INTRODUCTION TO SCILAB

Hands-on Workshop

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08.08.2025

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AGENDA

1. What is Scilab?
2. Why Use Scilab?
3. Installing Scilab
4. Scilab GUI Tour
5. Basic Commands
6. Plotting in Scilab
7. Control Structures
8. Functions
9. Resources
10. Q&A + Discussion

WHAT IS SCILAB?

- Scilab = Scientific Laboratory
- Free and open-source alternative to MATLAB
- Developed by Inria (France)
- Widely used for:
  - Mathematics & simulation
  - Control system design
  - Signal and image processing
  - Optimization problems

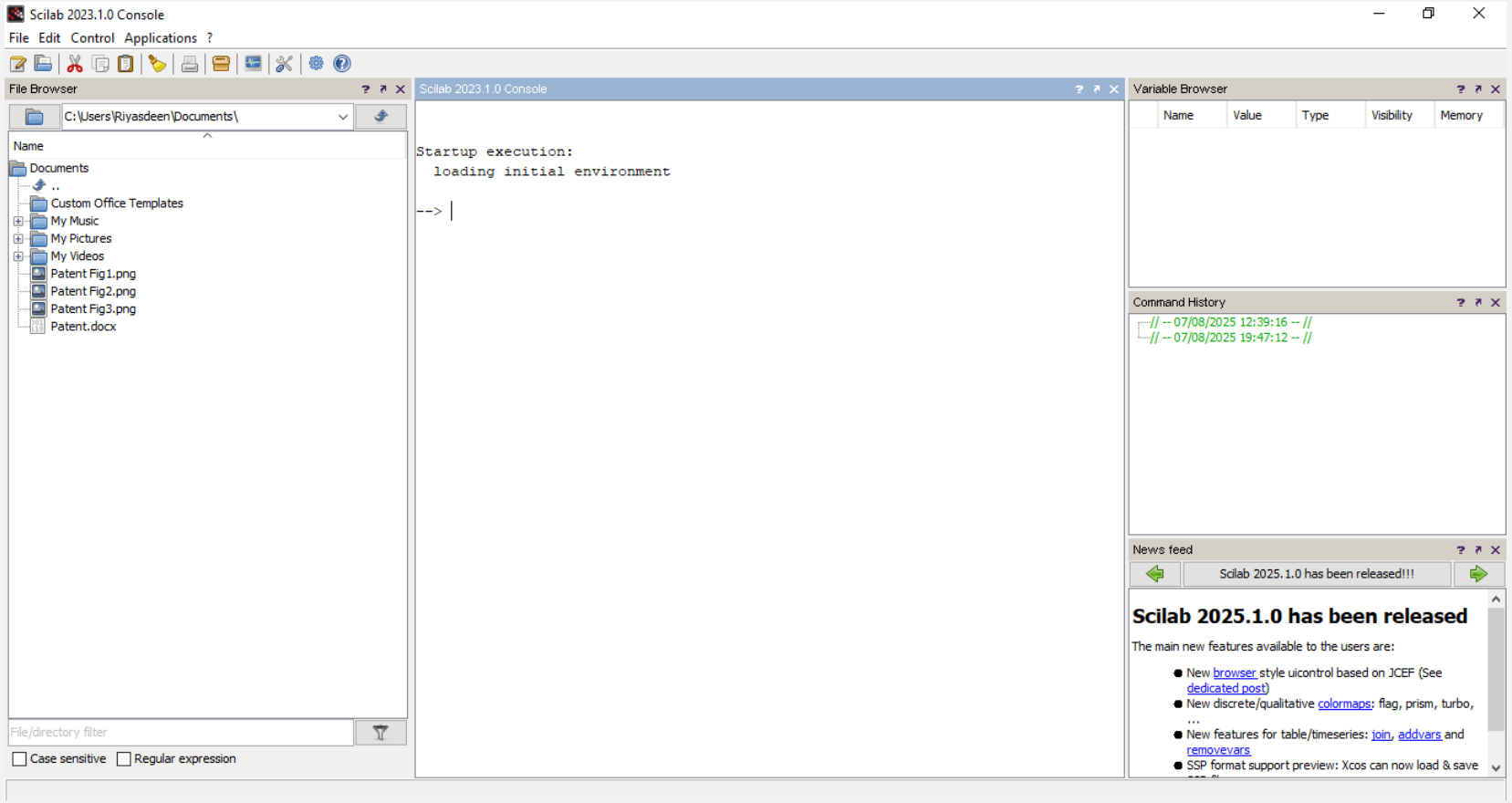
WHAT IS SCILAB?

- Open source (FREE)
- Easy syntax
- Powerful built-in functions
- Good for engineering and scientific problems
- Extensible with toolboxes
- Supports plotting, GUI, interfacing with C/C++, Python

INSTALLING SCILAB

- Go to https://www.scilab.org/download
- Choose your OS (Windows/Linux/Mac)
- Install like regular software
- Open Scilab GUI → Editor + Console

SCILAB GUI TOUR



- Console – for commands
- Editor – for writing scripts
- Graphics window – for plots
- File browser – for managing files

BASIC COMMANDS

- Variable assignment:
  - a = 5;
  - b = 3.2;
  - name = "Scilab";
- Vectors & matrices:
  - v = [1 2 3 4];
  - A = [1 2; 3 4];
  - Access elements:
    - v(3) // 3rd element
    - A(2,1) // Row 2, Column 1
  - Modify values:
    - v(2) = 10;
- Matrix operations:
  - A = [1 2; 3 4];
  - B = [5 6; 7 8];
  - Addition: A + B
  - Subtraction: A – B
  - Multiplication: A * B
  - Element-wise (Hadamard): A .* B
  - Inverse: inv(A)
  - Transpose: A'
  - Determinant: det(A)
- Math functions:
  - x = 0.5;
  - sin(x)
  - cos(x)
  - exp(x)
  - log(x)
  - sqrt(x)
  - abs(-3)
- Creating Ranges and linspace
  - x = 1:5; // [1 2 3 4 5]
  - x = 0:0.1:1; // [0 0.1 0.2 ... 1]
  - x = linspace(0, 2*%pi, 100); // 100 points between 0 and 2π

BASIC COMMANDS

- Display and Input:
  - disp("Hello Scilab"); // Display text
  - disp(a); // Display variable
  - x = input("Enter a number: "); // Take input from user
- Special Variables:
  - %pi → π
  - %e → Euler's number (≈ 2.718)
  - %i → imaginary unit
  - %nan → Not-a-Number
  - %inf → Infinity
- Useful Commands:
  - clc // Clear console
  - clear // Clear all variables
  - who() // List all variables
  - pwd() // Current directory
  - cd('C:/Users/YourName/Desktop') // Change directory

PLOTTING IN SCILAB

- Basic Plot
  - x = 0:0.1:2*%pi;
  - y = sin(x);
  - plot(x, y);
- Labels: xlabel(), ylabel(), title()
- Grid: xgrid()

CONTROL STRUCTURES IN SCILAB

IF

```
a = 10;
if a > 5 then
    disp("a is greater than 5");
end
```

IF-ELSE

```
a = 3;
if a > 5 then
    disp("Greater than 5");
else
    disp("Less than or equal to 5");
end
```

CONTROL STRUCTURES IN SCILAB

IF-ELSEIF-ELSE

```
grade = 85;
if grade >= 90 then
    disp("A");
elseif grade >= 80 then
    disp("B");
elseif grade >= 70 then
    disp("C");
else
    disp("Fail");
end
```

FOR

```
for i = 1:5
    disp("i = " + string(i));
end
```

WHILE

```
x = 1;
while x <= 5
    disp(x);
    x = x + 1;
end
```

break → exit loop early

continue → skip to next iteration

FUNCTIONS

- Define your own functions:
  - function y = square(x)
  - y = x^2;
  - endfunction
- Call with square(3) → 9

RESOURCES

- Scilab official site: https://www.scilab.org
- Tutorials: https://help.scilab.org/
- YouTube: "Scilab for Beginners“
- Books and eBooks

Q&A + DISCUSSION

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