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Course: Application Programming in MATLAB Environment 2000

Exercises 3–4

We try to become acquinted with MATLAB graphics. The main emphasis is on practising the hierarchy of graphical objects and possibilities to customize the appearance of graphical views by changing the properties of different objects.

Problem 1

Draw function $y = x$ on the interval $[0, 3]$ by using the `plot` command.

Change the background color in the figure window to red/blue/yellow.

Change location of the figure window to the up-left corner of the screen.

Change the thickness of axes to two (2) and change also the color of axes.

Change the definition of axis to show the function on the interval $[1, 4]$
without redrawing the image.

Add suitable markers to drawing points and change the color of the plot.

Perform the operations above by using:
a) the command line commands `get` and `set`
b) Property Editor (`propedit`)

Problem 2

Write the macro "Tyypillinen 2D grafiikkaa piirtävä ..." presented in the lecture notes at the top of page 14 into a suitable (m-)file and run it from the command line. Then study with Property Editor the arising graphical objects within the image. Change the macrofile by removing from the first image the text and pointer to the minimum and add instead to the other plots of individual functions a similar information pointing to minima and maxima.

Problem 3

Illustrate function $z = \sin(4\pi x)\sin(4\pi y)$ in at least five different ways.

Problem 4

Suppose that an $n \times m$ matrix $\mathbf{A}$ has been given. Design a MATLAB environment which can be utilized to illustrate the structure of rows/columns of the given matrix in a "best possible way" (try first what the single `plot` command does).

Problem 5

Create a random matrix of suitable size with the `rand` command and illustrate this matrix using the just designed environment. Make an animation of e.g. 20 pictures when function x^2 is applied to components of the matrix sequentially. What happens? You can make the animation by suitably setting the `Erasemode` property while drawing the different views or by directly using the command `movie`.
(see *Help Desk/Getting Started/Animations&Movies*).

Problem 6

Load the example image "clown" of MATLAB using the command `load clown`. Where does this example come from? See what you have in the namespace. Draw the clown using the `image` command (matrix `X` contains the desired values!) and illustrate the colors using the `colorbar` command. What happens when you draw the image using the colormap `map` instead of the standard one? Illustrate the difference between the standard and `map` colormaps by using the `bar` command with the RGB-values that you have in the two maps. Perhaps it is better not to draw each RGB-value but only every fourth of them to have clear images.