

MATLAB : Session 2

Reading/Writing text files

The syntax is almost the same than in the C Language. The basic functions in Matlab are:

Open a file:

```
file_id = fopen(file_name,'mode')
```

Read a line from a file:

```
data_line = fgetl(file_id);
```

Get the variables from the line of data:

```
variable = sscanf(dat_line,'%f')
```

Read formatted data from a file:

```
array=fscanf(file_id,'%e%c',[4,inf])
```

Write text on a file:

```
fprintf(file_id,' %s \n', text_variable)  
fprintf(file_id,'%8.2f\t', data_variable)
```

Close a file:

```
fclose(file_id);
```

Example

Program:

```
i:\public\teaching\eleceng\EE3252\lab2.m
```

Data:

```
i:\public\teaching\eleceng\EE3252\temp1.txt
```

Example of reading and plotting data (lab2.m):

```
filename=input('Input the filename:','s');  
fid=fopen(filename,'r');  
array=fscanf(fid,'%e%c',[4,inf]);  
plot(array([1],:),array([3],:));  
fclose(fid);  
xlabel('Time(us)')  
ylabel('Voltage(v)')  
title('Waveform demonstration')
```

grid

Demonstrating how to calculate the area under a curve.

You can create a curve, either by putting values of X1 and Y1 or generating them with a function such as cos, sin,...

```
function ar = area(x1,y1)  
% AREA Area between a curve and the X axis  
  
index=1; acc_area=0;  
while( index < length(x1) )  
    base = x1(index+1) - x1(index);  
    height = y1(index);  
    acc_area = acc_area + base*height;  
    index = index + 1 ;  
end  
ar = acc_area;
```

Demonstrating how to read data from file and plotting data as figures

FOPEN Open file
FPRINTF Write formatted data to file
FCLOSE Close file.
FSCANF Read formatted data from file.

```
filename=input('Input the filename:','s');
fid=fopen(filename,'r');
% 'r'      read
% 'w'      write (create if necessary)

array=fscanf(fid,'%e%c',[4,inf]);
% Use %c to read space characters

plot(array([1],:),array([3],:));
fclose(fid);
xlabel('Time(us)')
ylabel('Voltage(v)')
title('Waveform demonstration')
grid
```

To show how you can save your data in a text file

FPRINTF Write formatted data to file

```
x = 0:1:1; y = [x; exp(x)];
    fid = fopen('exp.txt','w');
    fprintf(fid,'%6.2f %12.8f\n',y);
% The special formats \n,\r,\t,\b,\f can be used to produce linefeed,
% carriage return, tab, backspace, and form feed characters respectively.
% Use \\ to produce a backslash character and %% to produce the percent
% character.

    fclose(fid);
```

Exercise:

- 1) Investigate more about the area.m .See if you can find a more accurate method for calculating the area under a curve.
- 2) Try creating a file(result.txt) with the cosgen function's result in it. Then open the file (result.txt) and plot and print it . (*use your own numbers for Amplitude, Frequency & Phase.*)