




8. Lab

Matlab toolboxes & their usage.

-  First, see in the lectures' part of the Laboratory manual (polycopié des TPs), the counterpart chapter of this Lab.

8

1. Complete the script `QuadraticEq.m` (given below) which calculates the symbolic solution of a quadratic equation $y = a * x^2 + b * x + c$?. Run your script.

```

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12

```

`QuadraticEq.m`

```

% Name of the script: QuadraticEq.m

% Define the required symbolic objects:
.....
.....

% Write the quadratic equation.
.....

% Find the symbolic roots of the quadratic equation.
.....

```

2. Use the Symbolic Math Toolbox to calculate the inverse (`inv`) and the determinant (`det`) of the matrix $A = [a11 \ a12; \ a21 \ a22]$. To do this, finish the following script :

```

1
2
3
4

```

`InvDetMatrix.m`

```

% Name of the script: InvDetMatrix.m
clear;clc
format compact

```

```

5   % Define the required symbolic objects (i.e., elements of a matrix A):
6   .....
7
8   % Define a matrix A.
9   A = .....
10
11  % Calculate the inverse and determinant of the matrix A.
12  inv_A= .....
13  determinant_A =.....

```

Run your script.

3. Use the two commands `laplace` and `ilaplace` to calculate :

(a) The Laplace transform of :

- $x(x) = \cos(x) + \sin(x)$.

- $x(x) = \exp(x)$.

- $x(x) = u(x)$.

(b) The inverse Laplace transform of :

- $X(s) = s/(s^2 + 1) + 1/(s^2 + 1)$.

- $X(s) = 1/(s - 1)$.

- $X(s) = 1/s$.

4. Use the two commands `diff` and `int` to calculate :

(a) The derivative of :

i. $x(x) = \cos(x) + \sin(x)$.

ii. $x(x) = \exp(x)$.

iii. $x(x) = u(x)$. (The Unit Step function)

(b) The integral of :

i. $x(x) = \cos(x) - \sin(x)$.

ii. $x(x) = \exp(x)$.

iii. $x(x) = \delta(x)$. (Dirac's impulse)