

Selected GAUSS Commands by Category

Mathematical Functions

Scientific Functions

abs	Returns absolute value of argument.
arccos	Computes inverse cosine.
arcsin	Computes inverse sine.
atan	Computes inverse tangent.
atan2	Computes angle given a point x,y .
besselj	Computes Bessel function, first kind.
bessely	Computes Bessel function, second kind.
cos	Computes cosine.
cosh	Computes hyperbolic cosine.
exp	Computes the exponential function of x .
gamma	Computes gamma function value.
ln	Computes the natural log of each element.
lnfact	Computes natural log of factorial function.
log	Computes the \log_{10} of each element.
pi	Returns π .
sin	Computes sine.
sinh	Computes the hyperbolic sine.
sqrt	Computes the square root of each element.
tan	Computes tangent.
tanh	Computes hyperbolic tangent.

Differentiation and Integration

gradp	Computes first derivative of a function.
hessp	Computes second derivative of a function.
intgrat2	Integrate a 2-dimensional function over a user-defined region.
intgrat3	Integrate a 3-dimensional function over a user-defined region.
intquad1	Integrate a 1-dimensional function.
intquad2	Integrate a 2-dimensional function over a user-defined rectangular region.
intquad3	Integrate a 3-dimensional function over a user-defined rectangular region.
intsimp	Integrate by Simpson's method.

Linear Algebra

balance	Balances a matrix.
cond	Computes condition number of a matrix.
chol	Computes Cholesky decomposition, $X = Y'Y$.
choldn	Performs Cholesky downdate on an upper triangular matrix.
cholsol	Solves a system of equations given the Cholesky factorization of a matrix.
cholup	Performs Cholesky update on an upper triangular matrix.
crout	Computes Crout decomposition, $X = LU$ (real matrices only).
croutp	Computes Crout decomposition with row pivoting (real matrices only).
det	Computes determinant of square matrix.
detl	Computes determinant of decomposed matrix.
hess	Computes upper Hessenberg form of a matrix (real matrices only).
inv	Inverts a matrix.
invpd	Inverts a positive definite matrix.
invswp	Generalized sweep inverse.
lu	Computes LU decomposition with row pivoting (real and complex matrices).
null	Computes orthonormal basis for right null space.
null1	Computes orthonormal basis for right null space.
orth	Computes orthonormal basis for column space x .
pinv	Generalized pseudo-inverse: Moore-Penrose.
qqr	QR decomposition: returns Q_1 and R .
qqre	QR decomposition: returns Q_1 , R and a permutation vector, E .
qqrep	QR decomposition with pivot control: returns Q_1 , R and E .
qr	QR decomposition: returns R .
qre	QR decomposition: returns R and E .
qrep	QR decomposition with pivot control: returns R and E .
qtyr	QR decomposition: returns $Q'Y$ and R .
qtyre	QR decomposition: returns $Q'Y$, R and E .
qtyrep	QR decomposition with pivot control: returns $Q'Y$, R and E .
qyr	QR decomposition: returns QY and R .
qyre	QR decomposition: returns QY , R and E .
qyrep	QR decomposition with pivot control: returns QY , R and E .
qrsol	Solves a system of equations $Rx = b$ given an upper triangular matrix, typically the R matrix from a QR decomposition.
qrtsol	Solves a system of equations $R'x = b$ given an upper triangular matrix, typically the R matrix from a QR decomposition.
rank	Computes rank of a matrix.
rcondl	Returns reciprocal of the condition number of last decomposed matrix.
rref	Computes reduced row echelon form of a matrix.
schur	Computes Schur decomposition of a matrix (real matrices only).
solpd	Solves a system of positive definite linear equations.

svd	Computes the singular values of a matrix.
svd1	Computes singular value decomposition, $X = USV'$.
svd2	Computes svd1 with compact U .

Eigenvalues

eig	Computes eigenvalues of general matrix.
eigh	Computes eigenvalues of complex Hermitian or real symmetric matrix.
eighv	Computes eigenvalues and eigenvectors of complex Hermitian or real symmetric matrix.
eigv	Computes eigenvalues and eigenvectors of general matrix.

Polynomial Operations

polychar	Computes characteristic polynomial of a square matrix.
polyeval	Evaluates polynomial with given coefficients.
polyint	Calculates N^{th} order polynomial interpolation given known point pairs.
polymake	Computes polynomial coefficients from roots.
polymat	Returns sequence powers of a matrix.
polymult	Multiplies two polynomials together.
polyroot	Computes roots of polynomial from coefficients.

Fourier Transforms

dfft	Computes discrete 1-D FFT.
dffti	Computes inverse discrete 1-D FFT.
fft	Computes 1- or 2-D FFT.
fftn	Computes 1- or 2-D FFT using prime factor algorithm.
ffti	Computes inverse 1- or 2-D FFT.
fftm	Computes multi-dimensional FFT.
fftni	Computes inverse multi-dimensional FFT.
rfft	Computes real 1- or 2-D FFT.
rfftn	Computes real 1- or 2-D FFT using prime factor algorithm.
rfftp	Computes real 1- or 2-D FFT, returns packed format FFT.
rfftnp	Computes real 1- or 2-D FFT using prime factor algorithm, returns packed format FFT.
rffti	Computes inverse real 1- or 2-D FFT.
rfftip	Computes inverse real 1- or 2-D FFT from packed format FFT.

Random Numbers

rndbeta	Computes random numbers with beta distribution.
rndgam	Computes random numbers with gamma distribution.
rndn	Computes random numbers with Normal distribution.
rndns	Computes random numbers with Normal distribution using specified seed.
rndnb	Computes random numbers with negative binomial distribution.
rndp	Computes random numbers with Poisson distribution.
rndu	Computes random numbers with uniform distribution.
rndus	Computes random numbers with uniform distribution using specified seed.
rndcon	Changes constant of random number generator.
rndmod	Changes modulus of random number generator.
rndmult	Changes multiplier of random number generator.
rndseed	Changes seed of random number generator.

Fuzzy Conditional Functions

feq	Fuzzy ==
fge	Fuzzy >=
fgt	Fuzzy >
fle	Fuzzy <=
flt	Fuzzy <
fne	Fuzzy /=

dotfeq	Fuzzy . ==
dotfge	Fuzzy . >=
dotfgt	Fuzzy . >
dotfle	Fuzzy . <=
dotflt	Fuzzy . <
dotfne	Fuzzy ./ =

Statistical Functions

dstat	Computes descriptive statistics of a data set or matrix.
conv	Computes convolution of two vectors.
corr	Computes correlation matrix of a moment matrix.
corrvc	Computes correlation matrix from a variance-covariance matrix.
corr	Computes correlation matrix.
crossprd	Computes cross product.
design	Creates a design matrix of 0's and 1's.

meanc	Computes mean value of each column of a matrix.
median	Computes medians of the columns of a matrix.
moment	Computes moment matrix ($x'x$) with special handling of missing values.
momentd	Computes moment matrix from a data set.
ols	Computes least squares regression of data set or matrix.
olsqr	Computes OLS coefficients using QR decomposition.
olsqr2	Computes OLS coefficients, residuals, and predicted values using QR decomposition.
stdc	Computes standard deviation of the columns of a matrix.
toeplitz	Computes Toeplitz matrix from column vector.
vcm	Computes a variance-covariance matrix from a moment matrix.
vcx	Computes a variance-covariance matrix from a data matrix.

Statistical Distributions

cdfbeta	Computes integral of beta function.
cdfbvn	Computes lower tail of bivariate Normal cdf.
cdfchic	Computes complement of cdf of χ^2 .
cdfchii	Computes χ^2 abscissae values given probability and degrees of freedom.
cdfchinc	Computes integral of noncentral χ^2 .
cdffc	Computes complement of cdf of F .
cdffnc	Computes integral of noncentral F .
cdfgam	Computes integral of incomplete Γ function.
cdfmvn	Computes multivariate Normal cdf.
cdfn	Computes integral of Normal distribution: lower tail, or cdf.
cdfn2	Computes interval of Normal cdf.
cdfnc	Computes complement of cdf of Normal distribution (upper tail).
cdftc	Computes complement of cdf of t -distribution.
cdftnc	Computes integral of noncentral t -distribution.
cdftvn	Computes lower tail of trivariate Normal cdf.
erf	Computes Gaussian error function.
erfc	Computes complement of Gaussian error function.
lncdfbvn	Computes natural log of bivariate Normal cdf.
lncdfmvn	Computes natural log of multivariate Normal cdf.
lncdfn	Computes natural log of Normal cdf.
lncdfn2	Computes natural log of interval of Normal cdf.
lncdfnc	Computes natural log of complement of Normal cdf.
lnpdfn	Computes Normal log-probabilities.
lnpdfmvn	Computes multivariate Normal log-probabilities.
pdfn	Computes standard Normal probability density function.

Series and Sequence Functions

recserar	Computes autoregressive recursive series.
recsercp	Computes recursive series involving products.
recserrc	Computes recursive series involving division.
seqa	Creates an additive sequence.
seqm	Creates a multiplicative sequence.

Precision Control

base10	Convert number to <i>x.xxx</i> and a power of 10.
ceil	Round up towards $+\infty$.
floor	Round down towards $-\infty$.
prcsn	Set computational precision for matrix operations.
round	Round to the nearest integer.
trunc	Truncate toward 0.

Matrix Manipulation

Creating Vectors and Matrices

editm	Simple matrix editor.
eye	Creates identity matrix.
let	Creates matrix from list of constants.
medit	Full-screen spreadsheet-like matrix editor.
ones	Creates a matrix of ones.
zeros	Creates a matrix of zeros.

Loading and Storing Matrices

loadd	Load matrix from data set.
loadm	Load matrix from ASCII or matrix file.
save	Save matrix to matrix file.
saved	Save matrix to data set.

Size, Ranking, and Range

cols	Returns number of columns in a matrix.
colsf	Returns number of columns in an open data set.
counts	Returns number of elements of a vector falling in specified ranges.
countwts	Returns weighted count of elements of a vector falling in specified ranges.

indexcat	Returns indices of elements falling within a specified range.
maxc	Returns largest element in each column of a matrix.
maxindc	Returns row number of largest element in each column of a matrix.
minc	Returns smallest element in each column of a matrix.
minindc	Returns row number of smallest element in each column of a matrix.
rankindx	Returns rank index of Nx1 vector. (Rank order of elements in vector).
rows	Returns number of rows in a matrix.
rowsof	Returns number of rows in an open data set.
cumprodc	Computes cumulative products of each column of a matrix.
cumsumc	Computes cumulative sums of each column of a matrix.
prodc	Computes the product of each column of a matrix.
sumc	Computes the sum of each column of a matrix.

Sparse Matrix Functions

sparseFD	Converts dense matrix to sparse matrix.
sparseFP	Converts packed matrix to sparse matrix.
sparseOnes	Generates sparse matrix of ones and zeros.
sparseEye	Creates sparse identity matrix.
sparseTD	Multiplies sparse matrix by dense matrix.
sparseTrTD	Multiplies sparse matrix transposed by dense matrix.
sparseSolve	Solves $Ax = B$ for x where A is a sparse matrix.
sparseHConcat	Horizontally concatenates sparse matrices.
sparseVConcat	Vertically concatenates sparse matrices.
sparseSubmat	Returns sparse submatrix of sparse matrix.
denseSubmat	Returns dense submatrix of sparse matrix.
sparseRows	Returns number of rows in sparse matrix.
sparseCols	Returns number of columns in sparse matrix.
sparseNZE	Returns the number of nonzero elements in sparse matrix.
isSparse	Tests whether a matrix is a sparse matrix.
sparseSet	Resets sparse library globals.

Miscellaneous Matrix Manipulation

rev	Reverses the order of rows of a matrix.
rotater	Rotates the rows of a matrix, wrapping elements as necessary.
shiftr	Shifts rows of a matrix, filling in holes with a specified value.
reshape	Reshapes a matrix to new dimensions.

vec	Stacks columns of a matrix to form a single column.
vech	Reshapes the lower triangular portion of a symmetric matrix into a column vector.
vecr	Stacks rows of a matrix to form a single column.
xpnd	Expands a column vector into a symmetric matrix.
delif	Deletes rows from a matrix using a logical expression.
diag	Extracts the diagonal of a matrix.
diagrv	Puts a column vector into the diagonal of a matrix.
exctsmpl	Creates a random subsample of data set, with replacement.
lowmat	Returns the main diagonal and lower triangle.
lowmat1	Returns a main diagonal of 1's and the lower triangle.
upmat	Returns the main diagonal and upper triangle.
upmat1	Returns a main diagonal of 1's and the upper triangle.
selif	Selects rows from a matrix using a logical expression.
submat	Extracts a submatrix from a matrix.
trimr	Trims rows from top or bottom of a matrix.
union	Returns the union of two vectors.
intrsect	Returns the intersection of two vectors.
setdif	Returns elements of one vector that are not in another.
complex	Creates a complex matrix from two real matrices.
imag	Returns the imaginary part of a complex matrix.
real	Returns the real part of a complex matrix.

Data Handling

Data Sets

close	Closes an open data set (.dat file).
closeall	Closes all open data sets.
create	Creates and opens a data set.
eof	Tests for end of file.
loadd	Loads a small data set.
open	Opens an existing data set.
readr	Reads rows from open data set.
saved	Creates small data sets.
seekr	Moves pointer to specified location in open data set.
iscplx	Returns whether a data set is real or complex.
typef	Returns the element size (2, 4 or 8 bytes) of data in open data set.
writer	Writes matrix to an open data set.

Data Set Variable Names

getname	Returns column vector of variable names in a data set.
getnamef	Returns string array of variable names in a data set.
indcv	Returns column numbers of variables within a data set.
indices	Retrieves column numbers and names from a data set.
indices2	Similar to indices , but matches columns with names for dependent and independent variables.
mergevar	Concatenates column vectors to create larger matrix.
makevars	Decomposes matrix to create column vectors.
setvars	Creates globals using the names in a data set.
vartype	Determine whether variables in data set are character or numeric.
vartypef	Returns column vector of variable types (numeric/character) in a data set.

Data Coding

code	Code the data in a vector by applying a logical set of rules to assign each data value to a category.
dummy	Creates a dummy matrix, expanding values in vector to rows with ones in columns corresponding to true categories and zeros elsewhere.
dummybr	Similar to dummy .
dummydn	Similar to dummy .
ismiss	Returns 1 if matrix has any missing values, 0 otherwise.
miss	Change specified values to missing value code.
missex	Change elements to missing value using logical expression.
missrv	Change missing value codes to specified values.
msym	Set symbol to be interpreted as missing value.
packr	Delete rows with missing values.
recode	Similar to code , but leaves the original data in place if no condition is met.
scalmiss	Test whether a scalar is the missing value code.
substute	Similar to recode , but operates on matrices.
subscat	Simpler version of recode , but uses ascending bins instead of logical conditions.

Sorting and Merging

sortc	Quick-sort rows of matrix based on numeric key.
sortcc	Quick-sort rows of matrix based on character key.
sortd	Sort data set on a key column.
sorthc	Heap-sort rows of matrix based on numeric key.
sorthcc	Heap-sort rows of matrix based on character key.
sortind	Returns a sorted index of a numeric vector.
sortindc	Returns a sorted index of a character vector.

sortmc	Sort rows of matrix on the basis of multiple columns.
uniqindx	Returns a sorted unique index of a vector.
unique	Remove duplicate elements of a vector.
intrleav	Produces one large sorted data file from two smaller sorted files having the same keys.
mergeby	Produces one large sorted data file from two smaller sorted files having a single key column in common.

Compiler Control

#define	Define a case-insensitive text-replacement or flag variable.
#definecs	Define a case-sensitive text-replacement or flag variable.
#undef	Undefine a text-replacement or flag variable.
#ifdef	Compile code block if a variable has been #define 'd.
#ifndef	Compile code block if a variable has not been #define 'd.
#iflight	Compile code block if running GAUSS Light .
#ifdos	Compile code block if running DOS.
#ifos2win	Compile code block if running OS/2 or Windows.
#ifunix	Compile code block if running Unix.
#else	Alternate clause for #if-#else-#endif code block.
#endif	End of #if-#else-#endif code block.
#include	Include code from another file in program.
#lineson	Compile program with line number and file name records.
#linesoff	Compile program without line number and file name records.
#srcfile	Insert source file name record at this point (currently used when doing data loop translation).
#srcline	Insert source file line number record at this point (currently used when doing data loop translation).

Program Control

Execution Control

end	Terminate a program and close all files.
pause	Pause for the specified time.
run	Run a program in a text file.
sleep	Sleep for the specified time.
stop	Stop a program and leave files open.
system	Quit and return to the OS.

Branching

if..endif	Conditional branching.
goto	Unconditional branching.
pop	Retrieve goto arguments.

Looping

break	Jump out the bottom of a do or for loop.
continue	Jump to the top of a do or for loop.
do while.. endo	Loop if <i>TRUE</i> .
do until.. endo	Loop if <i>FALSE</i> .
for.. endfor	Loop with integer counter.

Subroutines

gosub	Branch to subroutine.
pop	Retrieve gosub arguments.
return	Return from subroutine.

Procedures

local	Declare variables local to a procedure.
proc	Begin definition of multi-line procedure.
retp	Return from a procedure.
endp	Terminate a procedure definition.

Libraries

call	Call function and discard return values.
declare	Initialize variables at compile time.
external	External symbol definitions.
library	Set up list of active libraries.
lib	Build or update a GAUSS library.

Compiling

compile	Compiles and saves a program to a .gcg file.
saveall	Saves the contents of the current workspace to a file.
use	Loads previously compiled code.
save	Saves the compiled image of a procedure to disk.
loadp	Loads compiled procedure.

OS Functions

cdir	Returns current directory.
chdir	Change directory interactively.
ChangeDir	Change directory in program.
dfree	Returns free space on disk.
shell	Shells to OS.
envget	Get an environment string.
exec	Execute an executable program file.
fileinfo	Takes a file specification, returns names and information of files that match.
files	Takes a file specification, returns names of files that match.
filesa	Takes a file specification, returns names of files that match.

Workspace Management

clear	Set matrices equal to 0.
clearg	Set global symbols to 0.
coreleft	Returns amount of workspace memory left.
maxvec	Returns maximum allowed vector size.
delete	Delete specified global symbols.
new	Clear current workspace.
show	Display global symbol table.
iscplx	Returns whether a matrix is real or complex.
hasimag	Examines matrix for nonzero imaginary part.
type	Returns type of argument (matrix or string).
typecv	Returns type of symbol (argument contains the name of the symbol to be checked).

Error Handling and Debugging

debug	Execute a program under the source level debugger.
disable	Disable invalid operation interrupt of coprocessor.
error	Create user-defined error code.
errorlog	Send error message to screen and log file.
enable	Enable invalid operation interrupt of coprocessor.

#lineson	Include line number and file name records in program.
#linesoff	Omit line number and file name records from program.
ndpchk	Examine status word of coprocessor.
ndpclex	Clear coprocessor exception flags.
ndpcntrl	Set and get coprocessor control word.
scalerr	Test for a scalar error code.
trace	Trace program execution for debugging.
trap	Control trapping of program errors.
trapchk	Examine the trap flag.

String Handling

chr	Convert ASCII values to a string.
ftocv	Convert an NxK matrix to a character matrix.
ftos	Convert a floating point scalar to string.
getf	Load ASCII or binary file into string.
loads	Loads a string file (.fst file).
lower	Convert a string to lowercase.
putf	Writes a string to disk file.
stof	Convert a string to floating point scalar.
strindx	Find starting location of one string in another string.
strlen	Returns length of a string.
strrindx	Find starting location of one string in another string, searching from the end to the start of the string.
strsect	Extract a substring of a string.
upper	Changes a string to uppercase.
vals	Convert a string to ASCII values.
varget	Access the global variable named by a string.
varput	Assign a global variable named by a string.
vargetl	Access the local variable named by a string.
varputl	Assign a local variable named by a string.

Time and Date Functions

date	Returns current system date.
datestr	Formats date as "mm/dd/yy".
datestring	Formats date as "mm/dd/yyyy".
datestrymd	Formats date as "yyymmdd".
dayinyr	Returns day number of a date.
etdays	Difference between two times in days.
ethsec	Difference between two times in 100ths of a second.
etstr	Convert elapsed time to string.
hsec	Returns elapsed time since midnight in 100ths of a second.
time	Returns current system time.

timestr Format time as “hh:mm:ss”.

Console I/O

con Request console input, create matrix.
cons Request console input, create string.
key Gets the next key from the keyboard buffer. If buffer is empty, returns a 0.
keyw Gets the next key from the keyboard buffer. If buffer is empty, waits for a key.
wait Wait for a keystroke.
waitc Flush buffer, then wait for a keystroke.

Output Functions

Text Output

comlog Control interactive command logging.
output Redirect **print** statements to auxiliary output.
outwidth Set line width of auxiliary output.
print Print to screen.
print **[[on|off]]** Turn auto screen print on and off.
printfm Print matrices using a different format for each column.
screen **[[on|off]]** Direct/suppress **print** statements to screen.
screen out Dump snapshot of screen to auxiliary output.
lpos Returns print head position in printer buffer.
lprint Print expression to the printer.
lprint **[[on|off]]** Switch auto printer mode on and off.
lwidth Specifies printer width.
lshow Print global symbol table on the printer.
plot Plot elements of two matrices in text mode.
plotsym Controls data symbol used by **plot**.
cls Clear the screen.
color Set pixel, text, background colors.
csrcol Get column position of cursor on screen.
csrlin Get row position of cursor on screen.
edit Edits a file with the **GAUSS** editor.
ed Access an alternate editor.
format Defines format of matrix printing.
locate Position the cursor on the screen.
printdos Print a string for special handling by the OS.
scroll Scroll a section of the screen.
tab Position the cursor on the current line.

Screen Graphics

graph	Set pixels.
setvmode	Set video mode.
color	Set color.
line	Draw lines.
