Introduction to Scilab

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Outline

1. Introduction
2. Scilab Objects: Matrices and Polynomials.
3. Basic Programming
4. Basic Input And Output
5. Basic Graphics

About Scilab

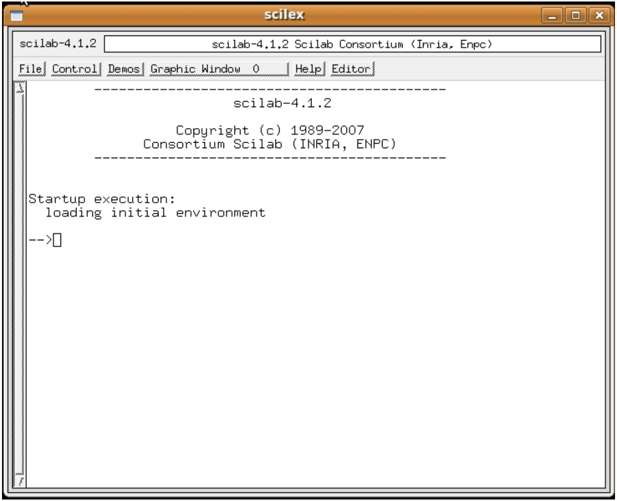
- Around since 1990
- Numerical Computational package
- Free and Open Source
- Maintained by INRIA

About Scilab

- Inspired by Cleve Molers MATLAB
- Interpreted
- Very High Level

  $Scilab : C = C : Assembly$
- Available for Linux, Mac and Windows

Scilab Window looks like



```
         ------------------------------------------
                       scilab-4.1.2

                  Copyright (c) 1989-2007
              Consortium Scilab (INRIA, ENPC)
         ------------------------------------------


Startup execution:
  loading initial environment

-->
```

Try This Stuff

- `42 + 4^2  64/4`
- `a = 1, b=2, c=3`
- `a + b + c`
- `institute = ‘‘IITB’’;`
- `typeof(institute)`
- `clear(‘‘institute’’)`
- `exists(‘‘institute’’)`

Try This Stuff

- `1/0`
- `ieee(2)`
- `1/0`
- `%e`
- `sin(%pi/2), cos(%pi/2)`
- `(10+5*%i)*(2*%i)`
- `2*cos(%pi/5)`

About Scilab

- Everything is a matrix!
- Even a real scalar is a 1×1 matrix
- You can define numbers, character strings, booleans, polynomials and lists

Try This Stuff

- `a=[1 2 3], b=[2 3 4]`
- `a'`
- `a*b`
- `a.*b`
- `a'*b`
- `a*b'`
- `size(a)`
- `length(a)`
- `diag(a)`

Try This Stuff

- A=[1 2; 0 4], B=[1 2; 3 4]
- A+B, A-B
- A*B, B*A, A.*B, B.*A
- det(A)
- inv(A)
- size(A)
- length(A)
- spec(A)
- trace(A)
- diag(A)

Try This Stuff

- A=1:4 //This is a comment
- B=2:2:8 // range
- B([3 4]) // submatrix extraction
- A(6)=6 // add an element
  // oops! Forgot the fifth element!
- A($ − 1)=5 // ‘‘ $’’ is last element
- B=2*A // reassignment
- B=[B 2*B; 3*B] // new rows
- B($ + 1,:)=4*B(1,:)
- B([2 3], 2:$ − 1) //submatrix extraction

Try This Stuff

- pwd
- cd(‘‘path-to-directory’’)
- diary(‘‘ my-record-of-what-follows.sci’’)
- inv([1 2; 0 4])
- C=rand(3,3)
- C>.5 // boolean matrix
- find(C>.5)
- C(find(C>.5))
- disp(C)

Try This Stuff

- `P=poly([2 3 1], ‘x’, ‘coeff’)`
- `Q=poly([-1 4], ‘x’)`
- `P*Q, P+Q, P-Q`
- `roots(P), roots(Q), roots(P*Q)`
- `factors(P), factors(Q), factors(P*Q)`
- `1/P`
- `Q/P`
- `derivat(P), derivat(Q), derivat(Q/P)`

Conventions

- Commands may be put in scripts.
- Extension is `.sce`
- If it only contains function definitions, the extension is `.sci`
- These are conventions!
- Execute:`exec('path-to-script/script-name.sce')`

Functions

```
function [y1, y2, ...]=foo(x1, x2, ...)
    statement
    statement
    statement
endfunction
            OR
deff(‘‘[y]=foo([x])’’, ‘‘statements’’)
```

Functions

- If function definitions are in a script file, use `getf('path/script.sci')`
- To see the source of a Scilab coded function use `fun2string(function-name)`

Branching

```
if condition then
       statement
       statement
       statement
else
       statement
       statement
       statement
end
```

Iterations

```
for name = expression
     statement
     statement
     statement
end
// Use break to stop execution within statement block
```

Iterations

```
while condition
   statement
   statement
   statement
// Use break to stop execution within statement block
```

Try This Stuff

```
function y = myfactorial(x)
   if x==0 then y=1
   else y = x*myfactorial(x-1)
   end
endfunction
```

Try This Stuff

```
// try a few examples:
myfactorial(5), myfactorial(0)
// now try Scilabs own function:
factorial(5), factorial(0)
```

Input

- `name=input(''Enter your name:  '')`
  // oops (try entering your name in “ ”)
- or try this:
  `name=input(''Enter your name:  '', ''string'')`
- `disp(name);`
- more comfortable with C? try this:
  `mprintf(''Your name is %s'', name)`

[Optional] Look these up in help:

- `mopen`
- `mprintf`
- `mfprintf`
- `mscanf`
- `mfscanf`
- `mclose`

plot2d

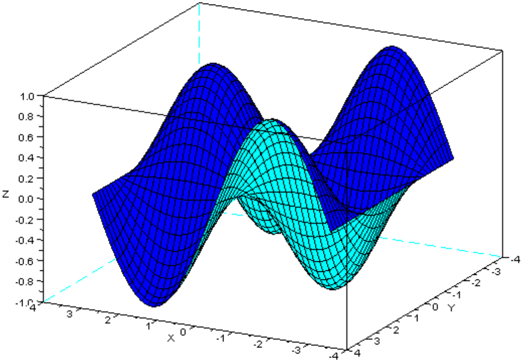
- x=linspace(-%pi, %pi, 40)
- plot2d(x, sin(x))
- //Try getting the axes in the centre
- //Don't like the continuous version?
- plot2d3(x,sin(x))

plot3d

```
y=x
plot3d(x, y, sin(x)'*cos(y))
```

— Notice the transpose

z=sin(x)'*cos(y)



Thankyou!

- www.scilab.org
- www.scilab.in
- http://scilab.in/cgi-
- bin/mailman/listinfo/scilab-indi
- “Modeling and Simulation in Scilab/Scicos” by Stephen L.Campbell, Jean-Philippe Chancelier and Ramine Nikoukah,(Springer)