

METODES NUMERICIS, ENG. QUIMICA, UPC
Parcial 2on quadrimestre 2009-10
Solucions

PROBLEMA 1

Executar des de linea de comandes:

```
f='cos(x)*exp(-x^2/3)';  
fp=diff(f,'x');  
fp525=double(subs(fp,'x',5.25))
```

PROBLEMA 2

Executar des de linea de comandes:

```
x=[0.1,0.2,0.3,0.5];  
y=[0.8,0.2,0.7,2];  
plot(x,y,'*');  
hold on  
p1=polyfit(x,y,1);  
y1=polyval(p1,x);  
plot(x,y1,'red');  
hold on  
p2=polyfit(x,y,2);  
y2=polyval(p2,x);  
plot(x,y2,'green');  
p3=polyfit(x,y,3);  
y3=polyval(p3,x);  
plot(x,y3,'black');  
hold off
```

PROBLEMA 3

La funcio splinecos.m ha de ser:

```
function M=splinecos(t,y)  
  
n=length(t);  
  
% les taules de valors de sin, cos es calculen mes rapidament en vectors  
cost=cos(t);  
cos2t=cos(2*t);  
sint=sin(t);  
sin2t=sin(2*t);  
  
M=[];  
deriv0=1;  
  
for i=1:n-1,  
    Matr=[1,cost(i),cos2t(i);1,cost(i+1),cos2t(i+1);0,-sint(i),-2*sin2t(i)];  
    Ind=[y(i);y(i+1);deriv0];  
    ABC=Matr\Ind; % ABC es [A;B;C]. Aquest sistema pot ser incompatible.  
    M=[M,ABC];  
    deriv0=-ABC(2)*sint(i+1)-2*ABC(3)*sin2t(i+1);  
end;
```

PROBLEMA 4

(i) La funcio fun.m ha de ser

```
function V=fun(t)
global A B C
V=A+B*cos(t)+C*cos(2*t);
```

(ii) Des de linea de comandes s'ha d'executar

```
global A B C
A=1;B=-2;C=3;
```

```
[tzero1,Vval1]=fzero(@fun,1)
```

```
[tzero2,Vval2]=fzero(@fun,2)
```

(iii) mantenint els valors de A,B,C, des de linea de comandes executar

```
[tmin,Vmin]=fminbnd(@fun,0,pi/2)
```