Introduction to MATLAB

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Abstract

Contents of the lecture:

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Command Window

The Command Window is used for:

☞ entering variables;

☞ running functions and M-files.

For example, enter the matrix of the second order and assign its value to the variable `A`:

```
>> A=[1 2; 3 4]
A =
     1     2
     3     4
```

Calculate the inverse matrix:

```
>> inv(A)
ans =
   -2.0000    1.0000
    1.5000   -0.5000
```

MATLAB assigned the value of the resulting matrix to the standard variable `ans`. Multiply the inverse matrix by the square of the matrix `A`:

– Typeset by FoilTEX –

```
>> ans*A^2
ans =
      1       2
      3       4
```
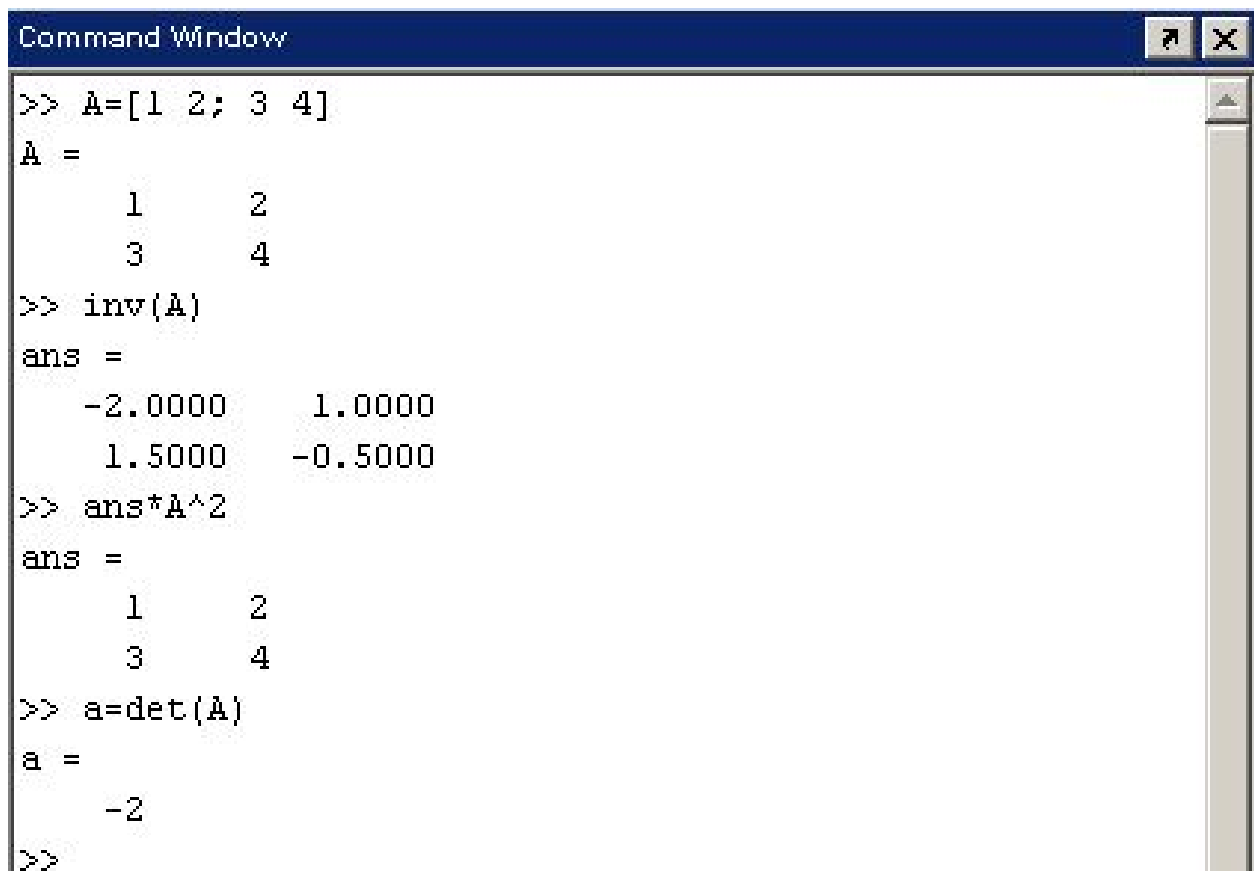
Calculate the determinant of the matrix `A`:

```
>> a=det(A)
a =
    -2
```

You can see the results of calculations in Fig. 1.
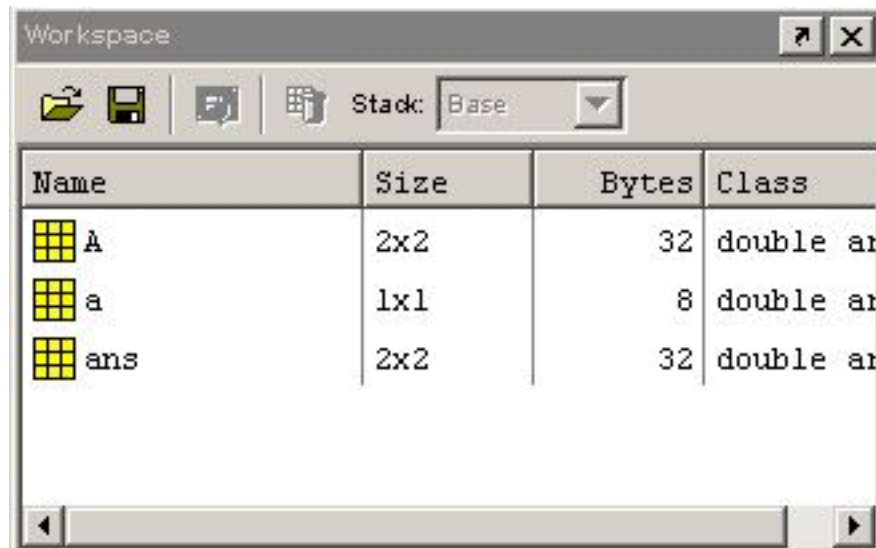

Figure 1: MATLAB Command Window

The command whos

Figure 2: The Workspace Window

The command whos lists all the variables in the current workspace, together with information about their size, bytes, and class. For example:

```
whos
  Name Size Bytes  Class

  A    2x2  32      double array
  a    1x1  8       double array
  ans  2x2  32      double array

Grand total is 9 elements using 72 bytes
```

Notice that the result of the calculation of determinant is an 1×1 array.
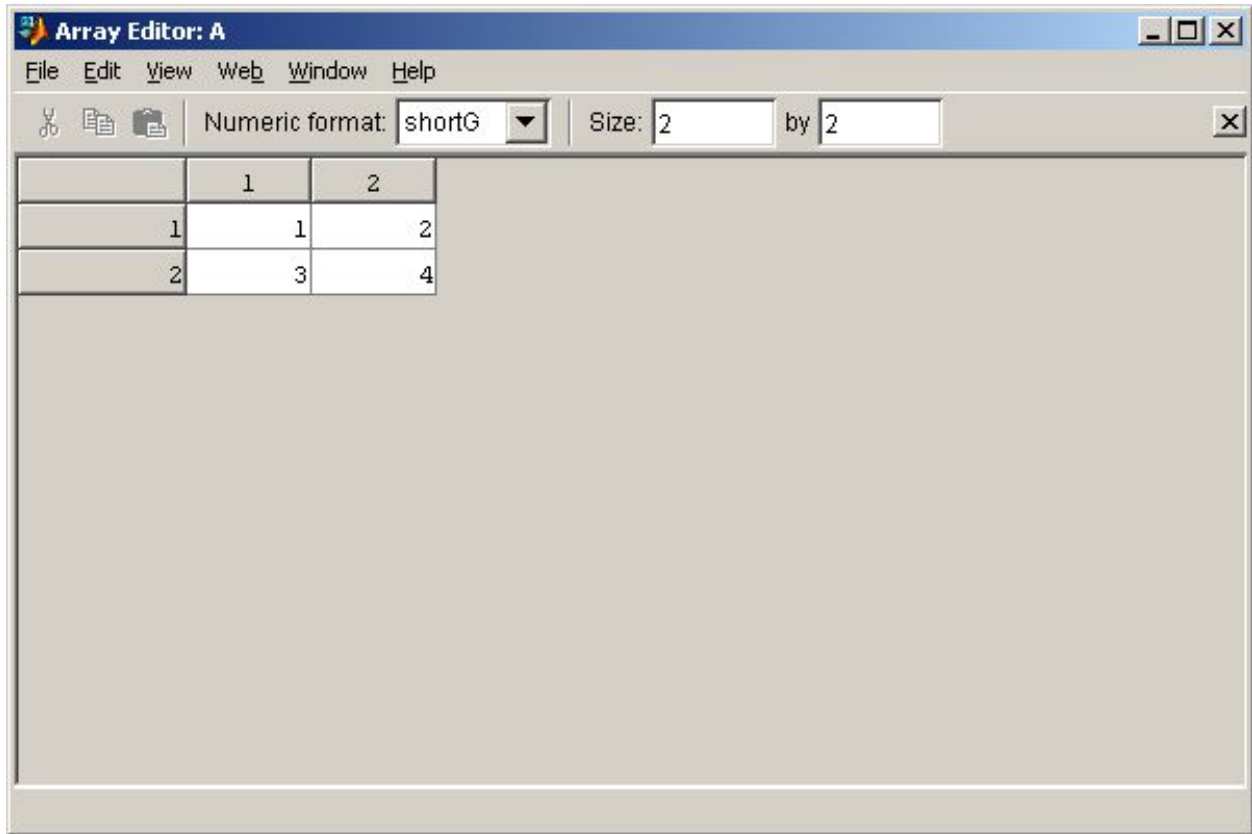
Figure 3: The Array Editor

You can find the same information in the Workspace Window (Fig. 2).

You can double-click on the variable identifier and change the value of the corresponding variable in the Array Editor (Fig. 3).

M-files or scripts

Choose menu item `File->New->M-file` and type the following:

```
% File:        first.m
% Description: This is the first program
% Author:      Anatoliy Malyarenko
% Mail:        anatoliy.malyarenko@mdh.se
A=[1 2; 3 4]
inv(A)
```

```
ans*A^2
a=det(A)
```
Write your own name and mail. Save the file under the name `first.m`. Type
```
>> first
```
and you will obtain the same result as in Fig. 1.

The simplest graf

Type in the Command Window
```
>> fplot('exp(-0.2*x)*sin(x^2)',[0 4*pi])
```
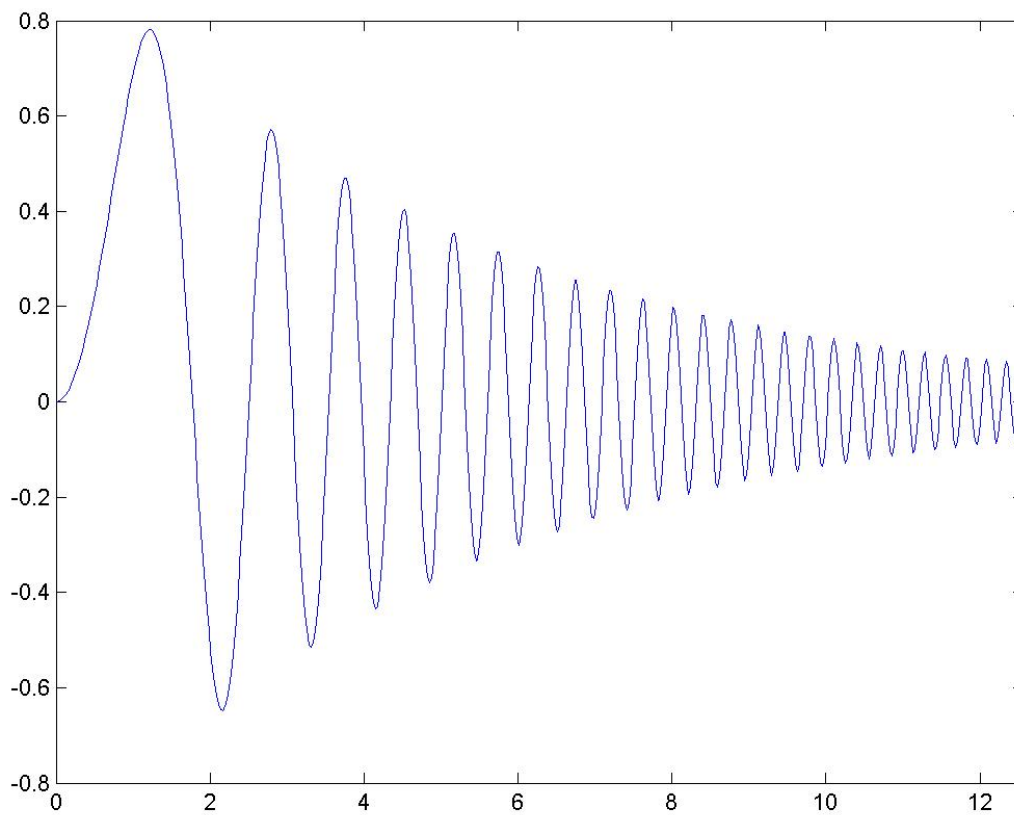and you will see the graf of the function $e^{-0.2x} \sin(x^2)$ for $0 \le x \le 4\pi$:

Figure 4: The graf of the function $e^{-0.2x} \sin(x^2)$

Help system

You can use the `help` command or the **Help** menu.

The command `help`, for itself, lists all primary help topics. The command `help topic` gives help on the specified topic. For example, `help general` displays general purpose commands.

The command `help fun` displays the help for the function `fun`. For example:

```
>> help det
 DET    Determinant.
    DET(X) is the determinant of the square
    matrix X. Use COND instead of DET to test
    for matrix singularity.
    See also COND.
```

The commands `helpwin` and `helpwin topic` display information in the separate window.

Problems

1. Create the file `first.m` . Execute the file and explain the result of the execution of the operator `ans*A^2`.

2. Write a simple script to plot the function $y = x^2 \cos x$. Take $-2 \leq x \leq 2$.