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//TP effectué par Joris CASTIGLIONE  
// L3 Magistère
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```
//Exo 1
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```
function[y]=simple(x)  
    y=x^2+1  
endfunction  
x=linspace(-5,5,41)  
//plot2d(x,simple(x),leg="y=x2+1")  
//plot2d(x,x^2+1,leg="y=x2+1")
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//Exo 2
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```
function[N]=permutation(M)  
    n=size(M)  
    N=zeros(n(1),n(2))  
    for j=1:n(2)-1  
        N(1:n(1),j)=M(1:n(1),j+1)  
    end  
    N(1:n(1),n(2))=M(1:n(1),1)  
endfunction  
M=[eye(5,5),-eye(5,5);-eye(5,5),eye(5,5)]  
N=permutation(M)  
//disp (N)  
function[N]=permutation2(M)  
    n=size(M)  
    N=[M(1:n(1),n(2)),M]  
    N(1:n(1),n(2)+1)=[]  
    N=N'  
endfunction  
N2=permutation2(M)  
//disp (N2)
```

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//Exo 3
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```
function[V]=vandermonde0(x)  
    m=length(x)  
    V=[x'*ones(1,m)].^[[0:m-1]']*ones(1,m)'  
endfunction  
function[V]=vandermonde1(x)  
    m=length(x)  
    V=zeros(m,m)  
    for i=1:m
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        V(i,1:m)=x.^(i-1)
    end
endfunction
function[V]=vandermonde2(x)
    m=length(x)
    V=zeros(m,m)
    for i=1:m
        for j=1:m
            V(i,j)=x(j)^(j-1)
        end
    end
endfunction
x=[2,3,4,7]
V=vandermonde0(x)
d=det(V)
Vi=V^(-1)
//disp(V)
//disp(d)
//disp(Vi)

```

//Exo4

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function[y]=blabla(x)
    m=length(x)
    y=zeros(1,m)
    for i=1:m
        if x(i)<0 then
            y(i)=x(i)
        else y(i)=0
        end
    end
endfunction
x=[2,4,-5,-3]
//disp(blabla(x))
function[y]=blabla2(x)
    m=length(x)
    y=zeros(1,m)
    y=(x-abs(x))/2
endfunction
//disp(blabla2(x))
X=linspace(-5,5,11)
//plot2d(X,blabla2(X))

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//Exo 5

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function[y]=truc(x)
    m=length(x)
    y=zeros(1,m)
    for i=1:m
        if x(i)<0 then
            y(i)=x(i)^3
        elseif x(i)>1 then
            y(i)=x(i)^4
        else y(i)=x(i)^2
        end
    end
endfunction
x=[2,0.5,0,-3]
//disp(truc(x))
X=linspace(-2,2,41)
//plot2d(X,truc(X))
function[y]=truc2(x)
    m=length(x)
    y=zeros(1,m)
    x0=(x-abs(x))/2
    xp=x-x0
    y=(x0.^3)+max(xp.^2,xp.^4)
endfunction
//disp(truc2(x))
//plot2d(X,truc2(X))

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//Exo 6
function[A]=rien(x)
m=length(x)
A=zeros(m,m)
A=diag(2+x)+diag(ones(m-1,1),1)+diag(ones(m-1,1),-1)
endfunction
x=[2,3,4,0,-2]
//disp(rien(x))

```

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//Exo 7
X=linspace(-%pi,%pi,25)
subplot(221)
plot2d(X,cos(X),style=-3,leg="cos(X)")
subplot(222)
plot2d(X,sin(X),style=-12,leg="sin(X)")
subplot(223)
plot2d(X,tan(X),style=3,rect=[-%pi,-2,%pi,2],leg="tan(X)")

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```
subplot(224)
plot2d(X,cos(X).^2,style=4,leg="cos(X)^2")
plot2d(X,sin(X).^2,style=25,leg="sin(X)^2")
```

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//Exo 8
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```
x= -%pi:0.1:%pi
for i=1:length(x)
    for j=1:length(x)
        z(i,j)=cos(x(i)+x(j))
    end
end
//plot3d(x,x,z,leg="z=cos(x+y)")
```

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//Exo 9
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```
clf
x= -%pi:0.1:%pi
for i=1:length(x)
    for j=1:length(x)
        Z(i,j)=cos(x(i)+x(j));
    end
end
surf(Z)
//sleep(1000)
clf
x= -2:0.2:2
for i=1:length(x)
    for j=1:length(x)
        Z(i,j)=exp(-(x(i)-1)^2+(x(j))^2)
    end
end
surf(Z)
```

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//Exo 10
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```
clf
X=linspace(0,1,21)
for i=1:10
    plot2d(X,X.^i),style=i,leg="X^"+string(i))
    sleep(750)
end
```