

TP series (Programming tools for mathematics).

TP1- First steps with MATLAB Objective: *The objective of this first practical is to become familiar with the MATLAB graphical interface and to learn how to define calculation expressions and how to use certain predefined functions under the MATLAB command line (command window).*

Exercise 1: Perform the following functions in Matlab:

1. $f: [0, 2\pi] \rightarrow \mathbb{R}, x \mapsto \sin(x) + \frac{1}{3} \sin(3x) + \frac{1}{5} \sin(5x) + \frac{1}{7} \sin(7x),$
2. $f: [-3, 3] \rightarrow \mathbb{R}, x \mapsto \sqrt[3]{x^2|x-2|},$
3. $f: [10^{-2}, \pi] \rightarrow \mathbb{R}, x \mapsto \sqrt{x} \sin(1/x).$

Exercise 2: Perform the following function in Matlab:

$$f: [-3, 3] \rightarrow \mathbb{R}$$
$$x \mapsto (1+x)e^{-x^2+3x \cos(x)} - (1+x^4)^2 \sin(x).$$

Exercise 3: Perform the following function in Matlab:

$$g(t) = e^{\cos(t)} \sin(t-1)^2 + 2\sqrt{t^3+7t}.$$

Exercise 4:

A. Give MATLAB commands to evaluate the following expressions:

1. $\logarithme_{10}(2)$
2. $\frac{1}{1+\frac{1}{1+\frac{1}{2}}}$
3. $-x^6 - \frac{5}{7}x^3 + x^2 + 5,$ pour $x = 1, x = 4$

4. $\frac{1}{\sqrt{8^3+2}} - \frac{2 \sin(45)}{e^2} + \ln(4)$ Les angles sont donnés en degré.

5. $\frac{x^3 \sin(\frac{4\pi}{2})^2}{\cos(2\pi-1)}$, pour $x = e^3$

6. $-2 \ln(5x) + \sqrt{4x^3 + 1}$, pour $x = -3i$

7. $\frac{4}{3} \pi R^3$ où $R = 3 \text{ cm}$

8. $z \leftarrow \frac{|2n^5-3|}{\sqrt{4n^2+\ln(6n)}}$

9. $x \leftarrow \frac{e^{\sqrt{x}}}{2y-1} + |x| - \frac{1}{y^2+3}$

10. $w \leftarrow \frac{b}{2} \times \sqrt{c^2 - \left(\frac{b}{2,5}\right)^2}$;

11. $y \leftarrow e^{2-\sqrt{b^3-\frac{1}{a}}}$;

B. Give the mathematical expressions equivalent to the following MATLAB instructions:

1. `exp(sqrt(x))/(2*y-1) + abs(x)-1/(y^2+3)` ;

2. `2* sind (45)/ exp (2)` ;