



ASPEN LEAFLET

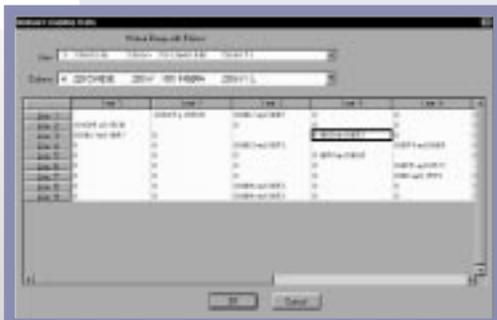
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Mutual Coupling

We are making two important changes to the way mutual couplings are handled in *OneLiner™* and *Power Flow™*: We are adding ‘from’ and ‘to’ percentages as additional parameters, and we are changing the user interface for viewing and editing mutual coupling data.

Up to now, we have assumed the mutual coupling parameters are for the lines’ entire length. This necessitates the use of tap buses for lines that are coupled over a limited distance. The ‘from’ and ‘to’ percentages in the new version will make it possible to do this without taps buses.



Mutual Coupling dialog box

The new info dialog box for a mutual group is done in the form of a spreadsheet. The rows and columns represent the lines in the group, and the parameter within the (i, j) cell is the mutual coupling between the ith line and the jth line in the group. To edit the parameter, you need simply double-click on the cell of interest.

You can now bring up this dialog box when you highlight two mutually coupled lines on the one-line diagram. The cell corresponding to the highlighted lines is selected when the dialog box opens.

In addition to the mutual-group dialog box, we are adding a “Mutual Group” page to the network browser. Here, the line pairs and their mutual parameters are listed in a tabular form.

Power Flow Update

We are overhauling the *ASPEN Power Flow Program* to get it ready for the upcoming release in the summer of 1999.

The switchable shunts and phase-shifter MW controls are new additions to the program. A switchable shunt is made up of banks of reactors and capacitors that can be switched on and off to regulate voltage. The new phase-shifter control is an addition to the existing phase shifter model. It adjusts the phase angle to regulate the MW flow.

We are also changing many aspects of the program to improve its ability to solve difficult-to-converge cases. This effort is being carried out on two fronts. The first is to improve the accuracy of the starting voltage profile. The second is to fine-tune program logic for automatic controls, such as LTCs (load-tap changing transformers), generator PV/PQ switching, and generator remote voltage targets.

A good starting voltage profile is essential to the convergence of modern power-flow solution techniques. Up to now, for a ‘flat’ start, the program sets the voltage magnitude to 1.0 per-unit and computes the initial voltage angle with an iteration of the fast-decoupled load flow. In the new version we are switching to a proprietary starting method that homes in on the solution voltages much more accurately and reliably. We were pleasantly surprised by the improvement: The MW and MVAR residuals become much smaller in the first iteration, and as a result, the program is able to start the automatic adjustments sooner, and solve the power flow in fewer iterations.

The program logic for simulating automatic controls does its work when the solution is close to convergence. We have put into this part of the program all the ‘tricks

of the trade,’ including step-size control, sensitivity calculations, partial refactorization, and localized updates. While most of these techniques are already working reasonably well in the shipping version, we decided to rework some of the algorithms to take into account interactions between controls, so that fewer moves are needed to achieve the desired objectives.

Our effort is paying off. The program is able to solve nearly all the difficult cases that eluded previous versions of the program. These include a 15,000- and 10,000-bus heavily loaded case of the MAPP system. The program is fast, too. As an example, it solved the 10,000-bus case in less than 15 seconds on a 400-MHz Pentium-based PC.

When the program is released this summer, users of the *ASPEN Power Flow Program* can expect to see their cases solved much faster and more reliably.

Scripting Language and Solution Viewer

These are two of the ideas we are considering for a future release of the *Power Flow Program*.

PowerScript is the name of the scripting language for the *Power Flow Program*. PowerScript will let you ‘drive’ the power flow solution from a program written in

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BASIC. This feature will open a new world of possibilities in customizing the *Power Flow Program*. As an example, to find the maximum transfer between two areas, you can write a program that gradually increases your area's export and solves the power flow in each step until some voltage limits are violated. We will implement the scripting-language feature in the *Power Flow Program* by making the program an 'automation server,' or a Windows program that can be driven by an external program.

It is important to note the distinction between scripting language and macros. Macros are like a deck of punched cards for a mainframe computer. They are only good for executing series of commands in a linear fashion. For complicated tasks, macros are no match for a scripting language, which is a full-blown computer programming language like BASIC. Also, unlike scripting language, macros are proprietary. Users who want to take advantage of the macros must learn a new syntax anew for each program.

Another idea we have for the *Power Flow Program* is to create a Solution Viewer that will enable anyone, anywhere, to view the power flow solution that is stored within an ASPEN binary file. We plan to make the Viewer available for download, free of charge, on our web site. The Viewer will display the flows, currents and losses on the one-line diagram the same way as the *Power Flow Program*. The user will also be able to print reports and to export the network data in ASPEN or PTI format. The only limitations are that the Viewer will not let the user modify the data or to solve a different case.

On-Site Training

We offer on-site training for all ASPEN software. There are many benefits in having the class held at your office. These include the ability to:

- Train many people at the same time, at a reasonable cost.
- Tailor the training topics to your needs.
- Overcome restrictions on traveling.

If interested please call or email Ed LaFon at elafo@aspeninc.com.

Employee Profile

Irma E. Velasquez is ASPEN's Chief Financial Officer. She is responsible for payroll, accounting, taxes, and government reporting. Being a native speaker of Spanish, Irma is also our chief liaison with Spanish-speaking clients. Irma has a B.A. degree in business from the University of San Francisco. Before joining ASPEN in



1990, she was a Trust Officer at a large San Francisco bank and a partner of a tax accounting business.

Irma is also an artist. She volunteers much of her spare time as a director of a not-for-profit art school for children.

Upcoming Events

- OneLiner Users Group Meeting at Atlanta on May 4.
- Hospitality suite at the Georgia Tech Relay Conf., Atlanta, May 4-6.
- Booth at the IEEE PICA Conf., Santa Clara, May 17-21.
- OneLiner training class in San Francisco, September 15-17.

New Users

ASPEN DistriView™

- Austin Electric Utility Dept., Austin, TX
- Central Power Electric Coop., Minot, ND
- Empresa Electrica de Guatemala, S.A., Guatemala City, Guatemala
- GE Power Management, S.A., Zamudio, Spain
- S. Peru Copper Corp., Lima, Peru

ASPEN Line Constants Program™

- City of Roseville, CA

ASPEN OneLiner

- Bahrain Ministry of Electricity and Water, Manama, Bahrain
- City Light, Water & Cable, Paragould, AR
- Emirates Trading Agency, Dubai, United Arab Emirates
- Empresa Electrica Quito, S.A., Quito, Ecuador
- Empresa Provincial de Energia - Santa Fe, Argentina
- Doble Engineering, Watertown, MA
- POWER Engineers, Inc., Hailey, ID
- Industry & Energy Associates, LLC, S. Portland, ME
- Sentry Technical Services, Millarville, AB, Canada
- Unil Service Corp., Hampton, NH

ASPEN Power Flow

- Burns & McDonnell Co., Kansas City, MO
- Industry & Energy Associates, LLC, S. Portland, ME
- TransAlta Utilities, Calgary, AB, Canada
- U.S. Bureau of Reclamation, Denver, CO

ASPEN Relay Database™

- City of Riverside Electric Utilities, CA
- Tucson Electric Power, Tucson, AZ
- Virginia Electric & Power Co., Richmond, VA
- West Kootenay Power, Trail, BC, Canada

