

# 繪圖軟體應用 第11周(11/20)

## CH08 底稿與函數的撰寫

函數主體和說明文字區之間要有一個空白行當界線

---

```
function total = sum2(x,y)
```

```
% H1列
```

```
% 說
```

```
% 明
```

```
% 文
```

```
% 字
```

```
% 區
```

```
% 函數的主體
```

```
total = x + y;
```

```
end
```

---

查閱m檔案的內容：使用type

函數：**sum2**

---

```
function total = sum2(x,y)
```

```
% H1列
```

```
% 說
```

```
% 明
```

```
% 文
```

```
% 字
```

```
% 區
```

```
% 函數的主體
```

```
fprintf('nargin = %d, ',nargin)
```

```
fprintf('nargout = %d\n',nargout)
```

```
total = x + y;
```

```
end
```

---

```
clear;clc  
help sum2 % 查詢 m 檔案 sum2 的說明文字區
```

```
H1列  
說  
明  
文  
字  
區
```

```
type sum2 % 查詢 m 檔案 sum2 的內容
```

```
function total = sum2(x,y)  
% H1列  
% 說  
% 明  
% 文  
% 字  
% 區  
  
% 函數的主體  
fprintf('nargin = %d, ',nargin)  
fprintf('nargout = %d\n',nargout)  
total = x + y;  
end
```

```
t = sum2(4,5)
```

```
nargin = 2, nargout = 1  
t = 9
```

```
s = sum2([5:10],[3:2:13])
```

```
nargin = 2, nargout = 1  
s = 1×6  
    8    11    14    17    20    23
```

圓周長和圓面積

函數：**circle**

---

```
function [len,area] = circle(r)
```

```
%輸入半徑計算圓周長和圓面積
```

```
fprintf('nargin = %d, ',nargin)
```

```
fprintf('nargout = %d\n',nargout)
```

```
len = 2.*r.*pi; %圓周長
```

```
area = r.^2.*pi;%圓面積
```

end

---

help circle % 查詢 m 檔案 circle 的說明文字區

輸入半徑計算圓周長和圓面積

type circle % 查詢 m 檔案 circle 的內容

```
function [len,area] = circle(r)
%輸入半徑計算圓周長和圓面積

fprintf('nargin = %d, ',nargin)
fprintf('nargout = %d\n',nargout)
len = 2.*r.*pi; %圓周長
area = r.^2.*pi;%圓面積
end
```

[clen,carea] = circle(10) %半徑為10的圓周長和圓面積

```
nargin = 1, nargout = 2
clen = 62.8319
carea = 314.1593
```

[clen2,carea2] = circle([20,30]) %半徑為10的圓周長和圓面積

```
nargin = 1, nargout = 2
clen2 = 1×2
    125.6637    188.4956
carea2 = 1×2
    103 ×
    1.2566    2.8274
```

## 引數的個數

- nargin : number of argument input
- nargout : number of argument output

---

```
function [x1,x2,x3] = W1101(a1,a2)
```

```
fprintf('nargin = %d, ',nargin)
```

```
fprintf('nargout = %d\n',nargout)
```

```
if nargin == 1
```

```
a2 = 0;
```

```
end
```

```
x1 = a1+a2;
```

```
x2 = a1-a2;
```

```
x3 = (a1+a2)/2;
```

```
end
```

```
-----
```

```
-----
```

```
function W1102(a,b)
```

```
fprintf('nargin = %d, ',nargin)
```

```
fprintf('nargout = %d\n',nargout)
```

```
if nargin == 1
```

```
xx = 1:length(a);
```

```
plot(xx,a)
```

```
else
```

```
plot(a,b)
```

```
end
```

```
end
```

```
-----
```

```
clear;clc;clf
[x1,x2,x3] = W1101(3,5)
```

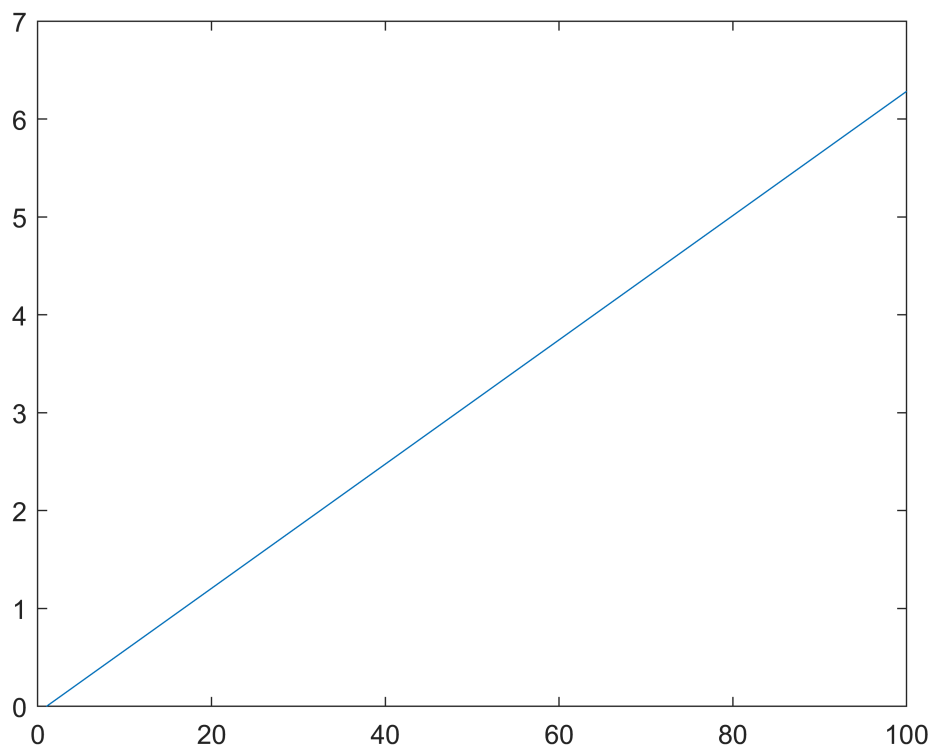
```
nargin = 2, nargout = 3
x1 = 8
x2 = -2
x3 = 4
```

```
[x1,x2,x3] = W1101(4)
```

```
nargin = 1, nargout = 3
x1 = 4
x2 = 4
x3 = 2
```

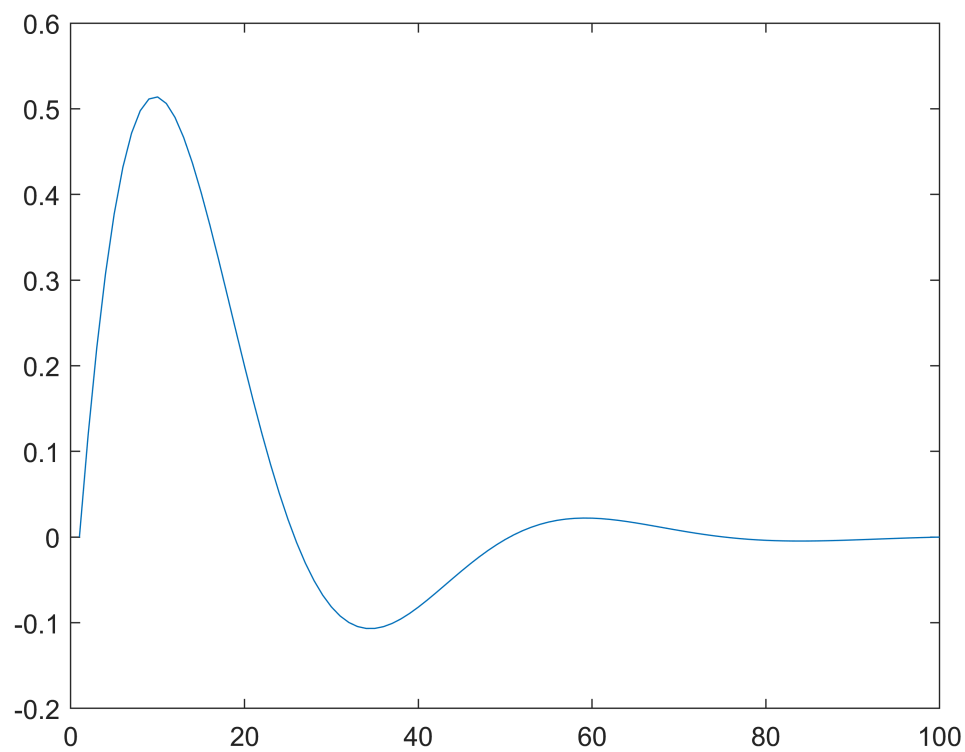
```
a = linspace(0,2*pi,100);
b = sin(2*a)./exp(a);
W1102(a)
```

```
nargin = 1, nargout = 0
```



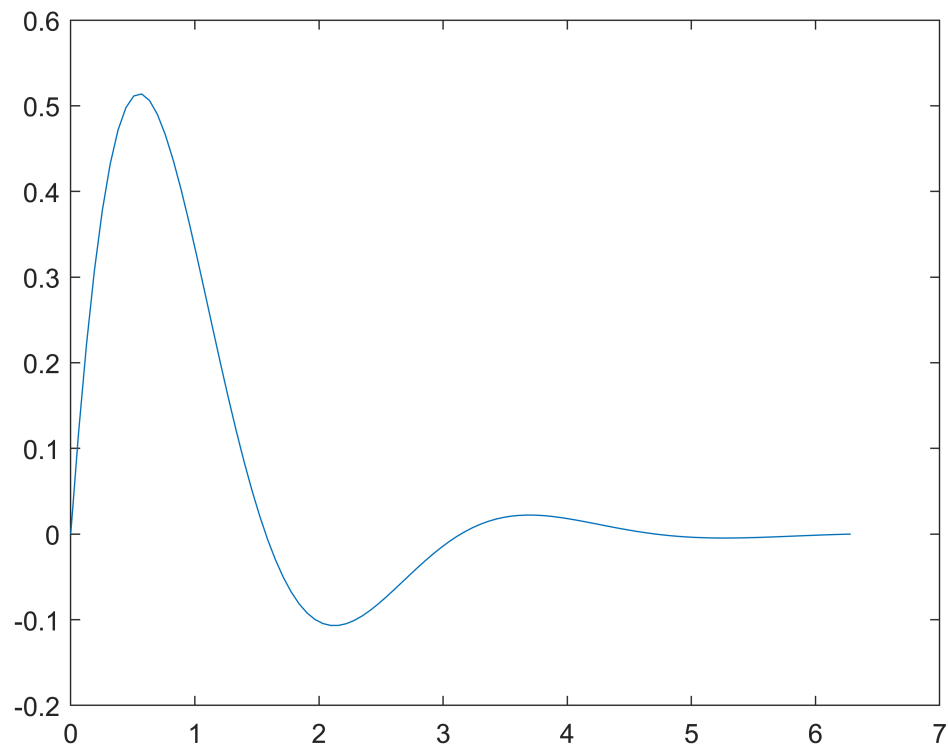
**w1102(b)**

nargin = 1, nargsout = 0



W1102(a,b)

nargin = 2, nargsout = 0



## 宣告全域變數

```
function W1103(num)
```

```
global VAR;
```

```
VAR = VAR+num;
```

```
fprintf('在函數內，VAR = %d\n',VAR);
```

```
end
```

```
global VAR
VAR = 10;
W1103(5)
```

在函數內，VAR = 15

```
W1103(5)
```

在函數內，VAR = 20

```
VAR
```

```
VAR = 20
```

## 子函數

一個M檔案最上方：主函數

其他函數：子函數

## 私有化目錄

- 不必設定路徑
- 不用把子函數撰寫在與主函數同一個M檔案內
- 

## 保護程式碼

打開後是亂碼，但還是可執行

```
pcode
```

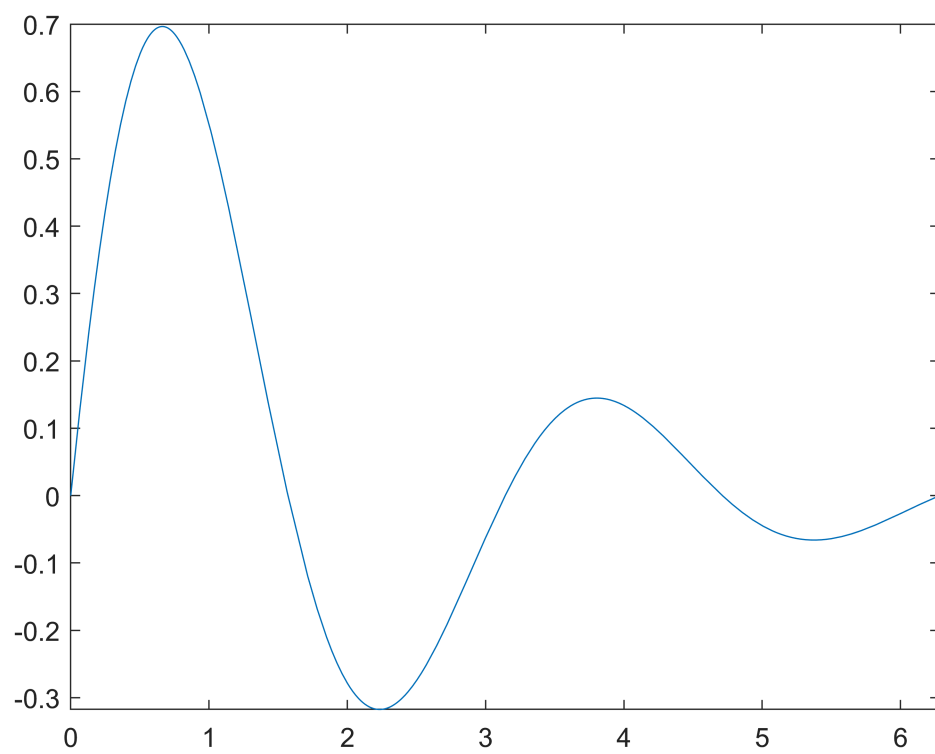
## 匿名函數

一個引數

```
f = @(x) sin(2*x).*exp(-x/2)
```

```
f = function_handle with value:  
@(x)sin(2*x).*exp(-x/2)
```

```
fplot(f,[0,2*pi])
```



兩個引數

```
g = @(x,y) x./(x.^2+y.^2+1);
```