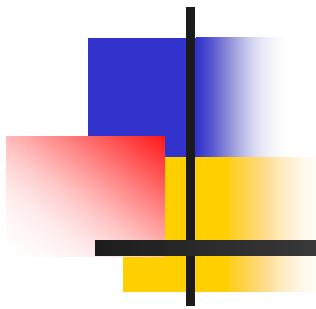
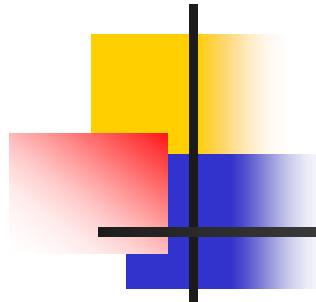


Fourier Series Practise by Matlab

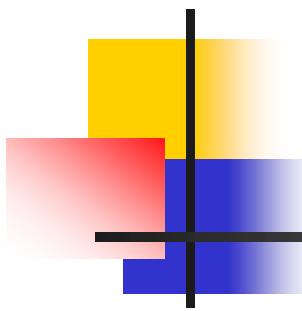


Fourier series approximation of function



$$t = 2 \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} \sin nt$$

- $-\pi < t < \pi$
- $n= 4$



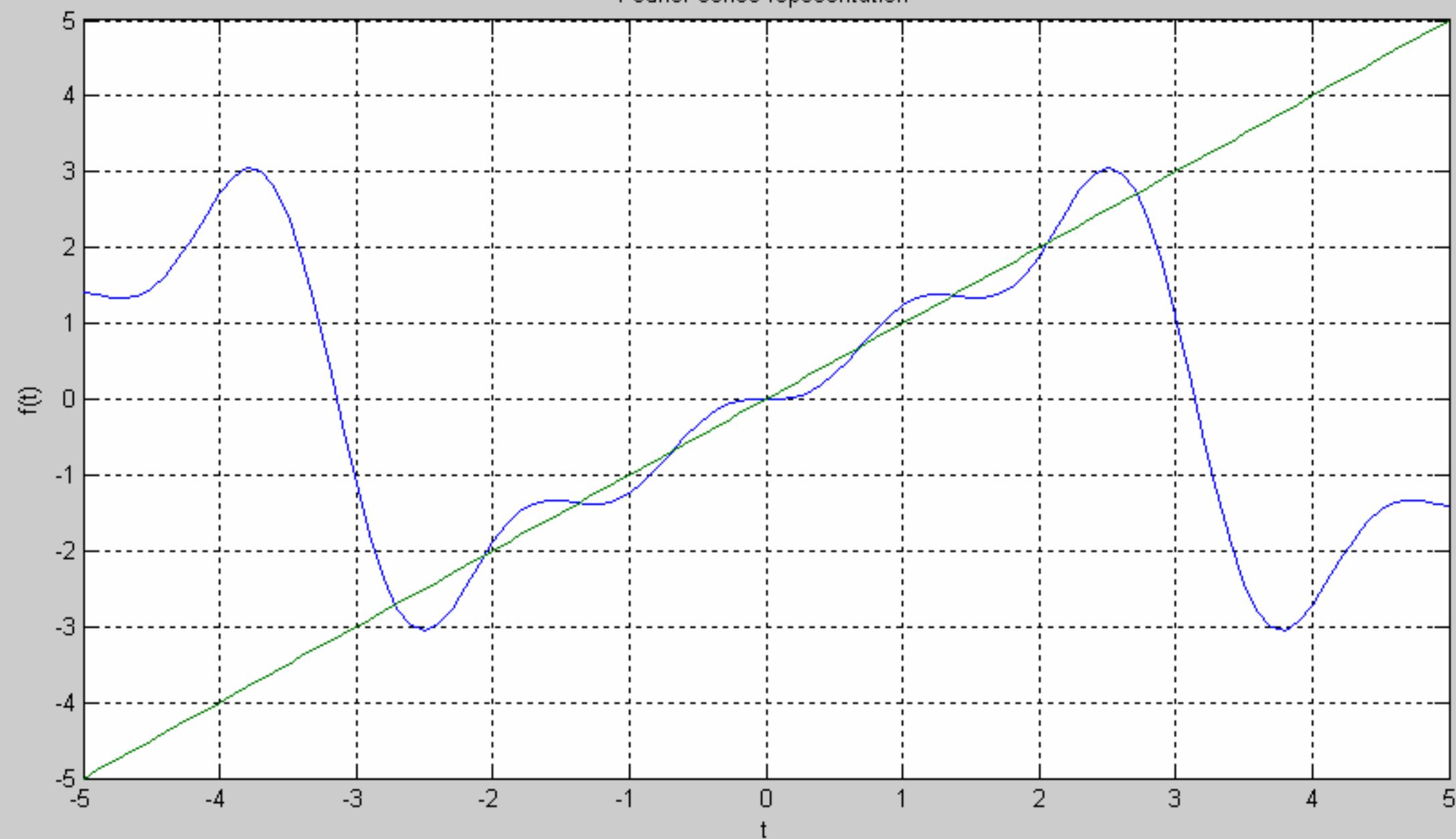
Command “for”

- Repeated calculation statements
- Description
 - The general format is
for variable=expression
statement
.....
statement

The image shows the MATLAB graphical user interface. The title bar reads "MATLAB". The menu bar includes "File", "Edit", "Debug", "Desktop", "Window", and "Help". Below the menu is a toolbar with various icons. The "Current Directory" is set to "C:\MATLAB7\work". A status bar at the bottom shows "Shortcuts", "How to Add", and "What's New". The main window is titled "Command Window". Inside the Command Window, the following MATLAB script is displayed:

```
>> t=-5:0.1:5;
>> A=0;
>> y=t;
>> for n=1:1:4
    g=2*(-1)^(n+1)/n
    h=sin(n*t)
    A=A+g*h
end
>> plot(t,A,t,y)
>> title('Fourier series representation');
>> xlabel('t');
>> ylabel('f(t)');
>> grid on
```

Fourier series representation



Fourier series of square wave

- Equation

$$f(t) = \frac{4k}{\pi} \left(\sin t + \frac{1}{3} \sin 3t + \frac{1}{5} \sin 5t + \frac{1}{7} \sin 7t + \dots \right)$$

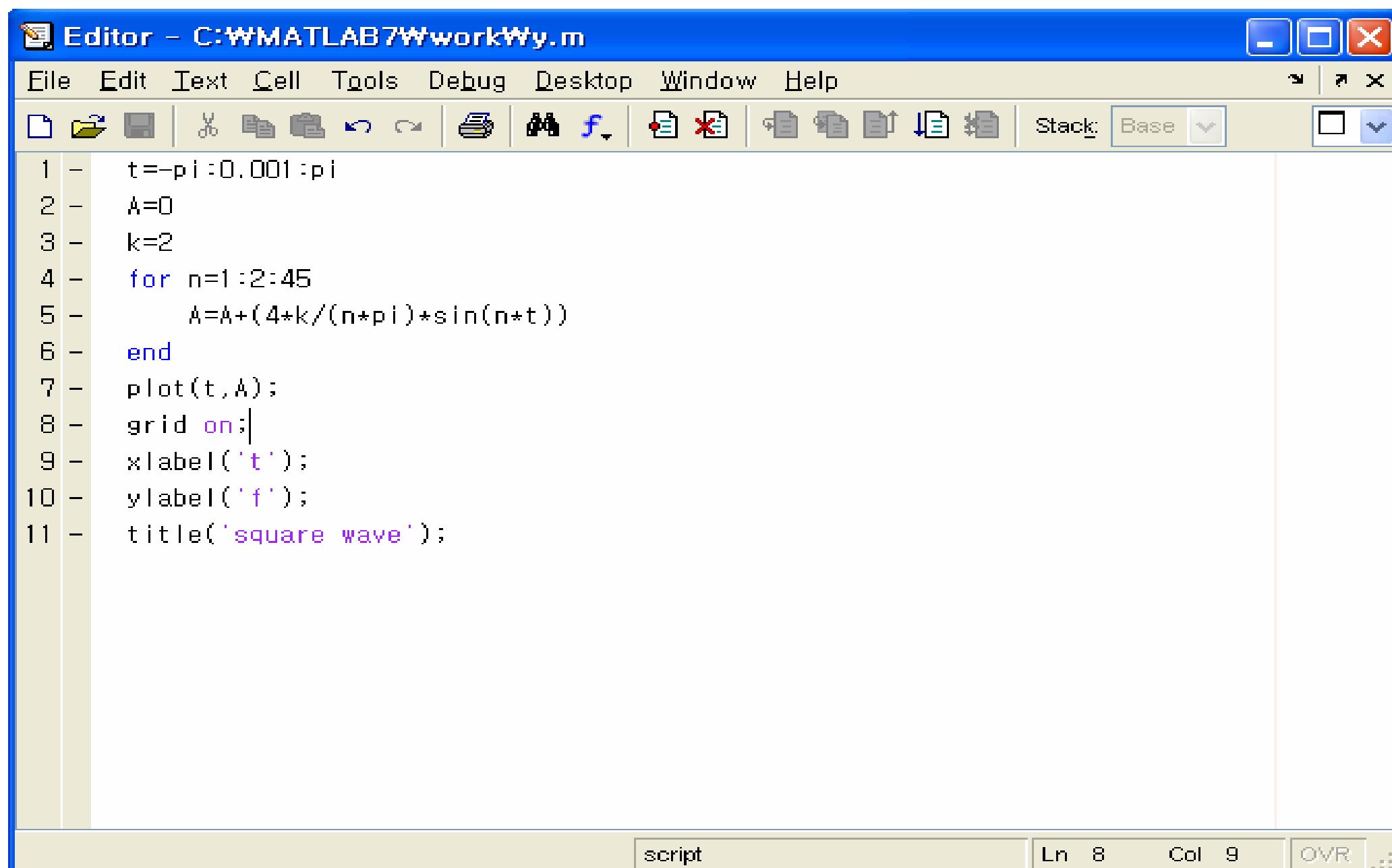
- General formula

$$f(t) = \frac{4k}{\pi} \sum_{n=1}^{\infty} \frac{1}{n} \sin(nt)$$

- Conditions

- $-\pi < t < \pi$
- $n = 45$ ($2n=0, 2n-1=n$)
- $k = 2$

Command ‘for’



The screenshot shows the MATLAB Editor window with the title bar "Editor - C:\MATLAB7\work\y.m". The menu bar includes File, Edit, Text, Cell, Tools, Debug, Desktop, Window, and Help. The toolbar contains various icons for file operations like Open, Save, and Print. The code area displays the following MATLAB script:

```
1 - t=-pi:0.001:pi
2 - A=0
3 - k=2
4 - for n=1:2:45
5 -     A=A+(4*k/(n*pi))*sin(n*t))
6 - end
7 - plot(t,A);
8 - grid on;
9 - xlabel('t');
10 - ylabel('f');
11 - title('square wave');
```

The status bar at the bottom indicates "script" is selected, with line 8 and column 9 highlighted, and "OVR" (Overwrite) mode is active.

square wave

