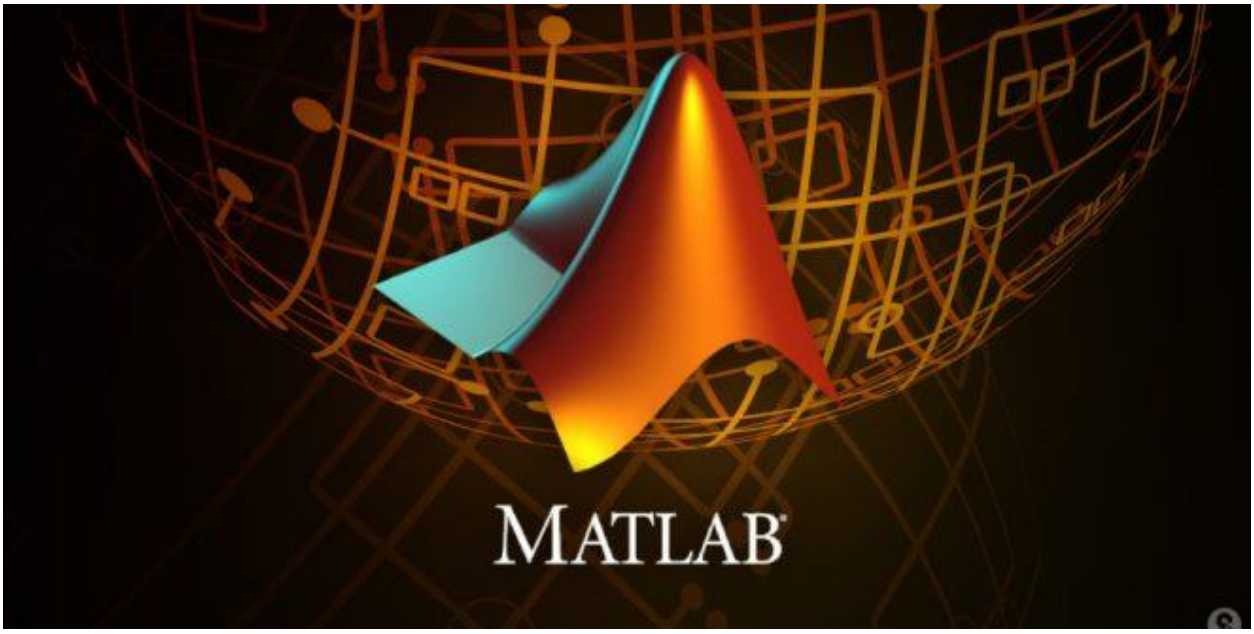
# Course N°01

# Introduction to the MATLAB environment

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## The MATLAB environment

The MATLAB program displays a number of windows on startup:

- ✓ Current folder : indicates the current directory and existing files (see, Fig 1).
- ✓ Command window : we use it to formulate our expressions and interact with MATLAB, and it's the most widely used window (see, Fig 1).
- ✓ Command history : keeps track of all commands entered by the user (see, Fig 1).
- ✓ Workspace : indicates all existing variables with their types and values (see, Fig 1).

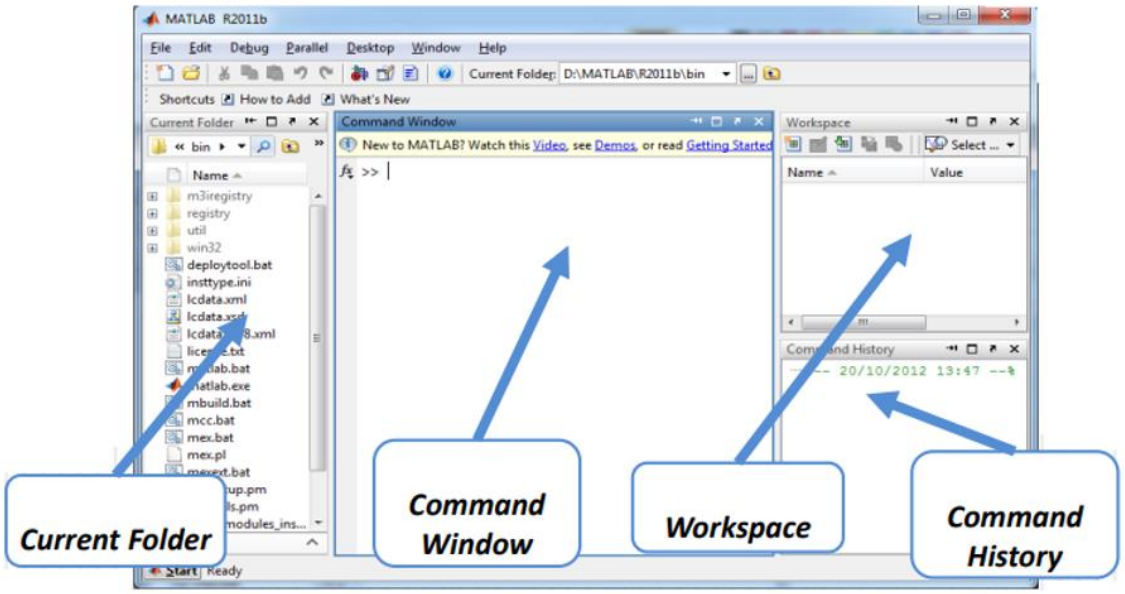


Fig 1. MATLAB user interface

| Command window | |
|---|---|
| date | is show day-month-year (see, Fig 2) |
| clock | is show year-month-day-hour-minute-second (see, Fig 2) |

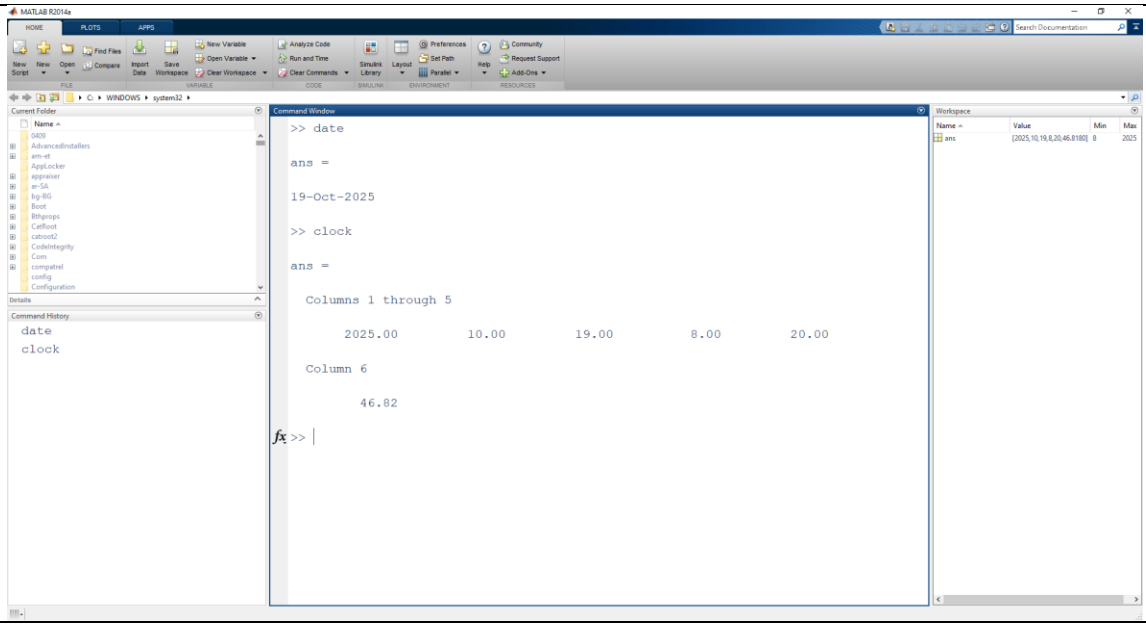


Fig 2. Commands display the current time

| Arithmetic operator | |
|---|---|
| + | Addition (see, Fig 3) |
| - | Subtraction (see, Fig 3) |
| * | Multiplication (see, Fig 3) |
| / | Division left (see, Fig 3) |
| \ | Division right (see, Fig 3) *Note. The boutons in keyboards* ALT GR + 8 |

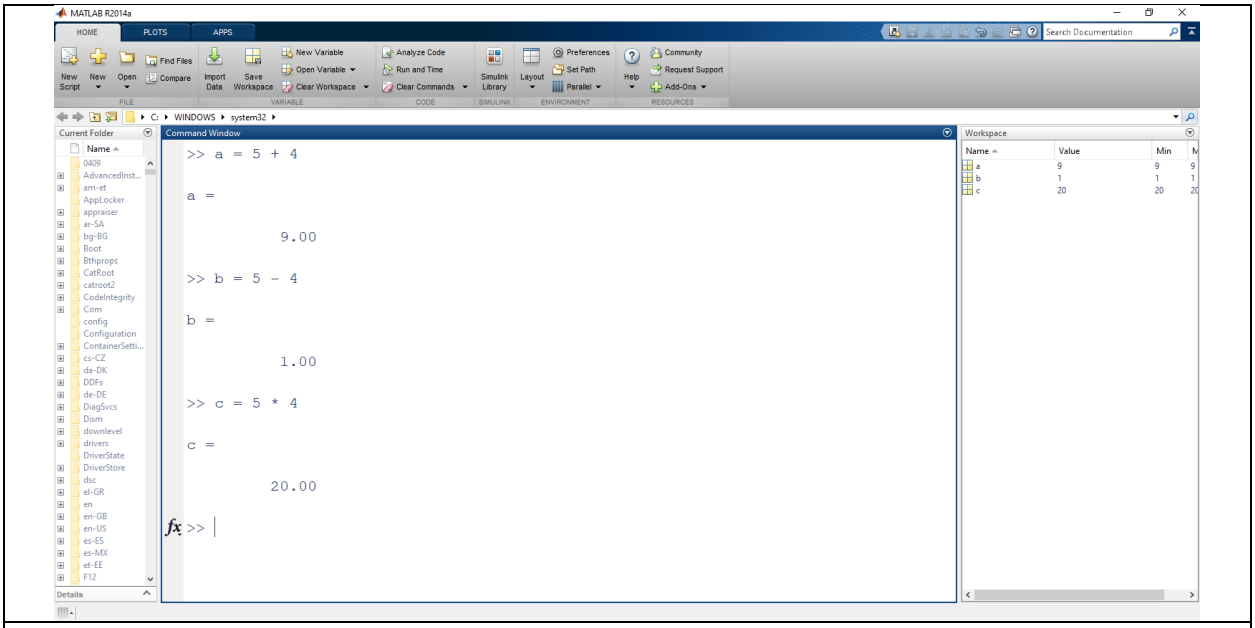


Fig 3. The addition, subtraction and multiplication operations

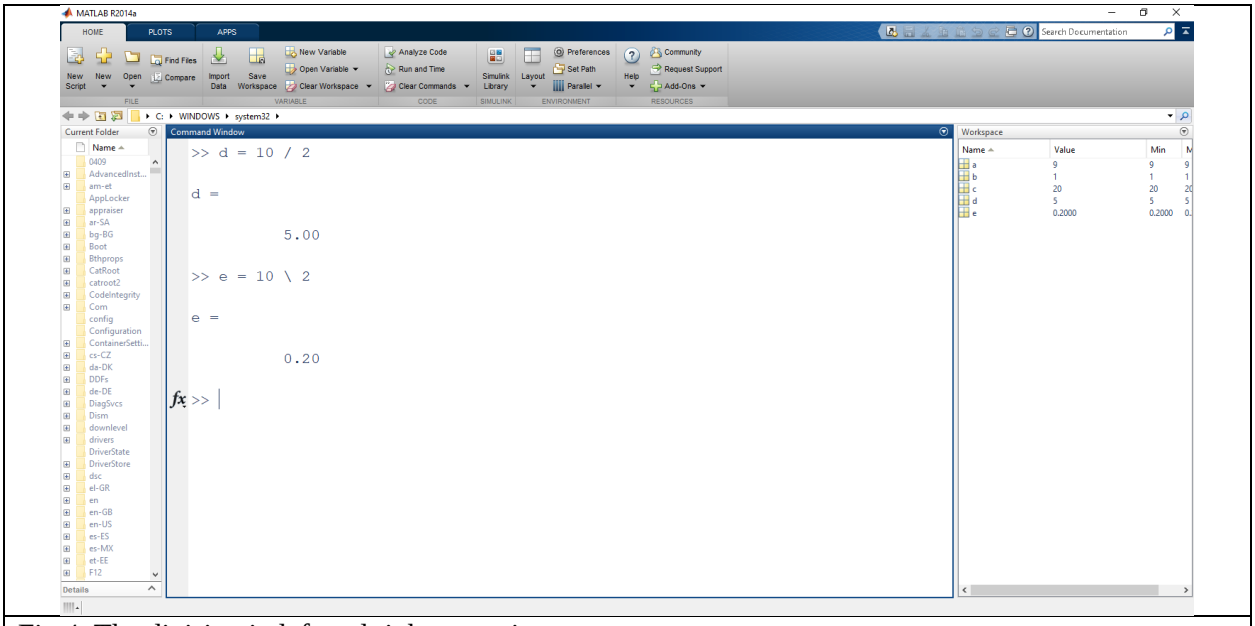


Fig 4. The division in left and right operations

| Constants and special characters | |
|---|---|
| pi | $\pi$ (see, Fig 5) |
| inf | $\infty$ infinite, is produced when dividing a non-zero number by zero (see, Fig 5) |
| NaN | No-Number (Not-a-Number) when there is no digit to display ( inf/inf where 0/0) (see, Fig 5) |

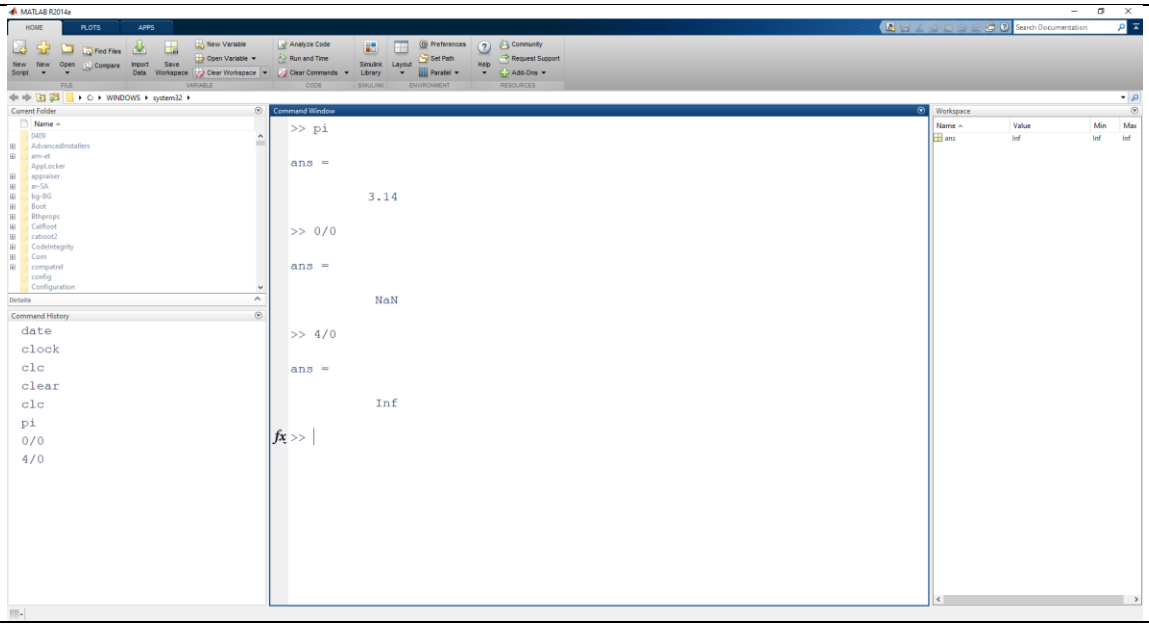


Fig 5. Test some MATLAB commands

| Trigonometric functions in Rad | |
|---|---|
| cos(x) | Cosinus (see, Fig 6) *Note. The value of x in Rad* |
| sin(x) | Sinus (see, Fig 6) *Note. The value of x in Rad* |
| tan(x) | Tangente (see, Fig 6) *Note. The value of x in Rad* |
| acos(x) | Arc cosinus |
| asin(x) | Arc sinus |
| atan(x) | Arc tangente |

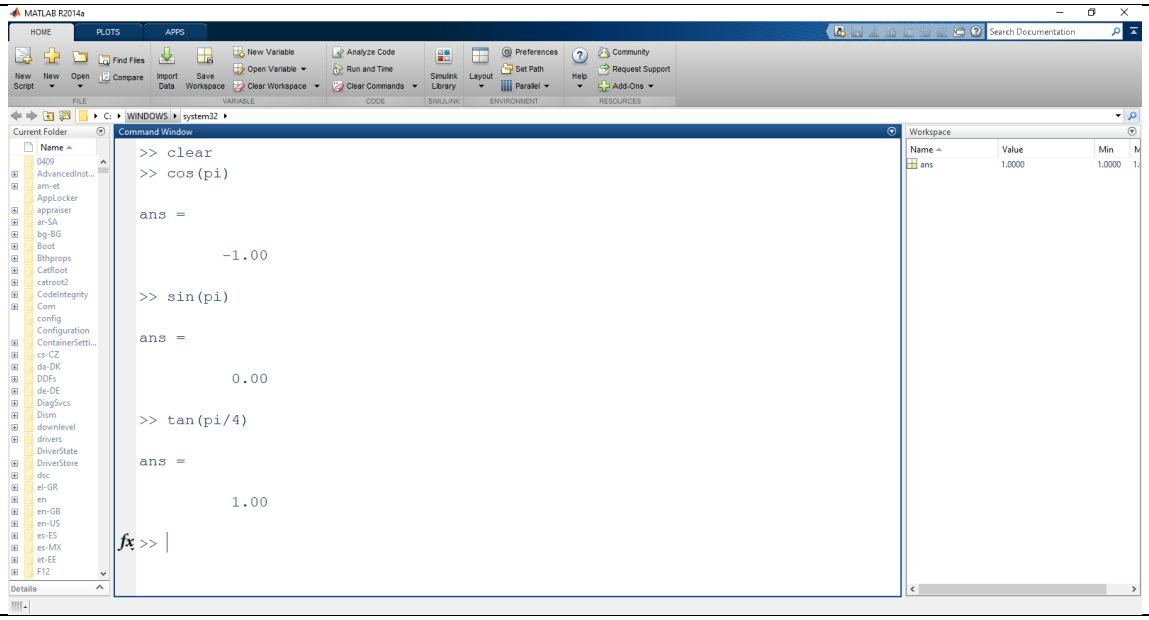

Fig 6. Test some trigonometric function commands in MATLAB

| Trigonometric functions in Deg (°) | |
|---|---|
| cosd(x) | Cosinus (see, Fig 7) *Note. The value of x in Deg* |
| sind(x) | Sinus (see, Fig 7) *Note. The value of x in Deg* |
| tand(x) | Tangente (see, Fig 7) *Note. The value of x in Deg* |

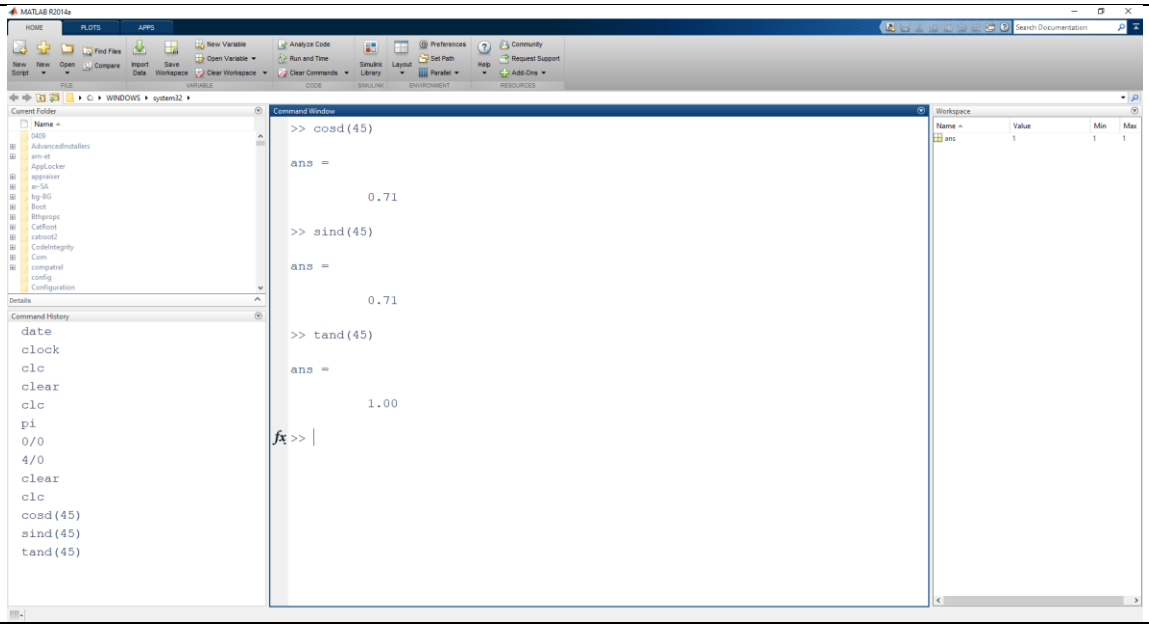


Fig 7. Test some trigonometric function commands in MATLAB

| Mathematical functions | |
|---|---|
| exp(y) | Exponential $e^{y}$ (see, Fig 8) |
| log(y) | Neperian logarithm $\ln(y)$ (see, Fig 8) |
| log10(y) | Decimal logarithm $\log10(y)$ (see, Fig 8) |
| sqrt(y) | Square Root $\sqrt{y}$ (see, Fig 9) |
| x^y | Power $x^{y}$ (see, Fig 9) |
| inv(y) | Inverse $\frac{1}{y}$ (see, Fig 9) |

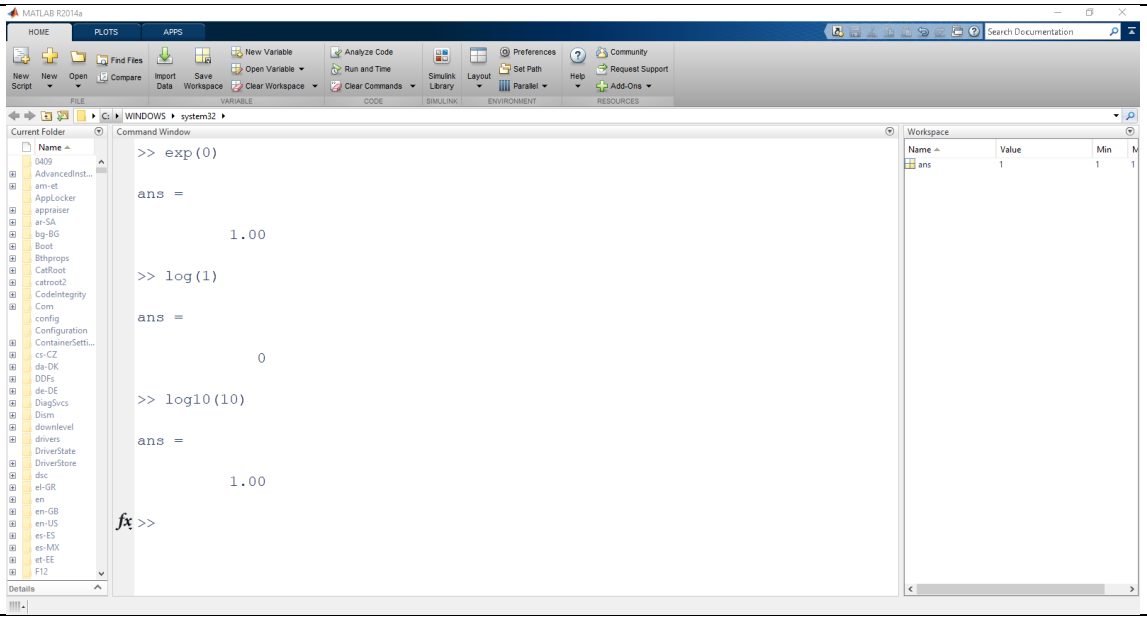


Fig 8. Test some mathematical function commands in MATLAB

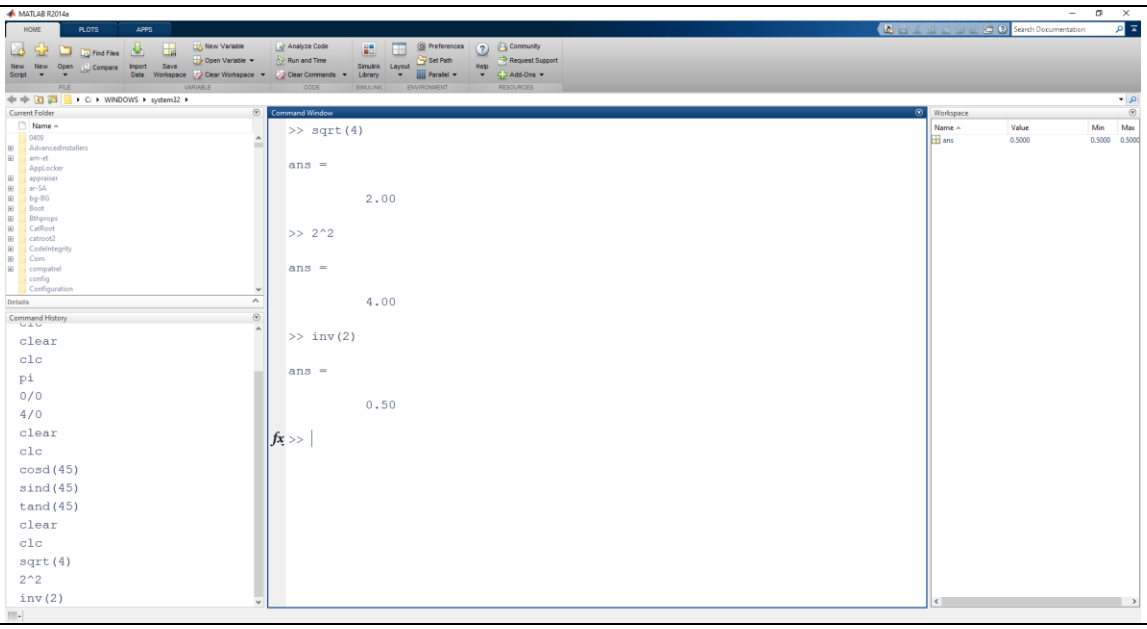


Fig 9. Test some mathematical function commands in MATLAB

| Shortcut | |
|---|---|
| ( | The bouton 5 |
| ) | The bouton ° |
| ^ | ALT GR + 9 |

| Command window | |
|---|---|
| clear | Deletes all program variables (from memory) |
| clear x y | Deletes only variables x, y (from memory) |
| clc | Deletes the contents of the command window screen |
| quit, exit | Quitter MATLAB |
| ans | Most recent answer (MATLAB uses a default variable 'ans' to store the result) |

| Complex variables | |
|---|---|
| i ou j | Imaginaire pur ($i^2=j^2=-1$) (see, Fig 10) |
| real(z) | Partie réelle (see, Fig 11) |
| imag(z) | Partie imaginaire (see, Fig 11) |
| angle(z) | Argument $\theta$ (en radian) (see, Fig 12) |
| abs(z) | $\lvert z \rvert$ (see, Fig 12) |
| conj(z) | Conjugué de z $(\overline{z})$ (see, Fig 12) |

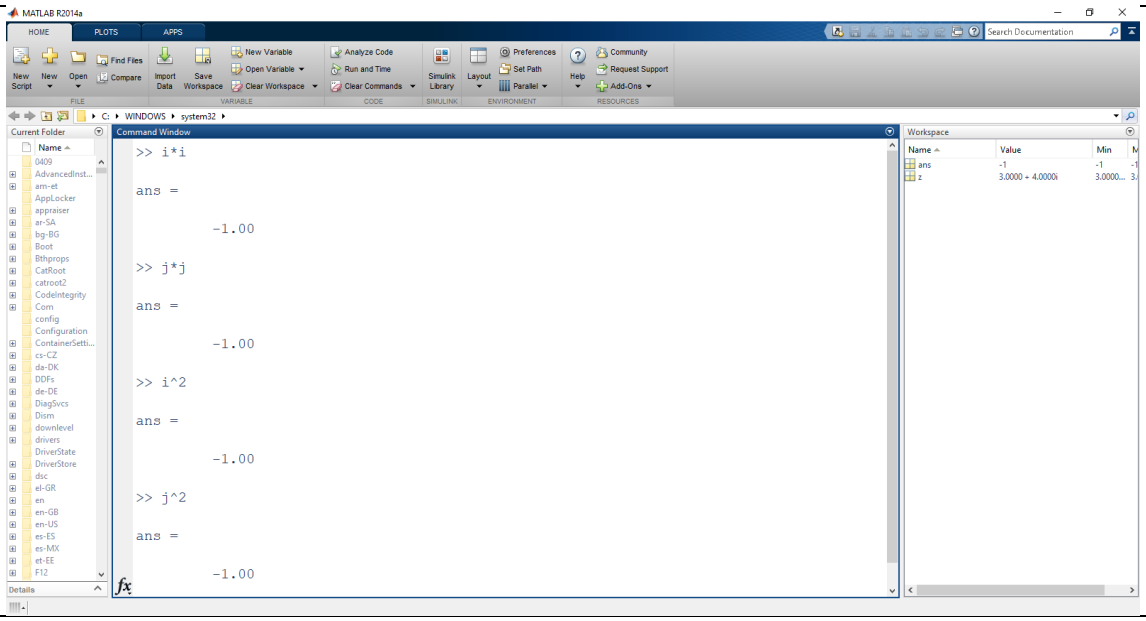


Fig 10. Test some complex variable commands in MATLAB

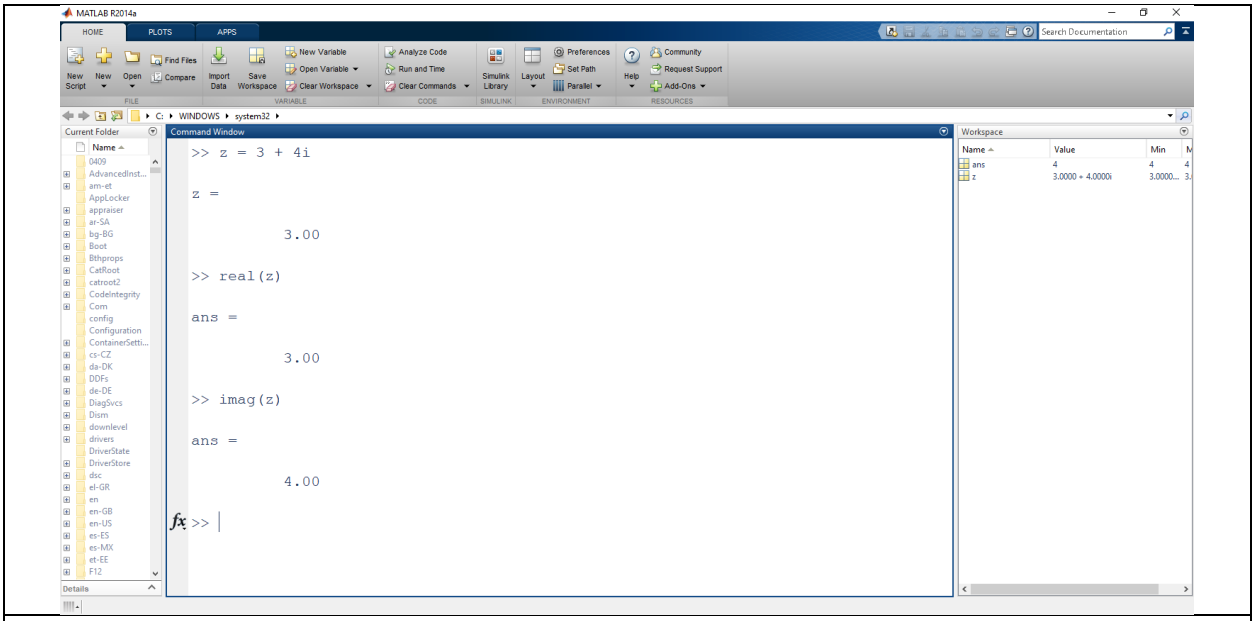


Fig 11. Test some complex variable commands in MATLAB

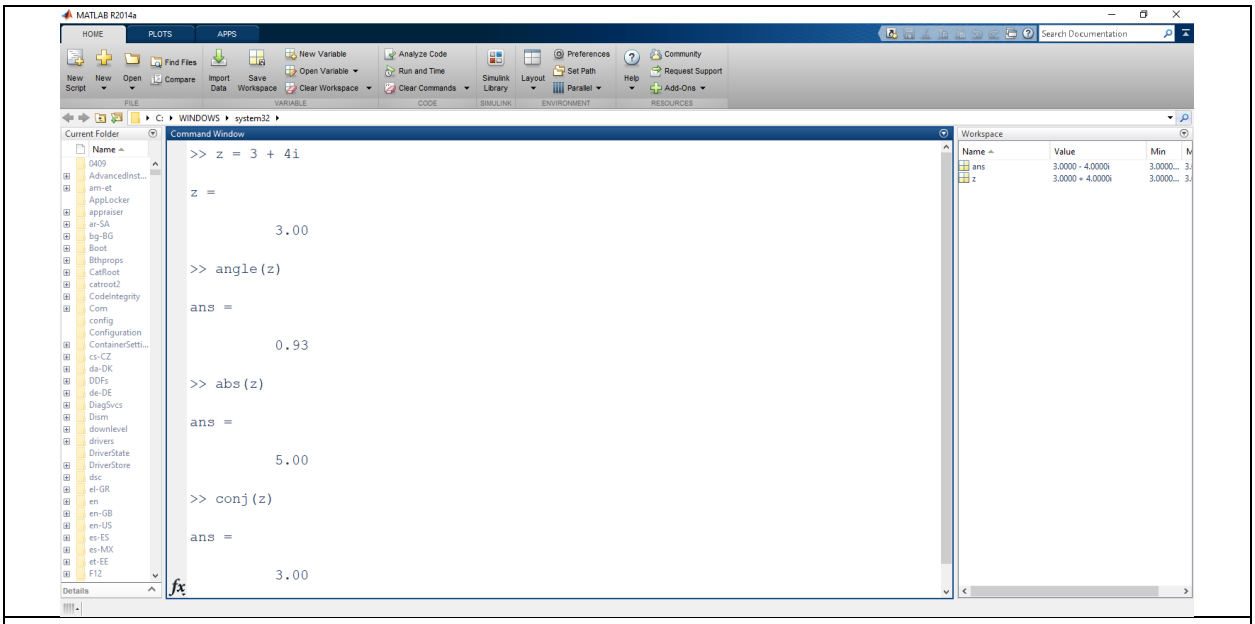


Fig 12. Test some complex variable commands in MATLAB

| Command window | |
|---|---|
| factorial(x) | x! to calculate the factorial of any number (see, Fig 13) |
| gamma(x+1) | x! to calculate the factorial of any (see, Fig 13) |

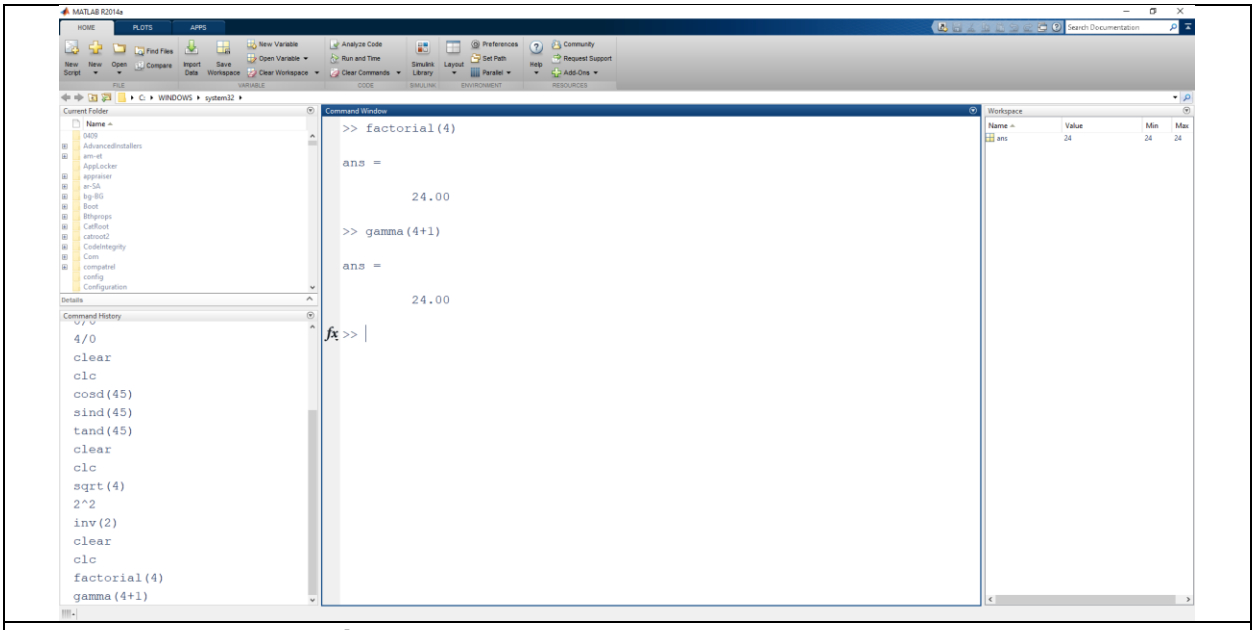


Fig 13. Test some commands in MATLAB

| Command window | |
|---|---|
| gcd(x,y) | PGCD is the greatest common divisor of x and y (see, Fig 14) |
| lcm(x,y) | PPCM is the least common multiple of x and y (see, Fig 14) |

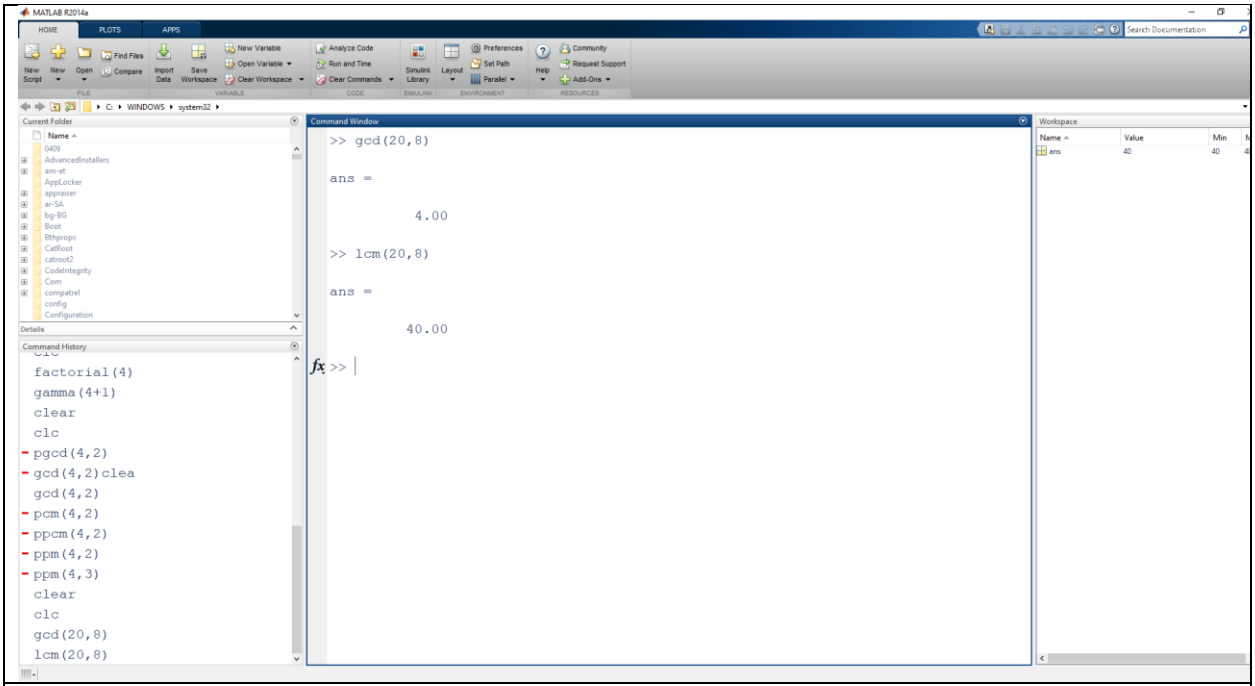


Fig 14. Test some commands in MATLAB

## List of References

[1] MATLAB A PRACTICAL INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

[2] MATLAB for Beginners

[3] MATLAB A SELF-TEACHING GUIDE

[4] Introduction à MATLAB et Simulink

[5] Initiation à Matlab

[6] A Matlab Exercise Book

[7] MATLAB Essentials