 of year 2000 (seen in the copyright notice at the start of execution) has become easy and obvious in WP 10 of year 2001. For example, instead of *"Publish to HTML,"* WP 9 has *"Internet Publisher,"* and this replaces the original WP-formatted storage by HTML-formatted storage without changing the file type (amazing). This is the result of clicking on *"Format as Web Document"* (one of 4 choices). Something as simple as the creation of a separate, additional .htm file seems not to have occurred to the WP 9 writers. Finally, the output of WP 9 was more distorted (e.g., the right margin was not justified as it should have been). So, if one is interested in HTML, WP 10 seems clearly preferable to WP 9.

Lunch at Sakura of Tokyo, a Japanese restaurant located on Highway 99 perhaps a mile and a half north of BPA, was the highlight of the day. Like the famous Benihana restaurant chain that began with a single restaurant in New York City during 1964, food at Sakura is grilled at the customer's table rather than in a remote kitchen. More precisely, each table is U-shaped, with the grill in the middle and the cook behind it, facing the diners as if on a stage. As explained at www.benihana.com, food is *"prepared right at the table teppan-yaki style (Teppan meaning steel grill and yaki meaning broiled) with dazzling effects by highly trained chefs."* A highlight of the performance by Sakura's Laotian chef was the juggling of an egg (which cracked upon being allowed to drop onto the grill), and at the end, juggling of the whipped butter container (which was not dropped). For this, the cook used his large spatula. He explained that no Japanese is spoken today, unfortunately, following retirement of the former owner more than a year ago. Today, the restaurant is run by Vietnamese. Presumably the Portland area already is saturated with offerings of South East Asian cuisine following emigration that can be traced to the 1975 fall of South Viet Nam; presumably adaptation to Japanese grilling was doable for South East Asian cooks. It must be noted that the meal began in typically-American fashion, however. Prior to appearance of the chef, a green salad was served. According to Prof. Ametani, a Japanese restaurant would not do this. Fish might be eaten raw in Japan, but vegetables invariably are cooked ! To be continued.

Monte Carlo (STATISTICS)

John Schaad's work with parallel processing at BPA was summarized in the April and July, 2003, issues. Two E-mail messages dated October 6th report progress. First, some statistics. Mr. Schaad mentions power flow solution using *"the entire 39-node cluster. ... Every node on the cluster has the equivalent of four 2.4-Ghz XEON cpu's ... The cluster rack is about half-full, and could be almost doubled in capacity, in the same floor space ... The cluster is ... close to being made available for trials, practice, test user accounts, etc. Access to the cluster will be via Hummingbird eXceed 8.0 with Secure Shell (SSH) protocol, and VMware Remote Console (with SSH). Programs that are currently installed and running on the cluster ... GE PSLF, ver. 14 beta for linux. ... BPA IPF ... PowerWorld Simulator (PWS) [Windows version]."* But some commercial software prevents such parallel support: *"License restrictions and software limitations prevent the PWS / Vmware / Win2000 combination from utilizing any more than a single node on the Cluster."*

Monte Carlo simulation is the first ideal application of clustering that is mentioned in a 4-page paper entitled *"Migrating to Linux clusters for high performance computing."* This is by Quinn and Lyer of Linux Networx, which John Schaad describes as *"one of the commercial cluster vendors."* About potential applicability to ATP, consider this opinion from Networx : *"1) Monte Carlo Analysis or parametric execution. In simple terms, are you running a program many times using different sets of input data? A cluster provides an ideal platform for this type of application."* Yes, this is what a STATISTICS or a SYSTEMATIC study involves, and parallel Monte Carlo simulation (for the STATISTICS alternative) was perfected long ago. The interested reader will find OBSERVE PARALLEL MONTE CARLO, or OPMC in its short form, mentioned in the January, 1989, issue. Simply regard a cluster as a network of computers and applicability should be obvious. John Schaad could do 39 such energizations at the same time, it would seem! Mr. Schaad explained that the previously-mentioned paper was found at the Networx Web site **www.linuxnetworx.com** where your Editor gathered summary details by clicking on *"Company | Overview."* This explains : *"Linux Networx focuses exclusively on designing and building complete Linux cluster systems tailored to meet each customer's unique requirements."* Based in Bluffdale (20 miles south of Salt Lake City, at the southern end of the Great Salt Lake valley), Utah, the company began *"in 1989, initially designing transputer-based hardware technologies and associated software tools. This effort naturally evolved into clustering, and in September of 1997, the company delivered the world's first commercial Linux cluster."*

Consider the high end of such technology : *"In late 2002, Linux Networx delivered the most powerful Linux cluster in the world to Lawrence Livermore National Laboratory (LLNL). With 1,152 nodes, the system was a landmark in supercomputing history, ranking in the top five of all supercomputers ever built."*

A cluster would allow **more** simulation, but not **faster** simulation. This is the bottom line. Rather than simulate faster, ATP would be executed in parallel. Each node could work on a different energization. There should be excellent balance because, in general, ATP simulation time is not influenced much by the random switching times. If Monte Carlo studies are the bottleneck, a cluster seems like the ideal solution. If instead real-time simulation is the goal, forget about clustering. This is your Editor's summary conclusion. As for Linux, freedom from a proprietary operating system does seem attractive. Yet, details of the network software might not be important. Almost any networking should be adequate. If Networx has special software to reproduce the data and start the parallel executions on the different nodes, presumably it would be used. If not, writing a program in FORTRAN to do this work should not be difficult. This would be an extension to OPMC and parts probably would not be universal because details of execution depend on the operating system.

Why not Motorola / IBM PowerPC processors instead of Intel processors, however? *"Low-cost supercomputer put together from 1,100 PC's"* is the title of a story in the *New York Times* that was published October 22nd. It seems that faculty and students of Virginia Tech, working in California with Apple Computer, are providing a significant challenge to Intel using PowerPC. The story, filed from San Francisco, begins : *"A home-brew supercomputer, assembled from off-the-shelf personal computers in just one month at a cost of slightly more than $5 million, is about to be ranked as one of the fastest machines in the world."* Compare this with conventional supercomputers : *"the fastest machines have traditionally cost from $100 million to $250 million and taken several years to build."* Slightly faster initially is that Linux cluster at Livermore : 7.63 vs. 7.41 trillion operations per second. Both have comparable numbers of processors, but the Apple-powered machine is said to be substantially cheaper (the Livermore machine has *"price estimated at $10 million to $15 million"*). About the time and ease with which the super computer was built : *"Scientists from the school met with Apple executives two days after the company introduced its new 64-bit desktop computer in June. Apple agreed to put the school at the head of the line for the new machines. Starting when they returned to school in September, student volunteers ... helped with the assembly of the system ..."* Conclusion: any commercial simulation service certainly should be able to provide parallel Monte Carlo capability using ATP cheaply enough. No, this would not be real-time simulation as desired to drive relays. But it should be plenty fast for humans who might be watching and waiting. As a first approximation, assume that cost varies linearly. I.e., 100 processors might be obtainable for $500K. Considering the uncertainty of parameters (your Editor **does** believe Al Legate's assessment of this detail three decades ago), 100 shots should be about adequate. A 100-node network should complete 100 shots in approximately the same time as a single, deterministic simulation. Two hundred might not have much added engineering significance, but would result in smoother results, and could be obtained in the time of two deterministic simulations. Etc. (extrapolate linearly).

GNU ATP for Mingw32

The optional 4th data card for VARDIM was mandatory prior to a correction to the translator that is used for GNU. At issue was missing initialization of vector LSTNEW. For Mingw32 as used at BPA, failure to define List 31 resulted in CIDEAL(2147348480) as reported to Orlando Hevia on September 12th. Actually, Mr. Hevia reported a different symptom, presumably due to different (negative?) garbage. The following day, the translator was corrected. But do not remove the optional 4th data card from LISTSIZE.BPA just because of the correction. The 200 card images as requested on the 4th card are desired as an alternative to the default value 10. For practical ATP use, the default value for List 31 (10) would be no more satisfactory than the default value for List 2 (300) would be.

Computer Viruses and Worms

"Microsoft offers reward to catch writers of computer viruses" is the title of a *New York Times* story dated November 6th. The introduction is as follows : *"At a news conference in Washington including national and international law enforcement officials, Microsoft announced a $5 million antivirus reward program to encourage tipsters, with initial rewards of $250,000 for evidence leading to the capture and conviction of the original authors of the MSBlast and SoBig"* (see the October issue) . People continue to ask : why MS? The *Times* story provides an uncommon answer after the obvious ones : *"in part because the company is despised in many cyberspace neighborhoods."* But will the bounty work? *"The response among security specialists to the Wild West-style initiative was generally positive, but with a smile."* There have been jokes as well as some skepticism. One *"chief security counsel"* (what is that? a lawyer who specializes in computer hackers?) is quoted as asking : *"Why don't they pay people to fix the vulnerability, rather than pay for people to go to jail for exploiting them?"* Of course, *"a Microsoft official called that view unfair."* A Reuters news story found at *Wired News* is entitled *"MS calls out bounty hunters."* Dated November 5th, this provides context for the strategy: *"Security experts familiar with the ongoing cyber dragnet said the trail had recently run cold. The unprecedented lure of cash was seen as a way to generate new leads ..."* But leads to whom? There is speculation that LovSan (also named Blaster) might have been a teenage prank. But *"SoBig is a different story. I think that's the work of an organization or group."* This according to Mikko Hypponen of F-Secure in Finland. SoBig is the more troubling. *"Because of the spamming connection, law enforcement officers and security experts*

suspect the SoBig authors were motivated by profit, stoking fears that organized groups may increasingly resort to this form of cyber-sabotage." Yes, well, Bill G has made it easy. Viruses and worms: legacy of the guy who, in some circles, just a few short years ago, was regarded as a computer visionary. In any case, MS remains prosperous, and has promised to buy its way out of trouble. A CNN story dated November 5th quotes Brad Smith, Microsoft senior vice president and general counsel : *"If we need to spend more money, we will spend more money."* There is plenty, of course. Smith stated that Microsoft *"had more than $51 billion in cash as of the end of October."*

Messenger Service is the location of the latest gaping hole in MS Windows. The result has been spam from companies that understand MS Windows well enough to exploit it. A Dow Jones story was the first that your Editor saw describing the problem. Dated November 5th, this explained : *"The pop-up ads look like a typical Microsoft window, and are labeled 'Messenger Service.' But the text includes advertising, pornographic messages and other unwanted solicitations, as well as advertisements for $30 software meant to stop the messages ... Unlike typical spam, the messages can appear independent of e-mail in word processing applications and other programs."* Who is vulnerable? *"It's happened to a lot of people who have Microsoft Windows XP. ... While high-speed Internet users who are always connected are more likely to get the messages, even users of slow dial-up modems have been hit ..."* About a remedy: *"The FTC will also be announcing steps consumers can take to stop the messages. ... Microsoft will disable Windows Messenger in its update of Windows XP ..."* So, another unintended consequence. Except for that $30 offer, all might well be perfectly legal. With the $30 offer, the operation might look more like a protection racket (i.e., extortion). Two days later, a Reuters story found at the CNN Web site documented the FTC response : *"The FTC said it had temporarily shut down one marketer, San Diego-based D Squared Solutions ... the agency would seek to force D Squared to return the money it had collected from consumers."* But note the key words *"temporarily"* and *"would seek."* Perhaps all that has happened is this : the FTC went to court and filed suit against the company. Immediately, there is a big press conference at which government officials pat themselves on the back for protecting the public once again. But what will occur next? Now the complaint might well be negotiated. Remember that story about 14-year-old Jonathan Lebed in New Jersey, who earned $285K by hyping stocks (see the January, 2001, issue). Typically the accused will admit no wrong doing, but he will promise to stop doing it in exchange for a dismissal of the suit. Too often, this is the American way because regulatory agencies have so little power, and are understaffed.

Comings and Goings

California Governor Gray Davis was re-elected in November of 2002 as stated in the April, 2003, issue. But this was far from the end of the story. More than just the price of electricity was being hidden in taxes, and imbalance of the state's income and spending rapidly became evident to the masses shortly after the election. October 7th, voters removed Democrat Davis from office and replaced him by Republican Arnold Schwarzenegger. Only the second such successful *recall* of any state governor during the nation's 215-year history, the 55% margin of victory was unprecedented. Two days later, a story in the *Washington Times* had title *"Arnold vows not to raise taxes."* Much spending of rival Democrats must be reduced or eliminated, then : *"the state ... is staggering under a budget deficit estimated from $8 billion to $20 billion."* There is one other potential source of revenue, however : gambling. The Austrian-born movie star and governor-elect said *"that he would negotiate new contracts with American Indian tribes that pay much lower taxes in California than in neighboring states for casino operations."* About interest of the electorate : *"More Californians cast ballots for Mr. Schwarzenegger than they had for Mr. Davis in his two gubernatorial election victories."* In the April issue, your Editor concluded that *"Democrats remain in control of the state."* No longer as firmly as in years past thanks to the tidal change that began with shortages of electric power. There is nothing more effective than bad economics to revive the opposition. Historically, Americans *have voted their pocketbooks,* as the saying goes.

With high labor costs and no relief from high taxes in sight, California appears less attractive to business than in years past. Consider this quotation from a spokesman at Intel: *"California has become one of the worst places to do business, not only in the United States but around the world."* Other states as well as countries are trying to attract California businesses, of course. The preceding Intel quotation and related information were found in a NewsMax.com story that is entitled *"Other states poach businesses from tax-crazed California."* Dated October 23rd, the interesting conclusion is that other countries --- not other American states --- should be the primary beneficiaries of a bad California business climate : *"An increasing number of companies that choose to expand do so in developing countries, where costs are lower. ... Many California high-tech companies are expanding in India, China, Russia and Southeast Asia. ... about one in 10 technology jobs will move overseas by the end of next year. In the past four years, Intel has opened facilities in Russia, China and India totaling nearly 3,000 employees."* Yes, businesses have become global and they owe little allegiance to the places they began (for Intel, Santa Clara of the San Francisco Bay Area).

TMT&D Corp. in Japan is the employer of Masahiro Kan as mentioned in the October issue. However, that referral *"see the January issue"* deserves explanation. The January, 2003, issue mentioned TM T&D with a space separating the two halves. Why the difference? In E-mail dated September 1st, Mr. Kan explained : *"When I sent to you my move last October, 'TM T&D' was correct. But recently it was changed to 'TMT&D' because of the patent problem."*

Power Company Politics and Religion

Dilbert was mentioned again, in the preceding issue. Dilbert is the name of a popular cartoon character as already explained in the July, 1995, issue. But what was missing in 1995 was a reference. The typical dominant newspaper of any sizable American city will carry Dilbert on its comics pages. Also, Dilbert can be read free of charge via the Web on a daily basis. The *Washington Post* is a prominent example (click on *"Comics"* within the line that begins with *"Daily diversions:"*). Stupidity of management is a common Dilbert theme. Enough of these cartoons have accumulated to make a small book, and this states on the cover : *"Dogbert's top secret management handbook as told to Scott Adams, author of The Dilbert Principle."* This book from HarperBusiness begins with a warning : *"If you are not a manager, put this book down right now. There are some things you're better off not knowing."* Oh, a final detail. Dilbert has contributed a verb to our language : *"Dilberted. To be exploited and oppressed by your boss."* Credit for this creation is given to *Wired* (magazine, presumably).

Minnesota Power has been allowed to keep its old name, although it seems to have a new owner. A business envelope received around the start of September states, as part of the return address : *"an ALLETE company."* A Google search for this name then led to a Web site with this explanation : *"ALLETE is a publicly-held corporation ... with energy and automotive services at its core. Its workforce of more than 13,000 employees offers a full range of automotive services across the U.S. and Canada. ... ALLETE also owns Enventis Telecom, a growing fiber optic communications provider ..."* Turmoil of the industry continues. Your Editor is reminded of the purchase of Systems Control by British Petroleum perhaps two decades ago. It is hard to imagine that commonality of business, or understanding, inspired the union. If anyone from MP&L wants to explain the logic, he is invited to do so.

396 Coupled Coils in Hong Kong

A limit of 35 arguments of $INCLUDE use was discovered within OVER1 following a report of trouble by Qibin Zhou, one of Dr. Du's students in Hong Kong. July 12th, Mr. Zhou sent illustrative data that involved just 26 coupled conductors (so was renamed DUM26.DAT for storage at BPA) . Local variables of Watcom ATP became corrupted, and execution failed to perform the insertion correctly for 52 arguments. Was it possible that ATP never was protected? The October, 1999, newsletter reported variable-dimensioning of the code for DATA BASE MODULE (DBM) which creates the file : *"The previously-fixed LIMARG = 85 was replaced by the List 6 (switches) limit on July 5th, completing variable dimensioning of the DBM feature. As distributed by the user group, LSWTCH = 1200, so it should be a while before DBM again is overflowed."* So, the file-creation code of SATURA was variably-dimensioned and also protected against overflow. But the code of OVER1 that handles $INCLUDE during simulation was not protected. Furthermore, the OVER1 limit was the older 35, not the 85 as stated. Apparently no user ever noticed trouble until now, however. Curiously, F95 Lahey ATP was not affected, but Watcom ATP certainly was. So, OVER1 was variably-dimensioned to respect the new limit LIMARG that has default value 1200 (List 6 of either LISTSIZE.BPA or LISTSIZE.FGH) . This is comparable to SATURA, and it solved the problem of DUM26 for Watcom during the morning of July 15th. Also, modified DC-64 demonstrates reduction of the argument limit to LIMARG = 20. Reduce this number further to 3 or 4 and an error termination will be demonstrated (yes, OVER1 finally is protected) .

But trouble with Watcom linking resurfaced that same day (June 15th). An unrelated request from BPA engineer Anders Johnson was for List 8 of 480K instead of the usual 120K of FGH dimensioning. Just as mentioned in the January, 2000, issue, linking overflowed the MS Windows swap file. Recall *"Error (3009) : dynamic memory exhausted."* This persisted even after all other processes had been halted and Win 2K had been rebooted. So, Dr. Liu increased the Win 2K resource via "Settings | Control panel | System | Advanced | Performance | Virtual memory" as follows. *"Paging file size for selected drive"* has two figures :

```
                    Old  New
  Initial size (MB):  192  220
  Maximum size (MB):  400  450
```

Previously, using Windows NT, Dr. Liu remembers just a single figure, but now there are two. It seems the allocation is dynamic as can be seen from the "Virtual memory" window. How could the "old" figure be less than the report in the October, 1999, issue? Presumably the expansion to a 250-Mbyte file was lost with NT. In that both 192 and 220 are less than the 250 Mbytes (used during previous years), it is not obvious that the problem of Watcom linking is worsening. On the other hand, both 400 and 450 are substantially greater than 250, so more resources have been promised. The demand of MS Windows does seem to be ever-increasing. The linking succeeded, and Dr. Liu attached the resulting TPBIG to E-mail. Later that same day, Mr. Johnson reported: *"My case now runs successfully with the time step of 0.1 microseconds."*

The framework of a steel building, not a transformer, is what inspired the high-order modeling of Qibin Zhou in Hong Kong. He explained this in E-mail dated July 17th. Your Editor's concern was about whether or not a second, identical transformer might be modeled (thereby perhaps justifying the use of arguments with $INCLUDE). Well, no transformer, and probably no need for concern about a second copy of the same data (in this case, building): *"I model the steel framework of a building. I want to calculate the current in each branch and voltage at each bus under a large current impulse like lightning."* Upon reading this, your Editor inspected E-mail, which clearly indicated an unusual affiliation for an ATP user : *"the Department of Building Service Engineering."* Your Editor was fascinated, so he asked for clarification of the discipline. Mr Zhou explained : *"I am a student of electrical engineering, and my research direction is the*

lightning protection of tall buildings." About order, it seems that 396 coupled coils will not be the end: *"When my model becomes complicated, it will include more than 1000 coupled branches."* Your Editor was impressed. July 18th, he wrote : *"You will be navigating uncharted waters. Thus far, I know of no one who has exceeded 400 ... Yes, if 400 ** 2 = 160K, 1000 ** 2 = 1000K. Whether the 64-bit arithmetic now in common use will remain adequate, I do not know. That could be one of your determinations. Comparison with 128-bit Lahey simulation should be possible."*

Single-precision HIGH ORDER PI CIRCUIT (HOPC) was proposed to Qibin Zhou in Hong Kong as follows : *"If you really are serious about 1000 coupled coils, I would recommend your switch to C-like HOPC. In fact, we might even think about reduced precision : 32 bits would gain a factor of 2 compared with 64 bits, if you believe that 6 or 7 decimal digits of precision would be adequate for your [R], [L], and [C] data. My guess is that this will be the case. Physically, the solution can not be sensitive to small changes in input data. What I am proposing is this : you create a 32-bit binary file, and ATP would read this, and store it as 64-bit data. For order 1000, the saving would be about 2 Mbytes for [R], 2 Mbytes for [L], and 2 Mbytes for [C]. The 'about' is due to symmetry of the matrices, of course. 6 Mbytes is worth saving --- not just the space, but the time to read the data."* To be continued.

DCG EMTP Office in Montreal

EPRI, which once dominated the DCG / EPRI partnership for the commercialization of EMTP, seems to have retreated substantially during recent years. Your Editor is ready to drop the /EPRI from DCG/EPRI of years past because, in recent DCG advertising, EPRI seems to have been demoted to the status of any other DCG member. EPRI's decline in influence had been suspected for years, but easily-referenced documentation always seemed to be lacking. No longer. Laszlo Prikler attended the free DCG sales pitch at IPST in New Orleans, and returned with the important information. Not only did he himself summarize details, he mentioned a surprising Web page that documents the information: www.emtp.com Why surprising? Because this originally belonged to, and was controlled by, Tom Field of FREEP fame (see mention in the July, 1997, issue). No longer. When visited by your Editor early in the morning of October 22nd, the home page included this statement : *"EMTP-RV is developed and maintained by the Development and Coordination Group of EMTP which include American Electric Power, CEA Technologies, CRIEPI of Japan, Electric Power Research Institute, Electricite de France, Hydro One Networks, Hydro-Quebec, US Bureau of Reclamation and Western Area Power Administration."* Not only has EPRI lost its dominant position, its former *"associates"* AEP and EDF also have been lost to DCG. Deregulation of the American electric utility industry has not been kind to the once-powerful and arrogant bureaucrats in Palo Alto, California, USA.

ASEA, which was the Swedish half of what became ABB (see mention in the April, 1999, issue), is notable by its absence from the list of members. Curiously, past newsletters seem never to have mentioned the involvement of ASEA in EMTP commerce. However, the front of an early ATP Rule Book certainly does, and this detail will be reproduced here for the historical record : *"The first annual meeting of LEC was held in Leuven on November 4th of 1985, and Dr. Meyer agreed to bring ATP. About possible cooperation with those who then were trying to sell EMTP, the official minutes of this meeting records the following: 'It was unanimously agreed that the User Group wants to influence the politics of development by making a distinction between a) the EMTP proper (UTPF), which should remain free and intact; and b) preprocessors, postprocessors and data bases, which could be things to sell. After this discussion, it was agreed that TA should contact DCG in order to request EPRI not to sell the EMTP proper (UTPF). Should this first attempt prove to be unsuccessful, then DVD could try.' Here TA stands for Mr. Ture Adielson of ASEA, who at the time was the EMTP representative of ASEA to both DCG and LEC. Finally DVD indicates Prof. Van Dommelen, the Chairman of LEC. Prior to the vote authorizing this statement, Dr. Meyer had agreed to turn his ATP work into the public domain provided DCG and EPRI would do likewise. No response from DCG or EPRI was ever received, as far as the Can/Am user group knows."* So, during the mid-to-late '80s, ASEA was involved up to its eyeballs in EMTP commerce. In the USA, there was a connection with an ASEA office in suburban Milwaukee, Wisconsin --- not that far from collaborating Prof. Bill Long in Madison --- as your Editor vaguely recalls. But then along came the merger with Brown Boveri of Switzerland, and identities were obscured. All that is known today is this : eighteen years later, none of the past involvement by ASEA with DCG seems to have survived. DCG involves no individual manufacturer of the industry. To be continued.

Publishing Programs and Viewers

Hyperlinks now are possible within the PDF output of WP 11. This is confirmed by E-mail dated July 29th from Pamela Daw of Corel. Dr. Liu had telephoned the question, and this summarizes details: *"You will need to update your Acrobat Reader to version 5.0 in order for it to be active. You also need to enable this while you are publishing the document to PDF by choosing file/publishto/pdf, document tab, check off 'include hyperlinks'."* No question, this is progress (recall disappointment using WP 9 as summarized in the January, 2001, issue). But is this enough to make a difference? Perhaps not, simply because the PDF output of WP is too voluminous to be of general interest. This was the conclusion of the first controlled test in Portland as documented in E-mail to Laszlo Prikler dated June 17th. Using a complete, final copy of the July newsletter, this

confirmed Laszlo Prikler's skepticism : *"Yes, exactly as you wrote us, or exactly as I found using pdf995, PDF output of WP 9 or 10 is too big. ...*

```
JUL03  DOC  152,064  06-04-03  6:06p JUL03.DOC
JUL03  PDF  530,300  06-16-03  1:49p JUL03.pdf
```

No question, this is much too big to be useful. You were right. ... Oh, final detail: the preceding can not be much compressed. PKZIP gained only 3%, as I recall."

Openoffice for MS Windows (see mention in the Washington Post review of WP 11) is of interest to Orlando Hevia. July 5th and 6th, he wrote : *"It is interesting. I knew about OpenOffice for Linux, but this version for Windows is new to me. I downloaded it, and did a few tests. An interesting feature is this: tables have no limit on the number of columns. But a table with 80 columns cannot show text, because the font would be too small."* Your Editor was skeptical about ability to import files from other publishing programs. July 7th, Mr. Hevia observed : *"The OpenOffice word processor is better. I tried it, opening the manual of Word gtpplot.doc (it has text, tables, formulas and figures), and it looks correct in OpenOffice."*

Hoidalen Improves ATPDRAW

Confusion between ATP and ATPDraw is not a new subject. It has been written about before (e.g., see the April and July, 2001, issues). Another good illustration arrived by E-mail on November 5th. Days earlier, BPA's Dr. Tsu-huei Liu had used the EEUG list server to issue an announcement entitled *"Discrepancy between Pi section & distributed model of CABLE PARAMETERS."* This involved the trouble reported by Steve Nurse of BSCTS in England (see mention elsewhere). Dr. Liu's report documented an ATP error, and a change to correct it. The announcement did **not** mention ATPDraw, and it ended with this advice: *"Orlando Hevia should be updated soon in order that GNU ATP will reflect the preceding progress ..."* Five days later, a private response from Australia was this : *"Please advise when we may expect the release of an updated ATPDRAW 37p5 containing the improvements outlined in your email to ATP listserve 31/10/03 (Cable parameters discrepancy)."* The following day, Dr. Liu answered privately as follows : *"The improvement outlined in my email to ATP listserve ... has nothing to do with ATPDraw because no data change was involved. ATPDraw is a separate program which provides the option of graphically assembling the data for running ATP."* The Hoidalen Revolution continues. Prof. Hoidalen, the author of ATPDraw, seems to be winning.

Frequency Scans and Harmonics

Fixed-format LINE MODEL FREQUENCY SCAN (LMFS) had not been illustrated prior to September 3rd when the 3rd subcase of BENCHMARK DC-51 was converted from free-format to fixed-format data. Not only was the fixed alternative not being illustrated, it could not be illustrated in its long form because more than 24 bytes are required for the request word. For a decade or more, parameters were being decoded the same way as for FREQUENCY SCAN (FS) which began with an offset of 24X. But the long form of LMFS requires 25 bytes as discovered during work on the Rule Book. Apparently no one ever tried this, during a decade or more. Following a change to REQUES, parameters of LMFS are being shifted 8 bytes to the right compared with FS as the new comment-card ruler in DC-51 illustrates.

ANALYTIC SOURCES USAGE (ASU) allows the user to define his own sources as functions of time in user-supplied source code as illustrated by standard test case BENCHMARK DC-6. Why not a comparable definition of sources as complex functions of frequency for use during phasor solutions? This idea occurred to your Editor while writing E-mail to Zhou Qibin in Hong Kong on October 22nd. For three decades, program users have been able to supply their own source code to define each Type-1 (originally Type codes 1 through 9) source at each time step. Why not a comparable capability for phasor excitation, with frequency replacing time as the independent variable? Although not limited to any such case, the greatest practical interest almost certainly would be for a loop over frequency, which has three variations: 1) FREQUENCY SCAN (FS) ; 2) HARMONIC FREQUENCY SCAN (HFS) ; and 3) a loop over frequency that might be produced entirely by POCKET CALCULATOR VARIES PARAMETERS (PCVP) . So, the arbitrary definition of phasors by user source code begins October 26th as illustrated by a new 7th subcase of BENCHMARK DC-5. An arbitrary alphanumeric name of characters identifies each distinct function, and this allows a high-level match of the user's data with his appropriate source code. This is to be compared with Orlando Hevia's use of an arbitrary integer as described for USRFUN in the October, 2002, issue (such security is believed to be important). Program changes were confined to this new user-supplied subroutine named USER10 (user-supplied source code of UTPF overlay 10, which is where a phasor solution is performed) as well as UTPF segments SUBR5, SUBR10, and SUBR15. The last of these was to allow ANALYTIC sources for non-frequency scans as illustrated by DC-41 (see new node RRR which is excited by new function HYPERB of USER10) .

LINE MODEL FREQUENCY SCAN (LMFS) was made faster on November 19th following realization that the embedded LC or CC or CP data was being used more often than necessary. Thinking about a bigger idea of Zhou Qibin, your Editor had considered LMFS code, and he could not even remember whether the line or cable parameter calculation was made once per solution or once for each frequency. So, the symbolic debugger was used to answer the question experimentally. Good news was found: a single transfer provided circuit parameters for all frequencies. Yet, there was waste. Each LMFS data case involves 2 or 3 --- the latter if a double circuit rather than a single circuit is involved --- frequency scans for the 2 or 3 standardized tests that are used. For illustrations, see BENCHMARK DC-51 (the 2nd subcase is 3-phase and the 3rd is 6-phase). Yet, line or cable geometry is identical for all experiments within any one subcase. A better idea was this: only one access to the appropriate supporting program would be

needed if ATP bothered to retain and reuse the results of the first access. Relatively simple changes to OVER8 and SYSDEP now do precisely this. Only two standard test cases were affected (DC-51 and 52), and these demonstrate new interpretations for the 2nd or later reading of LC, CC, or CP data. For example, in DC52.LIS one sees two different interpretations for CP data cards for the second reading :

```
 Skip another card of CABLE or LINE CONSTANTS.
 Blank card terminates LINE or CABLE CONSTANTS.
```

Later, such output probably will be suppressed. But initially, until everyone is sure that operation is correct, such output has diagnostic value; it documents what ATP is doing as it skips over the data.

Type - 91 or 93 TACS Source

The request UNIQUE TACS SWITCH (UTS) will force uniqueness of the specification of each Type-91 or 93 TACS source. Recall each involves a switch that typically is identified by a single A6 terminal name, and this is not always unique as first was mentioned in the July issue. As explained in the following issue (October), logic associated with switch identification to control a Type-91 or 93 TACS source was made during April. Unfortunately, between that time and a September 17th correction within SSTACS, the switch identification logic in SSTACS conflicted with TACS CONTROL of a series R-L-C branch. Trouble first was reported two days earlier by Orlando Hevia who had written as follows from Argentina: *"That user in Spain sent the attached data cases with the same problem: different results when different order of data input."* There seemed to be a data-ordering problem because the error could be avoided in simple cases by placing the TACS-controlled branch first. This was demonstrated by simple attached data cases TRL3.DAT (TACS control of branch 4 was handled wrongly) and TRL4.DAT (TACS control of branch 1 was handled correctly) . But correction by difference of ordering was purely a coincidence. In general, there was a conflict between the storage of a switch number (for Type-91 or 93 printout) and the storage required by TACS control of series R-L-C. Both used the same part of vector LITYPE prior to separation of the demands on September 17th. Orlando Hevia had the final word. Later than same day, he explained : *"The changes solved the problem with the data cases I sent you. I sent the modified program to the user, who has bigger data cases. Surely he will test in detail. He is one of the students of Prof. Juan Martinez in Barcelona."*

TACS Definition of Series R-L-C

TACS CONTROL of a series R-L-C branch might have been wrong for all but the simplest data (all that had been verified by your Editor) prior to a correction to OVER12 on September 7th. The introduction of new variable N7 converted List-2 index N5 to List-3 index N7 (generally not equal to N5). The initial report of trouble came from Orlando Hevia in E-mail the preceding day : *"I send you a case where the location of a branch produces a problem. The case is from a user in Spain. I reduced the case, and translated his comments. ... How the user discovered the problem is another mystery."* Of course, your Editor diagnosed the problem and corrected the response of ATP. But this is only about half way through the story. Next, it was noticed that the modification to OVER12 changed the answer to that oversimplified illustration of Mr. Hevia's corona modeling in the 5th subcase of DC-38. The discrepancy began on step number 142. Of course, your Editor rapidly sought approval of the change from Mr. Hevia, who responded with a better illustration of his corona-modeling technique in the form of new disk file TIDDHHC.DAT In E-mail dated September 9th, Mr. Hevia wrote : *"I send you a case with corona that works. The values are invented, but the result is believable. I tried a simpler model, and it works. To reduce oscillations in the capacitances (they depend on voltage, and voltage can oscillate), I added an average calculation. This works OK. I suppressed this average to compare results; this too works."* However, Mr. Hevia observed a problem with ordering : *"I stacked the two cases to send to you, and in this case the second case produces very different signals."* Of course, your Editor corrected this ordering problem. September 10th, additions were made near the start of SUBR1 to initialize associated storage for any 2nd or later subcase. Then the TIDDHHC data was appended as a new 6th subcase of DC-38. Unfortunately, the answer changed. Need for yet another initialization near the start of SUBR1 was diagnosed, and the addition was made September 11th. Finally, DC38.LIS is believed to be correct, and this includes the new 6th subcase. Five batch-mode CALCOMP PLOT graphics of 4 signals each document the the various signals, which retain their general forms in spite of a doubling of time step size (to dT = 2.E-8 sec) in order to speed execution.

TACS CONTROL can be used to vary capacitance C of series R-L-C branches for corona modeling as inspired by Orlando Hevia. The 6th subcase of DC-38 illustrates such use, and the subject is being mentioned now, at the end of October, only because of a trivial but tricky detail that must not be overlooked. It is this: zero capacitance in the circuit corresponds to infinite capacitance on the data card if either R or L is nonzero. As your Editor wrote on October 30th : *"When is zero not zero? When it is infinity. This was Dr. Hermann Dommel's choice 40 years ago. Could this confusion be causing the problem? Let me look at your branches ... Note that when C = 0 you are left with a 10-ohm resistor. Circuit theory would suggest an open circuit, but Dommel chose a different convention. For a solution using circuit theory, C = infinity which means a short circuit (leaving just the 10 ohms) ."*

Courses : Is Licensing Required ?

A time-limited license for home use of ATP by undergraduate students of a conventional university course was proposed by Prof. Mustafa Kizilcay of FH Osnabrueck in Germany. In E-mail dated August 14th, he wrote about the need: *"Until now, students who attended*

my course on power system transients have used ATP only in the lab and therefore it was not necessary to license them. At the moment, I have two students, and they are very interested to use ATP on their home PCs to do the homework I give them, and to gain some experience. I am thinking how I can satisfy their request without violating any licensing rules. As EEUG policy, we do not license any undergraduate students at universities in Europe. Instead of students, their professor or lecturer is asked to apply for an ATP license." Note that this is a European problem, and perhaps a Japanese (JAUG) problem. It is not a Can/Am problem since the North American user group does license students for home use of ATP.

Prof. Kizilcay continued with a proposed extension to existing ATP licensing: *"In my case, I am responsible for the students. May I give them, for a limited period, ATP on a CD after having them sign a form (in German) that refers to licensing conditions at www.emtp.org and defines a limited licensing period? I intend to explain to them in German the contents of the form letter and licensing agreement because their English is not so good. Also, students tend to sign any document without reading it. I believe it is important that the students would receive the programs (ATP, ATPDraw and PlotXY) and documentation directly from me. They will not be given any password for secure Web sites. Otherwise, they could vacuum all information and data that they might find."*

Your Editor was sympathetic to the problem, although he began by proposing the Can/Am solution : *"It is easy to require licensing. Then there is no question. If EEUG does not want to do this, the Can/Am user group easily could. We have done this many times."* But note that this would involve communication with each individual student --- persons who might not read English well, and who might be inclined *"to sign any document without reading it"* (your Editor does not dispute this possibility and disadvantage). It also would confer full ATP rights on such undergraduate students whereas Prof. Kizilcay's proposal would convey only limited rights that would be tailored to the course. No question, what Prof. Kizilcay proposes has its attraction for use where English might not be easily read and where the local user group will not help by licensing undergraduate students. Your Editor liked the idea of a deadline --- the fact that home ATP use would be timed out after a relatively short period of time (a course typically lasts less than a year). During use, there should be protection. Your Editor wrote: *"Most important of all is the non-disclosure. Prior to expiration, there is no right to disclose ATP information to persons who are not licensed."*

Discussion was seen as the next step. Prof. Kizilcay wrote : *"If you find this proposal meaningful, we can think about a recommendation or a rule for all university professors / lecturers to act uniformly this way."* Your Editor's response: *"More writing for the newsletter, I guess. Note that the German you will use would not be useful in that many places of the world, however. As I understand it, your procedure depends on the local language."*

ATP Short Courses

ABB Corporate Research Ltd in Baden - Dattwil, Switzerland, offered a private, one-day short course on ATP for beginners. This was Friday, September 5th in Zurich, and Laszlo Prikler was the instructor. He summarized the course in E-mail 3 days later : *"The trip and the course was quite a success. I could finish even the PowerPoint slides at 3 a.m., 5 hours before the course began. Initially, the room was filled with 17 participants. But during the first coffee break we had to look for more chairs for some additional newcomers (3-4 people). I begin at 8:30 and even at 5 p.m. the room was nearly full, despite it being a Friday."* As traditional (open) ATP short courses have disappeared in North America and Europe, such closed offerings as this one for ABB show considerable promise, your Editor hopes. Four days beforehand, he had written : *"Congratulations. I do believe there is hope for such targeted and shorter offerings in this new world where the traditional short course about ATP seems almost to have disappeared. Yes, Argentina continues to give its traditional course in Santa Fe, but it also takes the course on the road."* In fact, nearby universities in Zurich and Lausanne also had been invited by ABB to participate. Your Editor's reaction was this : *"It makes sense to me. This looks like a win-win-win situation to me. ABB looks good to the schools and its students (cheap advertising). The schools take advantage of the free information. Finally, you have a bigger audience (this should inspire you, I hope)."* Laszlo Prikler's reaction was informative: *"Hungarian utilities expect that lecturers move to their employees to give a course. Some years ago we offered courses in Budapest and the students travelled. Now employers want a clever staff, without letting them out of work for longer period. Restructuring changed our work significantly."* Yes, this seems to be a global phenomenon, and traditional ATP short courses have suffered as a consequence. When courses began, they were longer (e.g., a week) . Then they became short. Finally, they must be portable, too, and the audience often is limited.

The Internet chose not to cooperate with a PDF illustration from Portland, however. Your Editor and Dr. Liu had worked hard to produce 101 pages of quality PDF output for Chapter II of the Rule Book, and Laszlo Prikler had hoped to demonstrate to the audience how easy it should have been for him to download the 495-Kbyte file from his Internet-connected storage in Budapest (where Orlando Hevia was to place the file at the last minute). But this was not to be : *"Unfortunately Orlando could not upload the new RB Chapter. I'm still investigating the reason. ... Before I rushed to the airport I used the 'test' account we share with Orlando to collect materials that I wanted to carry with me on a CD. Maybe I exceeded the disk quota?"*

About paper vs. PDF copies, Laszlo Prikler made this interesting observation : *"At the end, I showed them the ATP related resources on the Internet using Mr. Gariboldi's notebook PC. The status of Rule Book updating was described as well. I was surprised that access to a paper copy (that they must have received from Osnabrueck as an*

EEUG member) is an issue even for such a big company as ABB. So they were hungry for a high quality PDF copy." Your Editor was not surprised at all. His response: *"I would not bet on paper for any size company. I do believe that computer (or CD) storage is the answer. At least Chapter II now looks fairly good."*

The fall IEEE PES Switchgear Committee meeting for year 2003 is scheduled to include a demonstration of ATP, ATPDraw and ATP Analyzer as well as possible distribution of ATP for MS Windows. This according to E-mail dated September 9th from Ted Burse of Powell Electrical Manufacturing Co. From the attached agenda, the meeting is to be held in Portland September 21-25. About *"the Thursday ATP Presentation and Tutorial,"* the form letter included explanation from Dr. John Brunke of BPA, who offered distribution of ATP on a CD to ATP-licensed members : *"People attending ... who want to receive all the programs including ATP must register. Please (ASAP) go to www.emtp.org, print, complete the form, and mail it. If your registration is completed and accepted, I will give you a disk with everything on it. If not, you only get the 2 public programs."* It would seem that the offer was well received. Dr. Liu's mailbox has been busy receiving E-mail from the Web form. Your Editor counts 20 applications for the 3 days ending on September 11th as this paragraph is being written.

Miscellaneous Intel PC Information

"IBM finally is pushing Linux" was the start of a paragraph in the July, 2000, issue. Several years later, the story is being revisited. Progress has been slow, but the strategy now seems less obscure. *"I.B.M. Helps Promote Linux"* is the title of a story that was published in the *New York Times* on November 11th. It seems that Open Source Development Lab (OSDL) is the name of the consortium that has united with IBM to support Linux as an alternative to MS Windows. OSDL is to Linux as OSF (the Open Software Foundation) was to Unix during the '80s. OSDL seems far smaller, unfortunately, although *"membership includes Hewlett-Packard, Dell and Intel."* MS dominance is obvious : *"More than 300 million people worldwide use the Windows desktop operating system and Microsoft's Office suite ..."* So what is the pitch of opponents? *"Linux advocates say that the full complement of Microsoft desktop software has far more features, and is far more costly, than most workers at many companies really need. And corporate technology officers are concerned about the cost of upgrading tens of thousands of PC's every couple of years to new versions of Microsoft software and about the security flaws in Microsoft products ..."* How much cheaper might Linux PCs be? *"Studies have estimated the total cost of ownership of a PC in a corporate setting at $5,000 to $7,000 a year. The hardware and software costs are typically less than 30 percent of the total, with the expense of maintaining, updating and debugging accounting for the rest. Deploying Linux and having applications centrally distributed and managed on server computers, using Internet technology, can cut the cost of owning a desktop machine in half or more."* But what is this mention of *Internet technology*? What does the Internet have to do with the operation? Perhaps the Internet could be used if other networking were lacking (e.g., for remote company offices). Also, where are the guinea pigs who certify the cost savings? According to an IBM spokesman, *"the companies ... do not want to be named because they have not decided to switch ..."* If no names, what kind of companies, then? *"This kind of computing could be easily adopted by bank branch offices, sales people, insurance agents, auto dealers and others."* Finally, what about market share? *"Shipments of Linux rose to 2.8 percent of desktop operating systems in 2002, up steadily from 1.7 percent two years earlier, according to IDC ... Windows accounted for nearly 94 percent of shipments last year."* No question, Bill G remains firmly in control.

The 32-bit limit of Intel has been tested by Zhou Qibin in Hong Kong. First, for readers unfamiliar with the number, 2 ** 32 = 16 ** 8 = 256 ** 4 = 4.295E9. I.e., 32 bits can address a maximum of 4.3 Gigabytes of RAM. Dividing by 4 to convert to equivalent 4-byte words, this limit is 1074 Megawords. Well, 1017 Megawords is the size of tables of Mingw32 ATP that is being successfully used. Created here in Portland by VARDIHKG.BAT, execution at BPA was refused by Win 2K as follows: *"The system can not execute the specified program."* But Zhou Qibin's PC has more storage, and on October 13th, he wrote: *"It is great! The new TPBIG can run properly!"* To document precise numbers, 1017666871 will be seen in the header of a resulting .LIS file. About resources, Zhou Qibin wrote: *"my PC includes 512M of physical memory and 765M of virtual memory."* Compare this with Dr. Liu's PC at BPA, which has only 256 Mbytes of RAM and a maximum of 450 Mbytes of paging file on disk. It does seem that perhaps the sum of these two figures must exceed the total size of ATP tables (and at BPA it does not). Yes, Zhou Qibin did request larger tables, but execution failed in Hong Kong as well as at BPA. Yet, ATP execution is the only thing that failed, it is to be emphasized. VARDIM was executed normally; its output was compiled normally; and ATP was linked without incident. There was no hint of trouble prior to the denial of execution by the operating system. This seems to be what happens when GNU Mingw32 tables exceed the 32-bit limit of the Intel hardware. But note that other software might not behave as well. For example, the old Watcom linker would not have had a chance. As well known for years (the start of the escalation of paging file size can be found in the April, 1999, issue), linking of Watcom ATP would have failed.

Miscellaneous Small Items

A Heidler surge function that matches user-specified peak value and maximum slope are the creation of Orlando Hevia of UTN in Santa Fe, Argentina. The idea first was documented in E-mail dated August 12th : *"Time to peak and the tail time is not important, the expert said. To do my work, I created a fitter to generate the Heidler source parameters to comply with the peak and slope requirements. The tested range of amplitude is 1.0 to*

100.0 kA, the range of slope is from 1.5 to 150.0 kA/us. The tail time, or more correctly, Tau2 ... is one of the parameters, as is N." Five days later, UTPF segment HEIDLR was modified. Operation has been illustrated by the addition of one more request for fitting in the 11th subcase of DC-13 (see comment cards that mention HEIDSLOP.DAT, which was the name of the separate disk file used by Mr. Hevia).

H. Sturges is the author of *"The choice of a class-interval"* --- a famous paper that was published in J. Amer. Statist. Assoc. during 1926. This is the basis of a new option for statistical tabulation as first suggested by Orlando Hevia of UTN in Santa Fe, Argentina. In E-mail dated August 14th, Mr. Hevia wrote: *"If ... the number of cells for histograms are calculated using the formula of Sturges. ... There are other possibly better formulas, but they require values not immediately available."* For an illustration of use, see "STURGES" in the 1st subcase of DC-16 beginning August 16th. So, a recognition of STURGES in DICTAB is the first attempt to automate selection of the number of compartments for statistical tabulation. Previously, the user could specify either the compartment size AINCR or the number of compartments that the distribution will span. Now, that number can be determinated automatically and optimally by ATP. Well, not always optimally, it turns out. As your Editor and BPA's Dr. Tsu-huei Liu had suspected, any 1926 formula is necessarily oversimplified. How? Sturges assumed a normal distribution. For this case, optimal compartment size is a function of only the sample size NENERG, and the function is simple. The number of compartments $k = 1 + \log (n)$ where n is the sample size and the logarithm has base 2. So, for example, 100 shots will use 8 cells whereas 1000 will use 11. These seem like reasonable numbers, typically. For the 24 energizations of DC-16, an extra tabulation for energy has been added to the end. The reader can compare the 15 compartments that were requested manually with the 6 that result from use of STURGES. For theoretical discussion, consider this paper found by Dr. Liu on the Internet : *"The problem with Sturges' rule for constructing histograms"* by Rob J Hyndman at Monash University in Clayton, Victoria, Australia. This is dated 5 July 1995. The writing ends with this conclusion: *"The problem with Sturges' rule is that its derivation is wrong. It is a rule which no longer deserves a place in statistics textbooks or as a default in statistical computer packages."* To locate a copy, a Google search for *"The problem with Sturges"* is all that is required. Google required < 1 second (amazing).

An unsymmetrical [C] matrix first was proposed by Alejandro Montenegro at the University of Florida in Gainesville. In semi-public E-mail of the EEUG list server dated August 27th, he explained that *"the matrices represent a HF model of a 2 winding transformer."* Your Editor responded 3 days later with an explanation that MODEL [R][L] satisfied the need for resistance and inductance, but that capacitance had been overlooked during that 1997 work : *"What happened to capacitance? Presumably low frequency (magnetic) coupling was considered first, as the simplest case. At the time, no one responded to writing about the work. Specifically, no one asked about capacitance, and none was provided. There is no good reason to avoid [C], however. If there is a practical need, code to support [C] could be added. But what is the need? Also, if one had the model, where would unsymmetrical data come from? Finally, what does it mean from a physical perspective?"* Your Editor asked questions, but once again no one provided answers.

List 31 was mentioned in the July, 2003, issue. With every list size a candidate for abbreviation using "K" (see the July, 2001, issue), lists 7 through 31 have been encoded without difficulty within the 131 columns of an output line until Orlando Hevia reported trouble on August 27th. This really is a continuation of that writing in the preceding issue about Triacs. About your Editor's variable-dimensioning, Mr. Hevia wrote : *"I see you corrected this part in orthodox form. It runs OK with the case of Steve Voeller, from Germany. But the same user required List 15 LCTACS = 400K. In the new version (August 18th), LCTACS cannot be expanded over the 90K of listsize.big"* The solution of this problem has involved changes to both the text file and the code for SUBR1. Previously, there was just a single model for the display, and this framework remains valid for small data. But for total table size equal to or in excess of a million words, the output has changed in several ways. Most importantly, the initial line, which displayed List Sizes 1-6 on the right, has been augmented by List 7. I.e., one List Size has been moved from the second row to the first, where space was more plentiful. A second important change is the conversion of the associated error stop to a warning message. Should that full row of numbers ever overflow (unlikely for a while), it should be preceded by this message: *"+++ Warning. Line of Lists 7-31 has overflowed. List 31 = XX will be missing on the right."* In any case, execution should continue (important). Other changes are less dramatic, but worth noting : 1) the removal of unused blanks from the text; 2) the addition of a blank for a 5- or 6-digit number; 3) the removal of 1 blank for a 3-digit number; and 4) the removal of 2 blanks from any 2- or 1-digit number. Changes were completed August 29th.

Myriad is neither a rare nor a common English word. Although not part of your Editor's spoken vocabulary, the word is read from time to time, and is understood to mean *many*. But that is just one of two possible meanings. The other, pointed out by Orlando Hevia in E-mail dated August 28th, is the number 10000. Look at what your Editor found in his Webster's New Collegiate Dictionary : *"1. The number of ten thousand; ten thousand persons or things. 2. An indefinitely large number."* In fact, 10K is the first (supposedly the primary or most important) meaning. But why the concern? Your Editor had been complaining about lack of another good symbol besides K (used for kilo) to shorten the printed list sizes. From his knowledge of Spanish, Mr. Hevia had suggested Myriad on August 28th : *"The 10000 (1.E4) multiplier is myriad (miria in Spanish), but it is not used because m indicates milli and M is for Mega. ... I recall that miriametro = 10000 m = 10 km from my days in school*

half a century ago." Yes, the perfect word except that it begins with an already overused letter. It should be mentioned that the use of 2 bytes was briefly considered: E4 to indicate 10K. But this gives up 1 byte. The idea looks more promising for 5 zeros rather than 4 (i.e., E5). Of course, if and when a list size exceeds a megaword, M can be used for 6 zeros. Finally, there was Mr. Hevia's idea for the future: *"What if all numbers are converted to K, and the K is not printed?"*

List 12 overflow within SUBR15 was wrongly reported to the user prior to correction on September 8th. That enormous data case ATP667 from Hong Kong provided the diagnostic tool. List 12 was being exceeded, but Qibin Zhou did not know it because the complaint was about List 11. Two days earlier, he had written: *"TPBIG shows the following fault message ... Storage exceeded for EMTP List Number 11 ... List 11 storage is dedicated to outputs of Type-59 S.M. components. But I don't use any."* Following study of the problem around S.N. 8026, your Editor improved this as well as a number of similar overflow checks in the same module. But this repair was not exhaustive. Ten days later, yet another such correction was made to SUBR15 during work with large data from Andrea Mansoldo of Pirelli Cables & Systems in Italy.

File editor PFE for MS Windows was mentioned in the October, 2002, issue. As explained, free PFE is superior for large files. At the time, the 16 Mbytes mentioned by Laszlo Prikler seemed plenty big. But that was before your Editor began communicating with Qibin Zhou in Hong Kong. Consider this testimonial within E-mail dated September 10th : *"The largest file I have opened with PFE is 431,635 Kbytes, which includes the [R], [L] and [C] matrices for 3410 coupled branches."* This was using MS Windows, for which the supporting memory (virtual if not real) presumably must be available.

"SUBTS3. Illegal N15 = ..." was the beginning of a warning message that was weakened for the last time on September 3rd. At issue is protection against wrong (garbage) subscripts for compensation. Long, long ago (perhaps in the mid-to-late-'80s), there was trouble, and a reasonable fixed limit of 900 then had been programmed to protect N15. But August 30th, trouble with real data was reported by Orlando Hevia of UTN in Santa Fe, Argentina : *"I am running a big case, and the following messages are sent to screen ..."* Yes, lots of data (*"more than 800 kBytes"*). Such printout is inside the dT loop, so output could be substantial : *"A 512 MBytes file was generated."* Probably we could have just added a zero to the 900 (Mr. Hevia's patch) and survived another decade or so. But after all of these years of non-appearance, your Editor hopes that there no longer is need for any check against a fixed limit. So, the protection simply was removed from SUBTS3.

Long-term dynamics might be simulated using ATP? This was the interesting proposal by Robert Spiewak of PolAmex, Inc. in Houston, Texas, USA. His list server mail dated October 20th mentioned *"simulation of islanding power system."* This occurs for a *"system that has limited generation and for overload condition, system frequency decays and damping factors are properly represented for all system components."* An interesting and encouraging response was provided by Dr. Keith Walshe of Power Quality Technologies in Ultimo (suburban Sydney), New South Wales, Australia. The following day, he advised : *"You must include both governor and AVR models on the islanded generation if it is to be realistic. Since this aspect of ATP use is well established I think that the most challenging part is modelling the control and protection systems because the most challenging aspect of islanding is managing the transition from a small generator on a big system to an isolated machine(s). I have done this to investigate the response of a 'Vector Shift' relay associated with a remote gas turbine station. To prevent problems with ATP, you must include a high resistance bridging resistance across circuit breakers that open to form the island. The governor and AVR models must be made to change from kW and PF mode to speed and voltage mode as soon as the islanding circuit breaker opens. This represents the easy case of detecting islanding. The more realistic case is when you have a remote CB that creates the island - now you must model local protection (to your generator) that can detect the condition under all conditions. This is much harder and if you come across such protection that really works please tell me all about it."* A day later, your Editor questioned stability of the numerical methods : *"The phenomenon of interest is slow; it might take minutes. For ATP, this would take a very, very, very long time. Even with a very large time step such as 1 msec, there would be 1000 steps per second, 60K steps/minute, etc. This is enormously wasteful since you have no interest in the electromagnetic transients, anyway. Yet, PCs are so fast these days, it just might be doable provided stability of the simulation were not a problem. But stability almost always is a function of the data, so you just might need to try to find out. If you succeed, let me know as I should write something for the newsletter."* There also was the question of whether such use is illustrated in standard test cases. Your Editor explained : *"No BENCHMARK DC-XX test case simulates very long. By design, simulation is as short as possible to speed the verification."*

The volume of ATP licensing was measured following E-mail discussion with Laszlo Prikler. November 3rd, he wrote about EEUG : *"We issue roughly 90-100 new ATP licenses a year and roughly 15% of applicants join as members ..."* Your Editor responded: *"I have never counted our numbers. I suppose we license more than 100 per year, but this is just a guess."* Later, your Editor asked himself: Why guess when records can be counted easily enough? Well, this is what was done November 10th. Over the past half year (through licensing that was performed on May 13th), your Editor has approved 124 licenses involving the Web form. Add to this number the 7 of the old forms that Co-Chairman Liu processed (yes, more than years after licensing moved online, some interested persons continue to use the old licensing form that had nothing to do with the Internet) and the total for 26 weeks is 131 Can/Am licenses to use ATP.