

(Writing in progress)

Handling a function in Matlab

1. Defining functions

- Anonymous function: `funcName = @(inVar) funcExprs`
- Inline function: `funcName = inline(funcExprs, inVar1, inVar2, ...)`
- Using function: `function outVar = funcName(inVar1, inVar2, ...){ funcExprs }`

Graphs of functions

1. Plotting single variable functions: `plot`

- Decorating options: color and marking, `linewidth`, `markersize`
- Multiple drawing: `hold on`, `hold off`, `drawnow`

2. Plotting 2-variable functions: `surf`, `mesh`

- How to use `meshgrid`
- Predefined grid for sphere: `sphere`

3. Drawing implicit graphs

- Implicit plots in 2d and 3d: `implicit`, `implicit3`
- Plotting contour lines: `contour`, `contour3`

4. Adding legends

- Titles, x and y-labels: `title`, `xlabel`, `ylabel`
- Adding texts: `text`
- Adding legends: `legend`

Scatter plot and regression

1. Drawing scatter plot: `scatter`

2. Finding regression line: `regress` (Need *Statistics and Machine Learning Toolbox*)

3. Drawing histogram: `histogram`

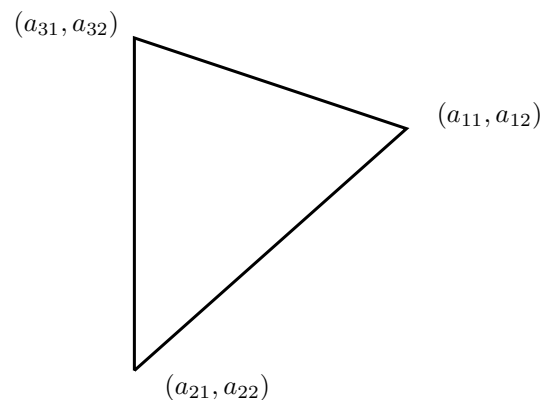
Exercise

1. Define the following function in three different ways: $f(x, y) = x^2 + y^2$
2. Plot the graph of single variable function: $f(x) = x^2 - x + 1$
3. Plot the graph of 2-variable function: $f(x, y) = x^2 - y^2$ over $[-1, 1] \times [-1, 1]$
4. Plot the graph of implicit equation: $x^2 + 2y^2 = 1$
5. Plot the graph of implicit equation: $x^3 + y^3 + z^3 = 1$
6. Write a function `triangle` which works as follows:

- The input of the function is 3×2 matrix

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix}$$

- As an output, the function draws the triangle in \mathbb{R}^2 connecting three points: (a_{11}, a_{12}) , (a_{21}, a_{22}) , and (a_{31}, a_{32})



- Fill in the inside of the triangle with a color by using the function `fill`