

## GETTING HELP

**help** open online Scilab help (F1)  
**demo\_gui** open demo

## SCILAB FILE EXTENSIONS

**.sce** Scilab script  
**.sci** Scilab macro (function)  
**.sod** binary files for data (Scilab Open Data)  
**.scg** saved file for figures (*load* to *load*)

## EDITOR KEYBOARD SHORTCUTS

Ctrl + D comment  
 Ctrl + Maj + D uncomment  
 Ctrl + I properly indent  
 F5 save and run a script  
 Ctrl + E run selection  
 Ctrl + Maj + O open selection with editors  
 Ctrl + S save  
 Ctrl + G move down a line  
 Ctrl + F find in a file  
 F1 open help/help on selection

## INITIALIZATION

**.scilab** init script of the environment (defined by the programmer) which automatically runs when opening Scilab in the according directory or  
**scilab.ini** (containing scilab.ini) or when a given user is in SCIHOME.  
**clc** clear the command window  
**xdel(winsid())** close all figures

## BROWSING

**cd** display or change current directory  
**dir/ls** list the current directory contents  
**pwd** display current directory  
**get\_absolute\_file\_path** get absolute path of opened file  
**getlongpathname** get long path name  
**getshortpathname** get short path name

## SPECIAL CONSTANTS

**ans** give last result  
**%pi, %e, %i** constants  $\pi$ ,  $e$ ,  $i = \sqrt{-1}$   
**%nan** Not a Number  
**%inf** infinite  
**%eps** machine accuracy  
**%t, %f** true, false  
**TMPDIR** temporary directory path  
**SCI** variable containing the value of the root path of Scilab  
**SCIHOME** contains the path to preferences, history files of your Scilab session

## MATRIX

**ones** create matrix of 1  
**zeros** create matrix of 0  
**eye** create identity matrix  
**linspace** generate linearly spaced vector  
**logspace** generate logarithmically spaced vectors  
**rand** generate random numbers matrix

## DIMENSIONS

**size** size of matrix  
**ndims** number of dimension in a table

**length** length of matrix  
 number of characters in a string  
 number of characters in each string of a string matrix

## SPECIAL CHARACTERS

// comments  
 " surround strings  
 ' transpose of a matrix  
 , separate elements on the same lines (matrix and command)  
 ; separate arguments of a function  
 ; end a command and disable display  
 ; end a line when assigning a matrix  
 () matrix indexation operator (line, column)  
 [] matrix definition and concatenation operator  
 : operator to create vector  
 >> a = 1 : 2 : 10  
 .. continue statement on the next line  
 . decimal marker  
 = assignment operator  
 \$ select last element (line, column...) within indexation

## CALCULATIONS

+ - \* / addition, subtraction, multiplication, division  
 \ left array divide (system of equations solving with least squares)  
 ^ power  
 . combined with arithmetic operator to calculate element by element.

## MATHEMATICAL FUNCTIONS

**sqrt** root square  
**abs** absolute value  
**log** natural logarithms  
**exp** exponential  
**log10** common logarithm (base 10)  
**10^** 10 power  
**modulo** remainder after division

## TRIGONOMETRIC FUNCTIONS

**sin, cos, tan, cotg** sines, cosines, tangent  
**asin, acos, atan** arcsines, arccosines, arctangent  
**sinh, cosh, tanh** hyperbolic sines, cosines, tangent  
**asinh, acosh, atanh** ...

## ROUND

**round** round to nearest decimal or integer  
**ceil** round to positive infinity  
**floor** round to negative infinity  
**int** round to zero

## STATISTICS/DATA ANALYSIS

**cumsum** cumulative sum  
**sum** sum  
**mean** mean value of matrix  
**median** median value of matrix  
**stdev** standard deviation  
**variance** variance  
**min, max** minimum, maximum  
**gsort** sort of matrix elements  
**prod** product of matrix elements  
**cumprod** cumulative product

**geomean** geometric mean  
**harmean** harmonic mean

## RELATIONAL OPERATORS

**=, <, >, <=, >=**

## LOGICAL OPERATORS

**& | ~** element wise AND, OR and NOT  
**and** determine if all array element are nonzero  
**or** determine if any array element is nonzero

## COMPLEX NUMBERS

**>> a = 12 + 5\*%i**  
**real** real part  
**imag** imaginary part  
**abs** complex magnitude  
**conj** complex conjugate  
**complex** create a complex number

## STRINGS

### handling

**str1 = "one" ; str2 = "string" ;**  
**str = str1 + " " + str2** concatenate  
**strcat** concatenate strings  
**strsplit** split string  
**convstr** convert string to lower/upper case  
**strsubst** replace substring  
**stripblanks** remove leading and trailing white space from strings  
**strcmp, strcmpi** compare strings  
**strtok** split string into tokens

### string/number conversion

**eval, evstr** execute a string containing an instruction/expression  
**strtod** convert string to double  
**string** convert to string  
**msprintf, mprintf** convert, format, and write data in a string

## FIGURES AND PLOT

### figure computation

**scf** create or select a figure  
**xdel** close one or all figure(s)  
**clf** clear figure  
**winsid** list existing figures  
**subplot** create axis in tiled positions  
**drawlater** make figure invisible while creating  
**drawnow** show invisible graphical items  
**xsave** save figure in .scg file  
**xload** load figure in .scg file

### 2D plot

**plot, plot2d** linear or logarithmic plot  
**plot2d2** plot with step  
**plot2d3** plot with vertical bars  
**plot2d4** plot with arrows style

### 3D plot

**surf** 3D shaded surface plot  
**mesh** mesh plot  
**plot3d, plot3d1** 3D line plot

### colors

**.75|.75|0** 'y' 'yellow' '!' + 'v' ▾

.75	0	.75	'm'	'magenta'	'o'	○	'^'	△
0	.75	.75	'c'	'cyan'	'x'	×	'<'	△
1	0	0	'r'	'red'	'+'	+	'>'	△
0	0.5	0	'g'	'green'	'*'	*	'p'	☆
0	0	1	'b'	'blue'	's'	□	'd'	◇
1	1	1	'w'	'white'				
.25	.25	.25	'k'	'black'				

## other plots

pie	pie chart
histplot	histogram plot
bar	bar graph
champ	3D vector field plot
contour	contour plot of matrix

## annotations

legend	legend
xlabel, ylabel, zlabel	axis labels
title	add title to current figure

## various operation

colorbar	display colorbar showing color scale
zoom_rect	zoom a selection of the current graphic figure
un_zoom	restore default zoom
xstring	create text object in current axis
xinfo	display string in status bar

## color scale

colormap	color map
Jet	Autumn
HSV	Winter
Hot	Gray
Cool	Bone
Spring	Copper
Summer	Pink

## FILE MANAGEMENT

edit	open a file with Scilab editor
copyfile	copy files
deletefile	delete files
fileinfo	display information about a file
mkdir	make a new folder
rmdir	remove new folder

## path management

fullfile	build full file name from parts
fileparts	parts of file (name, path and extension)
basename	extract file name from path
dirname	extract directory name from path
fileext	extract file extension type from path
filesep	returns directory separator for current platform
fullpath	creates a full path name for the specified relative path name

## PERFORMANCE ANALYSIS

tic, toc	start/stop stopwatch timer (measure time)
timer	measure consumed CPU time
profile	profile execution time for function
getmemory	display memory information

## READ/WRITE FILES

### high level

csvRead, csvWrite	read/write comma separated value (CSV) file
xls_open, mclose	open/close Microsoft Excel spreadsheet file
xls_read	read opened Microsoft Excel spreadsheet file
load, save	read/write binary Scilab file (.sod)
imread, imwrite	read/write image file (toolbox SIP)

### low level

1 - open the file	2 - position, read, write...	3 - close the file
mopen, mclose	open/close a file	
mscanf, mprintf,	read/write data file	
mgetl, mputl	read/write a line from a data file	
meof	test for end of file	
mseek	set the selector position in a file	
mtell	return the selector position in a file	

## CONTROL STRUCTURES

### iterative loop

```
for var = vector
    // Scilab code
end
while
    // Scilab instructions
end
```

### conditional structures

```
if logical expression 1 then // Mandatory
    // Scilab instruction
elseif logical expression 2 then // Optional
    // Scilab instruction
else // Optional
    // Scilab instruction
end // Mandatory
select expression // String, double, boolean
case value 1 // Mandatory
    // Scilab instruction
case {value 2, value 3} // Optional
    // Scilab instruction
else // Optional but recommended
    // Scilab instruction
end
```

### control commands

break	terminate execution of 'for' and 'while' loop
continue	pass control to next iteration of 'for' or 'while' loop
return	return control to invoking function
pause	halt execution temporarily

## TESTING

isempty	is empty?
isnan	is NaN?
isinf	is infinite?
isequal	is equal?
isdef	is variable defined?
isfile	is file?
isdir	is directory?
isnum	is string a number?
isfield	is a field that belongs to a structure?

## ERROR MANAGEMENT

try	
-----	--

```
// Scilab instruction
catch
    // Scilab instruction
end
error          throw error and display message
warning       display warning message
lasterror     send last error (and erase it!)
errcatch      catch a type of error
errclear      clear an error
```

## FUNCTION MANAGEMENT

Create a file myFunction.sci :

```
function [S1, S2, ...] = myFunction (E1, E2, ...)
    // Header comment
    // Scilab instruction
endfunction
```

Load myFunction.sci for use

```
exec("myFunction.sci", -1)
```

argn	number of function input/output arguments
varargin, varargout	input/output variables of function arguments as a list
exec	load a memorized function
getd	load every function (.sci) in a directory
genlib	build every function (.sci) in a directory
lib	define/load a functions library

## COMMUNICATION WITH USER

disp	display value of variable in command window
input	display a message and request user input
pause	halt execution temporarily
waitbar	open wait bar dialog box
x_dialog, x_mdialog	create dialog box that gathers user input
messagebox	create warning/error/help dialog box
uiputdir	selection box for directory
uigetfile, uiputfile	selection box for file
uigetcolor	selection box for color

## POLYNOMIALS

poly	define a polynomial
coeff	get polynomial coefficients
roots	get polynomial roots
detr	get polynomial determinant
determ	get determinant from a polynomial matrix
rational	define a rational fraction

## DATES

date	current date with strings
now, clock	current date with numbers or array
format	
chaîne	dd-mmm-yyyy
nombre	elapsed days since January 0, 0000
vecteur	[year, month, day, hour, minutes, seconds]

## conversion

datenum	convert array date to number
datevec	convert a date number to array date
DateScilab = DateExcel + datenum(1899, 12, 30);	

## others

calendar	calendarr
weekday	day of the week