

MATLAB 資料輸入與輸出

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請先下載本週上課資料

- <http://www.ym.edu.tw/~cflu>
- 點選左欄 [課程資料] → [MATLAB圖形使用者介面]
- 下載第7週 [上課資料] [materials_L7.zip](#) · 檔案大小約15MB

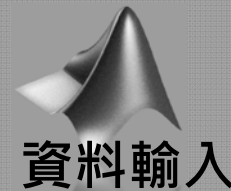
- 請先將Current Directory切換至materials_L7資料夾!

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本週內容 – File I/O

- 資料輸入(file input)
 - The first step for data analysis
- 資料輸出(file output)
 - The last step for data analysis

Input/Output the following file formats
*.mat, *.txt, *.csv, ...



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Types of Raw Data

- ASCII text (*.txt, ...)
- Excel files (*.csv, *.xls, *.xlsx)
- Binary format
- Medical image & signals (DICOM, MFER...)
- Vender-defined formats (*.*)

ASCII text →



Binary format →

Before File I/O...

Data Information

- Sampling rate
 - in Hz
- Data length
 - time frames or data points
- Dynamic ranges
 - maximal and minimal values
- Physical units
 - absolute or relative values, arbitrary unit
- Events, Annotations, Markers
 - onset time



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ASCII format

- Values are stored as a "Matrix"
- Values are separated by ...
 - , or ; or Space or Tab
- Use "Notepad" to check if ...
 - the file is ASCII format.
 - the data is stored as a matrix.

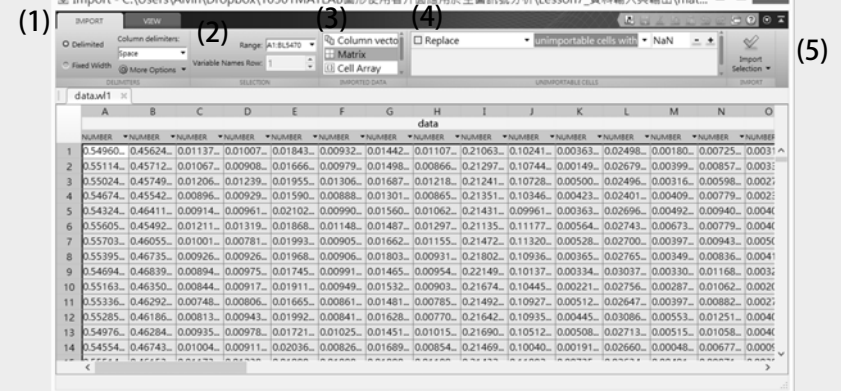


請試著開啟materials_L7\ASCII\data.w11
請試著開啟materials_L7\ASCII\marker.evt

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ASCII format

- Drag-and-drop file into MATABL workspace



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ASCII format

- Values are stored as a "Matrix"
- Values are separated by ...
 - , or ; or Space or Tab

Name	Value
data	5470x64 double
filename	'data.w1'
filepath	'C:\Users\Alvin\D...
full_filepath	'C:\Users\Alvin\D...

- load(fullpath);
- load('.\ASCII\data.w1')
- load('.\ASCII\marker.evt')

請開啟materials_L7\ASCII\load_ASCII.m

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Define File Path

- **Method 1:** **Include file extension!!**
 - Key in absolute file path
 - fullpath='C:\Users\Alvin\Dropbox\10301MATLAB圖形使用者介面應用於生醫訊號分析\Lesson7_資料輸入與輸出\materials_L7\ASCII\data.w1';
 - fullpath=[pwd '\ASCII\data.w1'];
 - fullpath='.\ASCII\data.w1';
- **Method 2:**
 - Key in relative file path
 - fullpath='MotionData.mat';
- **Method 3:**
 - Use **uigetfile**
 - [filename filepath]=uigetfile('*.*');
 - fullpath=[filepath filename];

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ASCII format

- Values are NOT stored as a "Matrix"
- Use "Notepad" to check

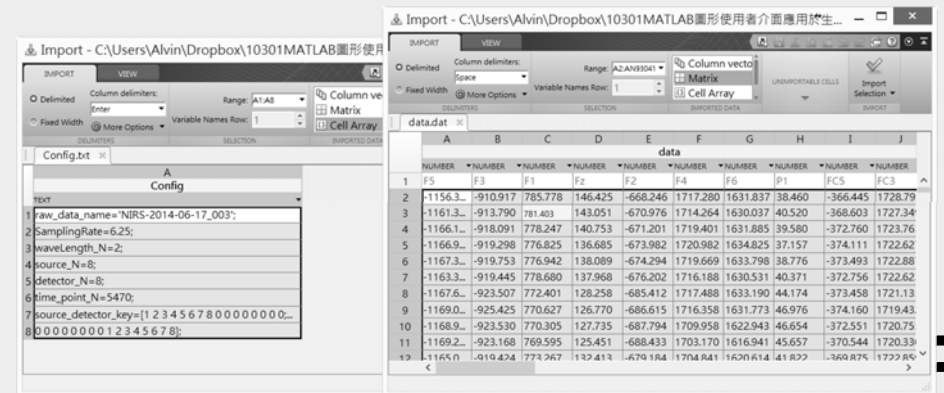


請試著開啟materials_L7\ASCII_mix\data.dat
請試著開啟materials_L7\ASCII_mix\Config.txt

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ASCII format

- Drag-and-drop file into MATALB workspace



ASCII format

- Values are NOT stored as a "Matrix"
- → Cannot use load to import data

- data=importdata(fullpath);
- data=importdata('.\ASCII_mix\data.dat');
- data=importdata('.\ASCII_mix\Config.txt');

```
Command Window
>> load('.\ASCII_mix\data.dat')
Error using load
Number of columns on line 2 of
ASCII file .\ASCII_mix\data.dat
must be the same as previous
lines.
```

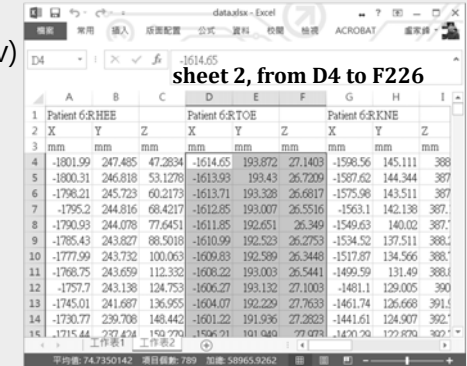
Input using fopen, fseek, fread, and fclose
<http://youtu.be/NMFgO4Embpa>

請開啟materials_L7\ASCII_mix\load_ASCII.m

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Excel or CSV

- Comma-Separated Values (*.csv)
- Excel files (*.xls or *.xlsx)
 - Save data in various sheets
- Use "Excel" to specify location...
 - Rows and Columns
 - Sheet



請試著開啟materials_L7\Excel\data.xlsx
 請試著開啟materials_L7\Excel\force.csv

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Excel or CSV

- Excel files (*.xls or *.xlsx)
 - allow data to be saved in various sheets
- Use xlsread to load an Excel file
 - [NUMERIC,TXT,RAW]=xlsread(fullpath,2);
 - data=xlsread(fullpath,2, 'D4:F266');
 - data=xlsread(fullpath,'工作表2','D4:F266');
- The Empty block will be assigned as a NaN.

請開啟materials_L7\Excel\load_excel.m

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Binary format <http://youtu.be/NMFgO4Embpa>

- Prior information of Data precision is required
- fid=fopen(full_filepath,'r');
- data=fread(fid,inf,'float32');
- data=reshape(data,channelNo,[]);
- fclose(fid);

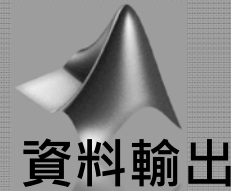
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Useful Functions - File Input

- `uigetfile` % 呼叫開啟檔案對話視窗選取檔案路徑
- `load` % 讀取ASCII 或 *.mat 檔案(MATLAB專用檔案格式)
- `importdata` % 使用自動輸入檔案功能
- `fopen` % 指派檔案ID(以正整數代表)給所選路徑檔案
- `fread` % 以特定precision讀取binary格式檔案
- `fscanf` % 讀取ASCII檔案內容
- `fseek` % 移動檔案游標位置
- `fclose` % 釋放檔案ID與所選路徑檔案
- `xlsread` % 讀取*.xls或 *.csv 等試算表或分隔符號檔案

Please help these functions in the command window

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Common Output Formats

- MATLAB data files (*.mat)
- Excel files (*.xls, *xlsx)
- Print Image files (*.jpg, *.tiff, *.bmp, *.pdf)
- ASCII text files (*.txt) <http://youtu.be/dJgk1x9pSxo>
- Self-defined binary formats (*.*)

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MATLAB Data Format

- Use `save` to create a *.mat file
- `save(filename)`
- `save(filename,variable1, variable2,...)`
- `save(filename,variable1, variable2,...,format)`
- The file created by `save` can be directly read by using `load`.

請開啟並執行materials_L7\MATsave.m

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Excel Files

- Use `xlswrite` to create an Excel file

Save a number array

- `xlswrite(fullpath,data,2,'B10');`

Save a cell array

- `xlswrite(fullpath,datacell,3,'A2');`

請開啟並執行materials_L7\Excelsave.m

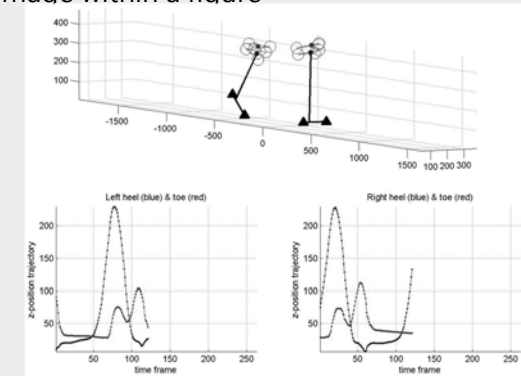
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Print Image Files

- Use `Print` to save the image within a figure

- JPEG – `'-djpeg'`
- BMP – `'-dbitmap'`
- TIFF – `'-dtiff'`
- PNG – `'-dpng'`

- PS (PDF) – `'-dpsc2'`



請開啟並執行materials_L7\ImagePrint.m

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File output常用函式列表

- `uiputfile` % 呼叫儲存檔案對話視窗選取檔案路徑
- `save` % 儲存 ASCII或*.mat 檔案(MATLAB專用檔案格式)
- `xlswrite` % 覆寫*.xls或 *.csv 等試算表或分隔符號檔案
- `fopen` % 指派檔案ID(以正整數代表)給所選路徑檔案
- `fseek` % 移動檔案游標位置
- `fwrite` % 以特定precision覆寫binary格式檔案
- `fprintf` % 覆寫ASCII檔案內容
- `fclose` % 釋放檔案ID與所選路徑檔案

Please help these functions in the command window

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THE END

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