Netlib News: World Wide Web

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Last fall, netlib joined the World Wide Web. Access by email and ftp is still supported, but now netlib is also equipped for those who prefer to cruise the information superhypeway with graphical tools like Mosaic.

The World Wide Web is a loosely organized set of information providers who make available hypertext pointing to various text and multimedia files. Some of the resources available this way are: Internet Talk Radio, a colorful MATLAB tour, the Porschephiles interest group, NASA Dryden photos of experimental aircraft, art museums, and mathematical preprints.

Chances are, if your site is connected to the Internet then somebody has already installed Mosaic, one of the most popular programs used for browsing the Web. This browser was written at the National Center for Supercomputing Applications - University of Illinois, and is supported on Unix/X11, Macintosh, and Windows. It provides some of the convenience of xnetlib, without need to run netlib-specific code at either server or client ends.

If nobody has installed it at your site yet, and you have the desire and skill to do so, look at `ftp.ncsa.uiuc.edu` under `/Mosaic`. As always, you should take security precautions: watch the URL lines, don't install gullible viewers, and read files you download before you execute them. If you find these terms or the installation process confusing, seek advice from a competent local systems administrator.

A link in the World Wide Web, called a URL for "Uniform Resource Locator", is written in a certain syntax that describes the transfer protocol (like `ftp` or `http`), the Internet host name of the server (like `netlib.att.com`), and a file name or query. For netlib, there will be a number of starting points adapted to different needs but one URL that should always work is `ftp://netlib.att.com/home.html`.

When you ask Mosaic to open that URL, text and images will be displayed on your screen. Some of these will be highlighted in some way and are active, in the sense that when you click on them with your mouse, you are asking Mosaic to pursue another link. For netlib, this mostly means browsing the hierarchy of index files until you find a particular subroutine or package that interests you. Clicking on that final link downloads the software to your local machine.

If the ultimate file is PostScript or an image (like `photo/golub92/phone.gif`) then after downloading, an appropriate viewer is automatically launched. Decompression of files is also automatic. Netlib tries to be a good network citizen and supplies all files in compressed form, so that the casual clicking to follow links doesn't soak up more network resources than necessary. If your system doesn't have "uncompress" installed, get `prep.ai.mit.edu:/pub/gnu/gzip-...` for Unix or one of the freeware compression tools for other systems. For example, a DOS version of gzip may be found on `wuarchive.wustl.edu`.

As mentioned before, there are alternate starting points in the Web that may help you locate information from netlib. A good example is GAMS, built by Ron Boisvert and others, whose URL is `http://gams.nist.gov`. This provides a more logical classification than the file hierarchy in netlib, though it does not necessarily cover everything in netlib. A conferences database is available at `http://netlib2.cs.utk.edu:7080/Conferences.html` and other services are also available from the Tennessee site.

Due to changes in the Internet gateway here, the ftp site moved last fall. The new name is `netlib.att.com`. Log in as `anonymous`, and `cd netlib/eispack` or wherever. (Since several users have been confused, perhaps it is worth emphasizing that this is `ftp`, not `telnet`.) A future column will cover features of the Plan9 ftp server that allow you to ask for `eispack/rg` and get back a package with exactly that subset of eispack needed for your problem.

Recent additions

Because of the long period since the last column, there have been too many changes to describe. Let's just touch on recent highlights.

Version 7.0 of Randy Bank's PLTMG package for elliptic partial differential equations was recently installed, replacing the earlier version, and a revised edition of the Users' Guide is available from SIAM. Some of the noteworthy features of PLTMG are adaptive mesh refinement, multigrid continuation, hierarchical basis multigrid solver, graphics, and grid generation.

Another recent code and book combination is `AMPL`, A Modeling Language for Mathematical Programming by Robert Fourer, David Gay, and Brian Kernighan. This provides "a language and system for formulating, solving, and helping understand problems of minimizing a function subject to constraints." It aims to deliver this important area of numerical technology to a wide audience, while at the same time offering model problems that will be of interest to algorithm developers.

A third example is `linalg/mltemplates.shar`, a set of Matlab scripts for iterative solution of linear systems as described in the Templates book by Richard Barrett, Michael Berry, Tony Chan, James Demmel, June Donato, Jack Dongarra, Victor Eijkhout, Roldan Pozo, Charles Romine, and Henk Van der Vorst. The book itself is published by SIAM and also available as a PostScript file in netlib.

Recent additions in the `toms` directory are:
720: adaptive cubature over a collection of 3-dimensional simplices, by Berntsen, Cools, Espelid
721: eigenvalues of Mathieu differential equation for noninteger and integer order, by Shirts
722: support IEEE binary floating point arithmetic, by Cody, Coonen
723: Fresnel integrals, by Van Snyder
724: F-percentiles, by Abernathy, Smith
725: multivariate normal integral, by Drezner.

`ScaLapack` is a new directory in netlib containing software by a number of authors "for MIMD distributed memory computers for some lapack routines: the direct factorization routines LU, QR, LLT (Cholesky), the upper hessenberg reduction (HRD), the tridiagonal reduction (TRD), the bidiagonal reduction (BRD), and the parallel implementation of the SIGN function, which utilizes deflation in order to find eigenvalues. The SIGN directory also contains subdirectories for QR with column pivoting (QRP) and triangular inversion (TRI)."

`Floppy` is a tool by Julian Bunn that checks Fortran input for adherence to coding conventions. It can also be used to derive a hypertext annotated Fortran code; you can use Mosaic to browse the code and follow links to subroutines and variables. The user manual itself is online in simple hypertext form.

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**** screen dump of netlib Mosaic session: eispack.gif ****

Sidebar

Netlib is a collection of mathematical software, documents, databases, and services. To get started, try `Mosaic ftp://netlib.att.com/home.html` or send the email message `help` to `netlib@research.att.com` Operated since 1985 at AT&T Bell Labs (Eric Grosse), at ORNL and Univ. of Tennessee (Jack Dongarra), and at replicated sites world-wide, netlib answered 1.8 million requests in 1993. Access is free to all, but designed primarily for exchange of research between professionals in scientific computing.

sample contents: linear systems and eigenanalysis (dense; sparse; iterative); splines; special functions; multivariate smoothing; FFT; nonlinear least squares; linear programming test problems; triangulation and finite elements for differential equations; ACM Collected Algorithms; benchmark programs and tabulations by machine; multiple precision and interval arithmetic; Fortran-to-C conversion (compiler; trial use via email); address lists.