Netlib News: BibNet augments preprint servers and electronic journals

Eric Grosse

30 Jan 1995

Mathematics is rapidly moving toward electronic publishing, but no one knows quite what shape it will take in our community. Will we use a centrally managed archive, analogous to netlib for math software and the eprint server at Los Alamos for physics papers? Will we publish in new journals like ETNA or electronic forms of established journals like ESISC? Will we depend on PostScript ftp archives at each research lab? All the above?

One thing is clear—locating a particular paper amidst this chaos can be a challenge. BibNet, a new service operated by Nelson Beebe and Stefano Foresti and hosted by netlib, offers an appealing answer to this challenge. Readers search this database or download individual author bibliographies by directing your favorite Web browser to `http://netlib.att.com/netlib/bibnet.html` or by a request like *find gold in bibnet* mailed to netlib.

The compelling idea behind BibNet is that authors have the motivation to keep complete, accurate, and timely bibliographic information about their own work. No one else is as well positioned to keep track of when their preprints appear, or when those preprints turn into final publications. Authors already have to maintain this information in a curriculum vitae for professional reasons, so there is little extra work for them.

BibNet has chosen to standardize on BibTeX, already widely adopted in math typesetting, as the format for these bibliographies. (If you're still using refer format, just ask netlib to *send bibnet/tools/software/r2b* for a converter.) A description can be found in your LaTeX manual or in the following:

```
@Article{Higham:1994:BVT,
author="Nicholas J. Higham",
year=1994,month=January,
title="{\BibTeX}: A Versatile
Tool for {\LaTeX} Users",
journal="SIAM News",
volume=27,number=1,
pages="10,11,19"},
URL="ftp://vtx.ma.man.ac.uk/pub/higham/bibtex.dvi.Z"
```

Each entry contains a key that BibNet makes up from the first author, the year, and initials from the title. This is guaranteed to be unique across the entire database and unchanging across time. Most BibTeX fields such as month are optional, but even the flimsiest preprint has to have an explicit author, year, and title.

Authors in scientific computing are invited to send their publication list to *bibnet-submit@math.utah.edu*. When you first send your bibliography, include whatever contact information you wish to have listed at the beginning of your bibliography. Customarily this includes name, affiliation, paper address, and email address. After some checking of the material, you will receive an a acknowledgement and instructions on sending updates. More information on BibNet and instructions for contributors can be found in the readme file in the top level directory of BibNet, or by sending email to *bibnet-info@math.utah.edu*.

As mentioned at the beginning, BibNet lives in the context of an exciting change in mathematical communication. An extra URL field is encouraged in bibliographic entries, pointing to the online form of the paper. For mathematics, this will probably best be a compressed PostScript file on an ftp or http server at the author's institution.

Sign up now, and get your work before a wider audience!

Recent additions to netlib

People interested in how C++ might affect the structure of scientific programs will want to look at `netlib/diffpack` by SINTEF and the University of Oslo. From the documentation: "Diffpack consists of a collection of object-oriented libraries for solving partial differential equations, and several Unix utilities for general software management and numerical programming. In particular, this piece of software is aimed at rapid prototyping of simulators based on PDEs, still offering a high level of efficiency."

A different perspective on rapid numerical prototyping is offered by `netlib/env/yorick/.tar.gz`, which defines an interpreted language like Lisp, but with C-like syntax, an emphasis on arrays, interactive X graphics, a library of functions (Bessel, least squares fitting, netCDF, etc.) written in the Yorick language, and a mechanism for linking compiled functions.

The contour plot is one of the most important graphical techniques in scientific computing, second only to scatter/function plots. The tool `netlib/graphics/xfarbe.taz.uu` by A. Preusser provides filled contours, legends, contour labels, extrema labels, and interactive data probing, producing output on X displays or Postscript. It uses bicubics on rectangles, so an initial interpolation stage may be necessary in some applications. This is a big topic (with useful programs available from netlib) but for now I'll just note that there are times when a crude contour plot based on piecewise linear triangles may be both computationally efficient and best for avoiding interpolation artifacts. When a raster image is desired, direct evaluation at pixels (with antialiasing) works well. But for most publication and data exploration purposes, `xfarbe` is the best freely-available package around.

A program for computing minimal surfaces using Sobolev gradients was added to `netlib/a/` by R. J. Renka and J. W. Neuberger.

The first release of the Interprocessor Collective Communications Library (by Barnett, Payne, Gupta, Shuler, van de Geijn, Watts) went into `netlib/intercom`. If you're using the NX library on the Intel Paragon, you'll want to look into this. Or if you're developing an efficient MPI library for another machine, the authors hope you can learn some tricks from studying Intercom.

T. Davis and I. Duff offer `linalg/umfpack.shar` for solving sparse unsymmetric linear systems by the multifrontal method.

In the `netlib/aicm` library (for the new journal Advances in Computational Mathematics) Marco Marletta contributed codes for solving eigenvalue problems for Hamiltonian systems.

The Numerical Algorithms journal published, in directory `numeralgo`: `na5`: near-breakdown in CGS, by Brezinski and Zaglia; `na6`: DQAINF - integration of infinite oscillating tails, by Espelid and Overholt.

Recent additions in the `toms` directory from the ACM Trans. on Math. Software are: `731`:

adaptive moving grid for univariate partial differential equation, by J. G. Blom and P. A. Zegeling; 732: nonseparable self-adjoint elliptic PDE on 2D polygonal domain via capacitance matrix, Laplacian preconditioner, FACR, by P. F. Cummins and G. K. Vallis; 733: optimal control problem, by D. Kraft; 734: translation of Algorithm 630 into Fortran90, by A. G. Buckley; 735: pyramid wavelet transform and inverse, by C. Taswell and K. C. McGill.

Noteworthy version updates are: `ampl`; `f2c`; `fdlibm` 5.2, 95/01/08; `fp/dtoa.c`; `ftnchek` 2.8.1; `linalg/qmrpack`; `pdes/mgghat`; `pltmg` 7.1; `pvm3` 3.3.6; `research/siamdb.enc` (SIAM membership list) Oct 1994; `slatec` 4.1; `toms/566` remark by Averbukh, Figueroa, Schlick.

The widely admired multiple precision arithmetic package `mpfun` by D. Bailey is now available in both Fortran77 and Fortran90 versions.

`ode/cvode.tar.Z` by Cohen and Hindmarsh combines earlier vode.f and vodpk.f to solve large non-stiff or stiff ordinary differential equation initial-value problems. It is written in C (my favorite language!)

One of the particularly interesting additions this period was Leveque's `pde/claw` package for solving hyperbolic systems of conservation laws in one and two space dimensions. More about that next time.

Eric Grosse is at the Computing Science Research Center, AT&T Bell Laboratories, Murray Hill NJ 07974, USA. `http://netlib.att.com/netlib/att/cs/home/grosse.html`