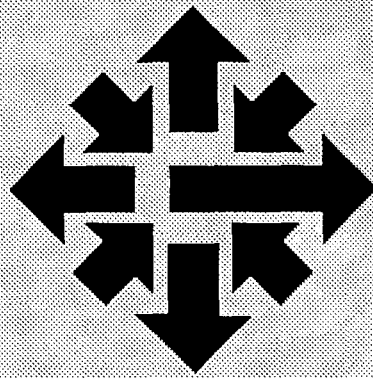


University Computer Center Newsletter

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Math and Engineering Software Tools

UCC provides an extensive collection of software tools for mathematics and engineering computing. The packages and subprogram libraries described in this article run on our CRAY-1 and CYBER research computers; the subprogram libraries are also available on MERITSS. All are well supported.

Packages

CALGOPL is a special CYBER file containing the Association for

Computing Machinery Collected Algorithms, published in *Transactions on Mathematical Software*. Documentation is in WRITEUP(CALGOPL) and the Collected Algorithms publication.

GAUS82 is the Gaussian 82 package that performs molecular orbit calculations used in chemistry. Documentation is in WRITEUP(GAUS82) and the Gaussian 82 *User's Manual*.

LINDO is a CYBER package used to solve small to medium-size

linear, quadratic, and integer programming problems interactively. The package is documented in the *LINDO User's Manual*.

MATLAB is a CYBER matrix instructional package that provides easy access to the well-known matrix software developed for the LINPACK and EISPACK projects. Documentation is in WRITEUP(MATLAB).

MPOS, a multi-purpose optimization program, solves linear,

continued next page

Supercomputing News

CRAY-2 and CYBER 205 Service

Supercomputing services at the University of Minnesota will soon be changing in significant and exciting ways. CRAY-1 service, provided by UCC since 1981, will be phased out during the next several months. New supercomputing services, on **CRAY-2** and **CYBER 205** systems, will be made available to University researchers by the Supercomputer Institute through Research Equipment, Inc. (REI), an affiliate of the University, and to other users directly or indirectly through REI. Users who are eligible for Supercomputer Institute grants can contact the Supercomputer Institute (376-8323). All others may contact Lenief Heimstead (638-0566) for further details about the upcoming transition in supercomputing services.

(Robert Williams
Research Equipment, Incorporated)

quadratic, integer, and mixed integer programming problems. The documentation for MPOS is the *Multi-Purpose Optimization System User's Guide*.

SAP4, a program for linear structural analysis, facilitates the static and dynamic analysis of linear structural systems, which may be composed of many different structural elements. SAP4 is documented in the manual *SAP IV, A Structural Analysis Program*.

NONSAP, for nonlinear structural analysis, is designed for the efficient solution of nonlinear problems and can also be used for linear analysis. See the NONSAP manual for documentation.

SPICE2 simulates the electrical performance of semiconductor electronic circuits, determining the quiescent operating point, the time-domain response, and the small-signal frequency-domain response of the circuit. The *SPICE 2* manual documents the package.

FORSIM, an ordinary and partial differential equations package, solves parabolic partial differential equations, reduces systems of partial differential equations to systems of ordinary differential equations, and performs many other related tasks. FORSIM is documented in the manual *The FORSIM VI Simulation Package*.

Libraries

The International Mathematics and Statistics Library, **IMSL**, is the most comprehensive of our subprogram libraries. IMSL provides routines for many purposes, including analysis of experimental design data, differential equations, forecasting and econometrics, interpolation, nonparametric and multivariate

statistics, regression analysis, and vector-matrix arithmetic. You can purchase IMSL Edition 9 manuals and updates from University bookstores or use reserve copies in the UCC Reference Room.

HARWELL is a general-purpose library of more than 300 subroutines for numerical mathematics problems. Documentation consists of two volumes of Harwell Subroutine Library specifications and a *Catalog of Subroutines*.

MINNLIB, the Minnesota Subprogram Library, contains subprograms for operations on matrices, vectors, and linear equations; the integration and solution of differential equations, polynomials and special functions; and statistical analysis. MINNLIB is documented in the on-line WRITEUP(MINNLIB).

LSODE and **LSODI** are libraries to solve initial value problems for stiff or nonstiff systems of first-order ordinary differential equations. LSODI solves the problems in an implicit form. Their documentation is in WRITEUP(LSODE) and WRITEUP(LSODI).

MIN5LIB is a library for solving problems in linear programming, unconstrained optimization, and linearly and nonlinearly constrained optimization. Documentation is in WRITEUP(MIN5LIB) and the *MINOS 5.0 User's Guide*.

You can use **GRG2**, a comprehensive nonlinear programming library of FORTRAN subroutines, to solve constrained nonlinear optimization problems. For copies of the *GRG2 User's Guide*, contact the Scientific Programs Librarian at the number listed below.

PCGPAK is a library for solving sparse systems of nonsymmetric

linear equations by iterative methods. Documentation is the *PCGPAK User's Guide*.

MINPACK is a library for solving problems that involve unconstrained minimization and nonlinear least squares. It is documented in WRITEUP(MINPACK).

YSMPLIB, the Yale Sparse Matrix Library, contains routines for solving sparse symmetric and nonsymmetric systems of equations. For documentation, consult the YSMPLIB manual in the Reference Room or contact the Scientific Programs Librarian at the number listed below.

EISPACK is a FORTRAN-callable eigenvalue-eigenvector library with routines for solving matrices that are tri-diagonal, symmetric/Hermitian, nonsymmetric, and other special types. Documentation is available on line in WRITEUP(EISPACK).

LINPACK is a library of FORTRAN subprograms that analyze and solve various types of linear equations. LINPACK includes routines for general, packed positive definite, symmetric indefinite, and triangular matrix problems. LINPACK is documented in the on-line WRITEUP(LINPACK) and the *LINPACK User's Guide*.

BSPLINE uses B-splines (piecewise polynomial functions) to solve various interpolation and approximation problems. *A Practical Guide to Splines*, on reserve in the UCC Reference Room, describes the library.

BESPACK is a library of FORTRAN routines for Bessel and Airy Functions. For copies of the BESPACK documentation, contact the Scientific Programs Librarian at the number listed

continued next page

NOS 2.4 Test Times

NOS 2.4 is now running on the CYBER CA every Sunday afternoon from noon until 3:30 p.m. to permit our CA users to try out the new operating system. These Sunday afternoon test times will continue on the CA until December 15, when we will convert the CA to NOS 2.4.

HELP-line personnel are available to answer your questions during the Sunday afternoon test times. Please call the HELP-line anytime for questions or assistance on NOS 2.

For each Sunday test session your NOS 2 batch and interactive passwords are the same as your NOS 1 password. Any changes to your NOS 1 password will affect your NOS 2 password for the following Sunday test session.

For information about the differences between NOS 1 and NOS 2, please refer to WRITEUP(NOS2) and WRITEUP(NOS2DOC).

(M. Riviere)

Software Tools continued

below.

Documents

These packages, and many more, are described in greater detail in two UCC manuals available at the Electronics Desk in the Minnesota Book Center (Williamson Hall) and the H. D. Smith Bookstore: the *Guide to Applications Packages: Mathematics and Engineering* and the *Guide to Subprogram Libraries*. The *Guide to Applications Packages: Mathematics and Engineering* describes packages available on our CYBER CA, the MERITSS machines (the ME and MD), and the CRAY-1 in these areas:

- mathematics: linear and nonlinear programming, ordinary

and partial differential equations, and algebraic manipulation

- simulation: discrete event and continuous simulation
- engineering: structural and electronic applications
- program evaluation and review

The description of each package includes sample jobs for the CYBERs and (when appropriate) for the CRAY, sample output, and information on acquiring documentation for the package.

When searching through the *Guide to Subprogram Libraries* for the subprograms you need, you should first refer to the back of the *Guide* in its "Key Word In Context Index." A new edition of the *Guide*

to Subprogram Libraries is in preparation and should be available this year.

You will find both these *Guides* and documentation for the software described above in the UCC Reference Room, 128A Lind Hall. You can also obtain your own copies of the documentation from the software suppliers and in some cases (as indicated above) from us.

For more information about these and other software packages for mathematics and engineering computing, see the *Guide to Applications Packages: Mathematics and Engineering* or call the UCC HELP-line (376-5592) or the Scientific Programs Librarian (376-1636).

DOCUMENTATION NEWS

UCC Briefs

UCC publishes several one- to four-page documents called *Briefs*. They are free to all users at the UCC Reference Room, 128A Lind Hall. Among the *Briefs* available this quarter are:

Welcome. Basic information for MERITSS users.

Getting Started. Basic information for research computing.

VAX/VMS Access. Basic information for VMS users.

Math and Statistics Routines. A summary of available CYBER and CRAY routines.

Writeup and EXPLAIN Information. Information about on-line documentation utilities on our CYBERs.

Liberal Arts Computing. A summary of relevant software and services.

Xerox 9700 Fonts. Explanation on using the many fonts available with the Scribe text processing system. Also contains font samples.

Other free UCC documentation includes our *Sites Map*, which indicates locations of campus computing facilities; our *Short Course Schedule*, which lists topics, times, and fees for UCC's fall short courses; and a *Consulting Schedule*, which lists hours of our Lind Hall walk-in consulting service and hours and phone numbers for our telephone consulting. We also provide a free *XEDIT 3.1 Reference Summary* that briefly describes XEDIT commands and a *Documentation Directory* to help you select the document you need for your project.

TSP Changes on CA

UCC will change versions of TSP from 4.0A to 4.0B when CA changes to NOS 2. Version 4.0A will become unavailable at that time. Since the new version is from a different vendor (the University of Western Ontario), there are some major and many minor changes that will affect TSP users. In general, the new version conforms much more closely to TSP International documentation.

Improvements and additions in TSP 4.0B include:

- Box-Jenkins modeling
- Three-stage least squares
- Seemingly unrelated regressions
- Improved matrix algebra routines
- Substantially better manuals

Potential drawbacks in TSP 4.0B include:

- Smaller available workspace
- No databank facility

Until the CA goes to NOS 2, the new version of TSP is available via the commands

```
/FUTURE, TSP  
/TSP
```

With the conversion to NOS 2, the new version of TSP will become the current version, accessed by the command

```
/TSP
```

We urge users to acquaint themselves with the new version as soon as possible since the current version will not be available under NOS 2. Further details about differences between the old and new versions may be obtained via the command

```
/WRITEUP, TSPCHNG
```

(Bruce Center)

Routing Output to Lind Hall

As most *Newsletter* readers know, UCC's Experimental Engineering I/O station moved to 128B Lind Hall in September into the space formerly held by the Engineering Library (which is now in Walter Library). When you ROUTE a printed file from the CYBER or VAX for delivery to Lind, you can use the same **EA** location code that you used in ROUTEing files to Experimental.

CYBER

While the CYBER CA is running the NOS 1.4 operating system, you can ROUTE printed output to Lind Hall with a command like the following example:

```
route,myfile/dc=lp,ec=a9,un=ea,bin=405
```

Here the **un=ea** parameter indicates the Lind Hall location and the **bin=405** parameter indicates the bin to which your output will be delivered. (The **dc=lp** parameter sends the file to a line printer and the **ec=a9** parameter indicates the file is a full ASCII—upper- and lowercase—file.)

After December 15, the CA will run the NOS 2.4 operating system. Then you will ROUTE output to Lind with a command like this:

```
route,myfile/dc=lp,ec=a9,un=ea,ujn=ea*405
```

Here the **un=ea** parameter indicates the site at which your job will be printed. The **ujn=ea*405** indicates the building and bin to which your output should be delivered, with the bin number always separated from the site code with an asterisk.

VAX

By default, VAX/VMS output is now delivered to Lind Hall. To route output from the VAX to a particular Lind Hall bin (for example, secure bin S201), type

```
PRINT FILENAME.LIS/NAME=EAS201
```

Also, you can continue using the /BIN and /SITE parameters on ENQUEUE. The verification for legal sites and bins on ENQUEUE has been updated to suit the new distribution of bins to Lind Hall. Please note that the use of /NAME on ENQUEUE overrides /BIN and /SITE. When /NAME is used, /BIN and /SITE are ignored.

LIND HALL BINS

Please note that the range of bins and bin numbers available at the Lind Hall site is different from that of the old Experimental site. These bins are located at the new Lind Hall I/O station:

Open bins:	401 to 448
Reserved bins:	R301 to R324
Secure bins:	S201 to S220

The shelves for alphabetically sorted output are substantially the same as they were in Experimental Engineering. Bins and bin numbers at our other sites remain the same.

Except for the first run of the day, the UCC shuttle leaves every hour from the Lind Hall location, where it is parked at the Amundson Hall loading dock near Church Street. From Lind, the shuttle travels the circuit to Wulling Hall (the new location of our administrative offices), to Lauderdale (our central site), and back to Lind. The first shuttle run of the day leaves from the west entrance of Ramp A, located at the corner of Union Street and Washington Avenue.

Fall Quarter

SHORT COURSE SCHEDULE

INTRODUCTORY COURSES

PRICES: U. Student = \$15, U. Staff = \$25, Non-University = \$35

Introduction to Computers	Oct 7-18	(MWF)	2:15-4 pm
Beginning NOS 2 (CYBER OS)	Oct 21-Nov 1	(MWF)	2:15-4 pm
XEDIT (CYBER Text Editor)	Oct 22-Nov 7	(TTh)	3:15-5 pm
Introduction to CRAY-1 & COS	Oct 22-31	(TTh)	2:15-4 pm

ELECTIVE COURSES

PRICES: U. Student = \$25-35, U. Staff = \$35-45, Non-University = \$60-80

DI3000 Graphics Routines	Nov 4-15	(MWF)	2:15-4 pm	\$35,\$45,\$80
Magnetic Tapes in NOS 2	Nov 12-21	(TTh)	2:15-4 pm	\$25,\$35,\$60
SPSS (Statistics Package)	Nov 11-15	(MWThF)	2:15-4 pm	\$25,\$35,\$60
"C" Programming Language	Nov 18-Dec 4	(MW)	2:15-4 pm	\$35,\$45,\$70

MICROCOMPUTER APPLICATIONS

PRICES: U. Student = \$25-40, U. Staff = \$35-50, Non-University = \$60-80
(Limited to 10 per class)

Introduction to Micros: MS-DOS*	Oct 15-17	(TTh)	1:15-4pm	\$25,\$35,\$60
(This course or "equivalent knowledge" is prerequisite for all of the following microcomputer classes.)				
Introduction to Word Perfect, Sec. 1	Oct 29	(Tu)	9:30-Noon	\$25,\$35,\$60
Introduction to dBase II & III	Nov 5-7	(TTh)	9:30-Noon	\$40,\$50,\$80
Introduction to Lotus 1-2-3	Nov 11	(M)	9:30-Noon	\$25,\$35,\$60
Introduction to Word Perfect, Sec. 2	Nov 13	(W)	1:30-4 pm	\$25,\$35,\$60
Advanced Lotus 1-2-3	Nov 19	(Tu)	9:30-Noon	\$25,\$35,\$60

*Additional sections of Introduction to Micros: MS-DOS will be offered if there is sufficient interest.



REGISTRATION: Registration is located at the UCC Reference Room, 128A Lind Hall (Hours: 8:00 am to 4:30 pm, Monday - Friday). Mail registrations will be accepted. Deadline for registering is Reference Room closing time on the last working day BEFORE class begins. Course fees may be paid by cash, check, or a signed University journal voucher. We can no longer charge short courses to UCC user accounts.

REFUND POLICY: NO refunds will be made after the class has begun. Refunds will be made in the same form as the fee was paid, i.e., check, journal voucher.

If you have questions on short courses or registration, call Jerry Stearns, 376-8806.

NOTE: November 28 and 29, Thursday and Friday, are University holidays. No classes will be held.

PHONE NUMBERS

<p>Access:</p> <p>CYBER(CA)—10, 30 cps 376-5730 —120 cps 376-5706</p> <p>MERITSS(ME)—10, 30 cps 376-7730 —120 cps 376-7120</p> <p>VAX/VMS(VA)—(autobaud) 376-8070</p> <p>Accounts:</p> <p>MERITSS 373-7745 User Numbers 373-4548</p> <p>Computer-Aided Instruction 376-2975 Computer Hours (recorded message) 373-4927</p> <p>Consulting:</p> <p>HELP-line 376-5592 7 a.m.—7 p.m., Monday-Friday</p> <p>Statistics Packages 376-1761 1—2 p.m., Monday-Friday</p> <p>Data Bases 376-1761 10—11 a.m., Monday-Friday</p> <p>Microcomputers 376-4276 9:30 a.m.—noon and 1:30—4 p.m., Monday-Friday</p> <p>Scribe, Text Analysis & Humanities Computing 376-2944 1—3 p.m., Monday, Thursday, Friday</p> <p>Contract Programming 376-1764 Data Base Applications 376-1764</p>	<p>EDUNET Liaison 373-7745 Engineering Services 376-1023, 376-8153 Equipment Purchase/Information 376-8153 Experimental Engineering I/O 373-4596 Graphics Software 638-0541 HELP-line 376-5592 7 a.m.—7 p.m., Monday-Friday</p> <p>HOURS-line (recorded message) 373-4927 Information, Wulling Hall 373-8432 Information, Lauderdale 373-4912 Instructional Labs 376-2703 Instructional Services 373-7745 Lauderdale Computer Room 373-4940 Lauderdale Services 638-0523 Lauderdale Services Manager 373-7538 Lauderdale Users' Room 373-4921 Newsletter Subscription 376-1491 Permanent File Restoration 376-5605 Professional Services Division 376-1764 Project Assistance 376-1764 Reference Room 373-7744 Remote Batch (RJE) Services 376-2703 Short Courses 376-8806 Shuttle Bus Service 376-3068 System Status (recorded message) 373-4927 Tape Librarian: see Lauderdale Services</p>
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OPERATING HOURS

	CYBER(CA)	Low rate	CRAY(CR)	MERITSS(ME)	VAX (VA)
M-F	7 a.m.-4 a.m.	8 p.m.- 4 a.m.	7 a.m.- midnight	7:45 a.m.- 3:30 a.m.	8 a.m.- 6 a.m.
Sat	4 a.m.- 5:15 p.m.	4 a.m.- 5:15 p.m.	7 a.m.- 5 p.m.	7:45 a.m.- 3:30 a.m.	24 hours
Sun	4 p.m.- 1 a.m.	4 p.m.- 1 a.m.	4 p.m.- midnight	4 p.m.-3:30 a.m.	24 hours

PUBLIC LABS—TWIN CITIES CAMPUS

Location	Batch	Interactive	Micro	Location	Batch	Interactive	Micro
<i>East Bank</i>				<i>West Bank</i>			
Arch 148		X	X	BlegH 25		*	
CentH		X		BlegH 90	X		
ComH		X		BlegH 140		X	
DieH 270, 207		X		MdbH		X	
Elth 121, 125		X		OMWL 2		X	
Elth N640	X			SocSci 167			X
FolH 14, 14a	X	X*	X	<i>St. Paul</i>			
LindH 26		X		BaH		X	
LindH 128B		*		ClaOff 125	X		X
MechE 308		X					
Physics 69		*					
SafH		X					
TerrH		X					
Vinch 4		X					
Walib B9		X					

* Research cluster; access to CYBER CA and VAX/VMS
 X in interactive column indicates access to MERITSS

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Michael M. Skow, Acting Director

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Comments, suggestions, articles, and announcements should be directed to the editor, 121 Lauderdale Computing Facility, (612) 376-1491.

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