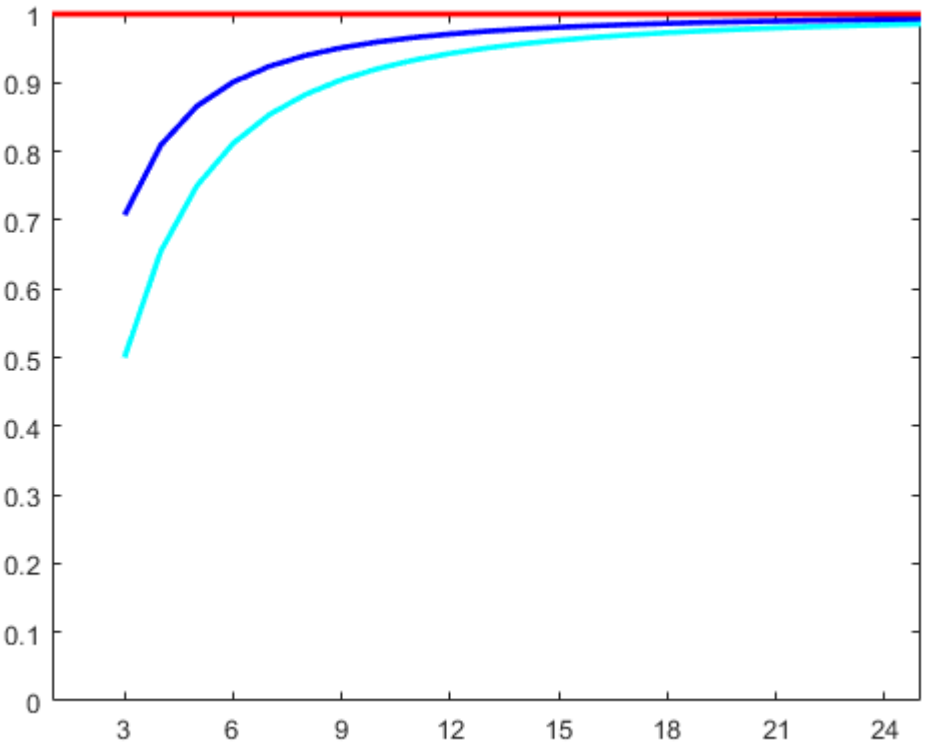
Examen Final QP1617 - Exercici 1 v2

by M. Àngela Grau Gotés

Contents

Gràfic dels radis espectrals de les matrius iteració

```
clear all, clc, format compact
%
rJ(1:2)=1;rG(1:2)=1;
for N=3:25
     [A,b] =matriu_v2(N);
    [rJ(N),rG(N)]=radis3(A);
end
plot(3:25,rJ(3:25),'-b',3:25,rG(3:25),'-c',1:25,ones([25,1]),'r','LineWidth',2),
axis([1,Inf,0,1])
set(gca,'XTick',3:3:25)
```



Solució aproximada N=20

```
[A,b] =matriu_v2(20);
D=diag(diag(A));
d=diag(1 ./diag(A));
L=tril(A,-1);
```

```
U=triu(A,1);
%%Mètode de Jacobi
Bj=-d*(A-D);
cj=d*b;
```

Iteracions del mètode

```
B=Bj; c=cj;
x=zeros(size(b));
for i=1:200
    x=B*x+c;
    r=norm(A*x-b,'inf');
    if r <=0.00005, break, end
end
ResJ=r, IterJ=i
```

```
ResJ =
   0.128067328253373
IterJ =
   200
```

Mètode de Gauss-Seidel

```
d=inv(L+D);
Bgs=-d*U;
cgs=d*b;
```

Iteracions del mètode

```
B=Bgs; c=cgs;
z=zeros(size(b));
for i=1:200
    z=B*z+c;
    r=norm(A*z-b,'inf');
    if r <=0.00005, break, end
end
ResGS=r, IterGS=i
sols=[x,z]
```

```
ResGS =
   0.013947793542393
IterGS =
   200
sols =
   7.143146022592523   7.898478480920053
  15.305429506368721  16.801467275879993
  22.505573088664349  24.711021161685117
  28.761429450157223  31.629003437190217
  34.089640361351002  37.557048786151057
  38.505191281044645  42.496532043360418
  42.021159519538003  46.448543426756331
  44.648337305085974  49.413870642060054
  46.395069870330374  51.392988104807742
  47.267002542077002  52.386053361097822
  47.267002542077002  52.392910626660033
  46.395069870330374  51.413101207513250
  44.648337305085974  49.445880417872019
  42.021159519538003  46.490240475169927
```

```
   38.505191281044645  42.544938730847285
   34.089640361351002  37.608530491268652
   28.761429450157223  31.679405597734345
   22.505573088664349  24.755827869505936
   15.305429506368721  16.835976470072350
    7.143146022592523   7.917988235036175
```

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Examen Final QP1617 - Exercici 2 v2

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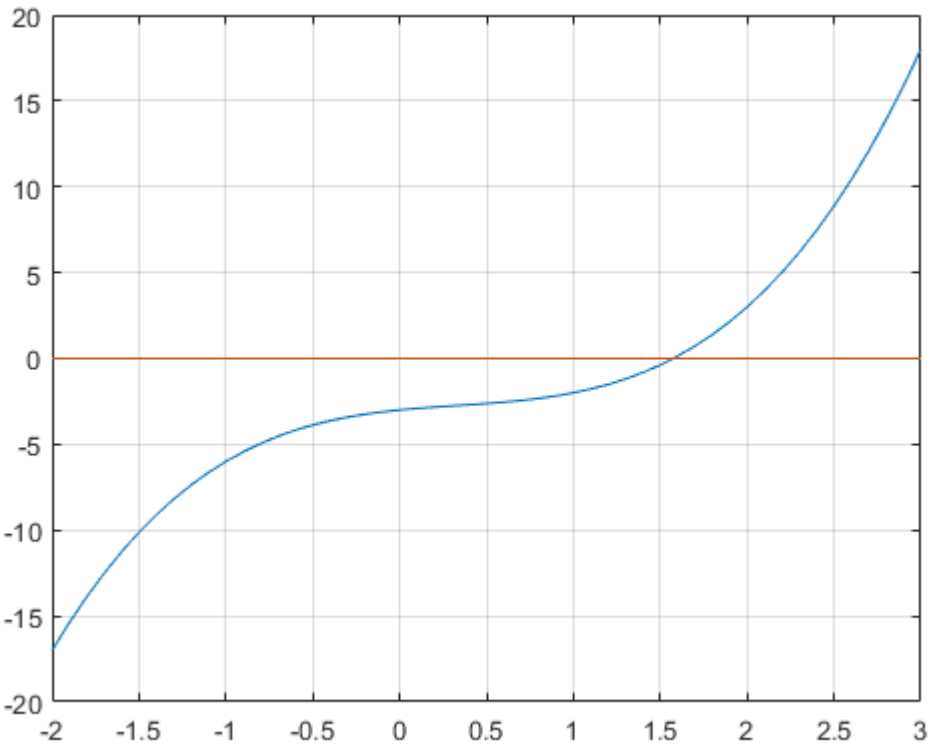
Contents

grafica

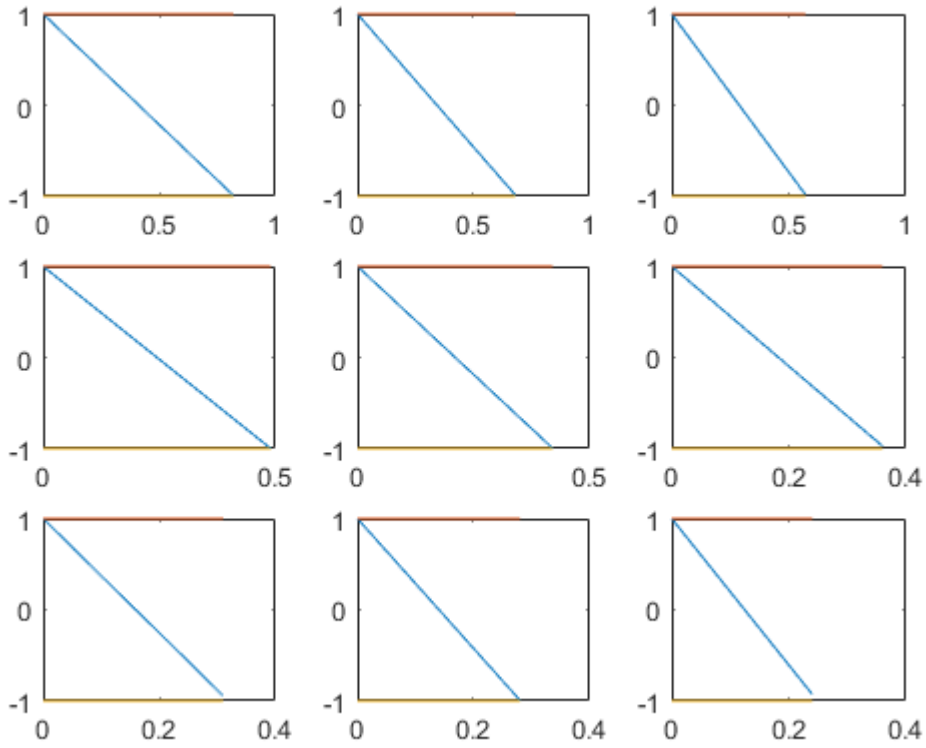
```
clear all, clc, format compact
%
x=-2:0.1:3;
f=@(z)z.^3-z.^2+z-3;
fp=@(x)(3*x.^2-2*x+1);
x0 = 1;  p = fzero(f,x0)
figure(1),plot(x,f(x),x,zeros(size(x))),grid
```

```
p =
   1.574743073887022
```



Estudi de convergència

```
for k=1:9
    x=1.+k*0.1;
    z=0:0.01:2/fp(x);
    gp=@(z)1 -z.*(3*x.^2-2.*x+1);
figure(2),subplot(3,3,k), plot(z,gp(z),z,ones(size(z)),z,-ones(size(z)))
end
```



Iteracions del mètode

```
l=1/7, %roots([3 -2, 1])
g=@(z)z-l*(z.^3-z.^2+z-3);
format long;
x=1.0; lmax=2/fp(x),tolx=1; tolf=1;
k=0; epsi=0.001;
taula(1,:)=[x,tolx,tolf];
while(tolx >epsi | tolf>epsi)
    y=g(x);
    tolx=abs(y-x);
    tolf=abs(f(y));
    x=y;
    k=k+1;
    taula(k,:)=[x,tolx,tolf];
end
disp('          x               tolx               tolf')
disp(taula)
error=abs(x-p)
```

```
l =
   0.142857142857143
lmax =
     1
          x                tolx                tolf
   1.285714285714286   0.285714285714286   1.241982507288630
   1.463140358184090   0.177426072469804   0.545378161176703
   1.541051524066476   0.077911165882386   0.174037782823072
   1.565914064469772   0.024862540403296   0.046415495680275
   1.572544849566954   0.006630785097182   0.011610535577350
   1.574203497506576   0.001658647939621   0.002853253937278
   1.574611105211901   0.000407607705325   0.000698044299731
error =
```

```
    1.319686751206639e-04
```

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Examen Final QP1617 - Exercici 3 v2

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Contents

mínims quadrats

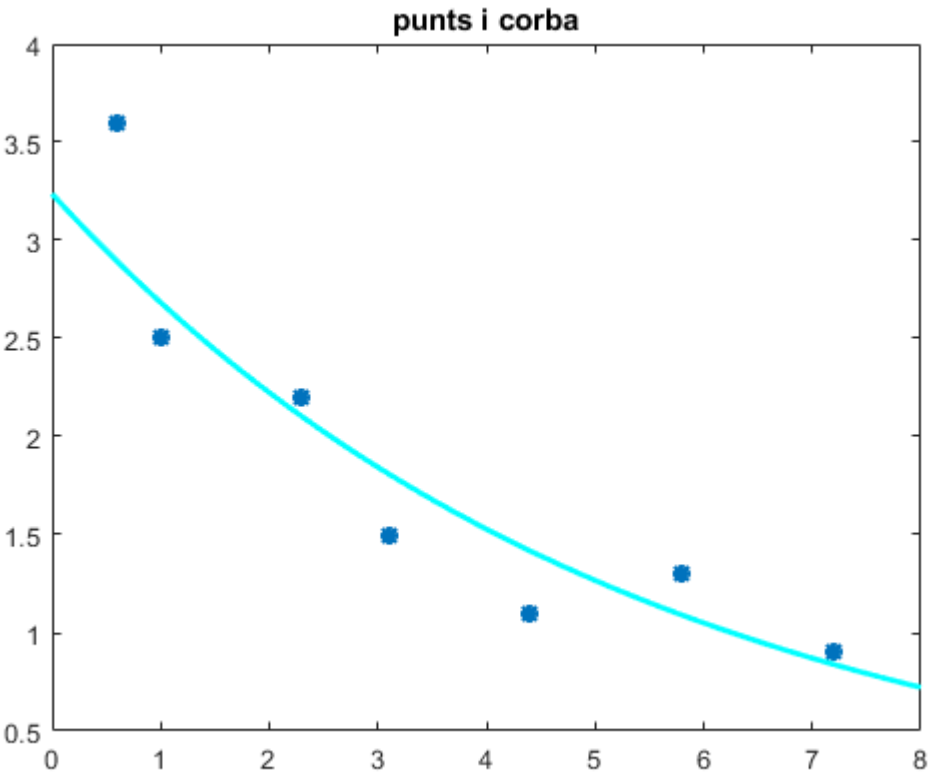
```
clear all, clc
X=[0.6 1.0 2.3 3.1 4.4 5.8 7.2];
Y=[3.6 2.5 2.2 1.5 1.1 1.3 0.9];
TAULA=[X;Y]'
```

```
TAULA =
   0.600000000000000   3.600000000000000
   1.000000000000000   2.500000000000000
   2.300000000000000   2.200000000000000
   3.100000000000000   1.500000000000000
   4.400000000000000   1.100000000000000
   5.800000000000000   1.300000000000000
   7.200000000000000   0.900000000000000
```

ajust per corba potencial

```
cr=polyfit(X,log(Y),1)
Z=0:0.1:8;
corba = exp(cr(2)).*exp(Z.*cr(1));
figure(2),plot(X,Y,'*',Z,corba,'cyan','LineWidth',2),title('punts i corba')
e=Y-(exp(cr(2)).*exp(X.*cr(1)));
residu_corba=norm(e)
```

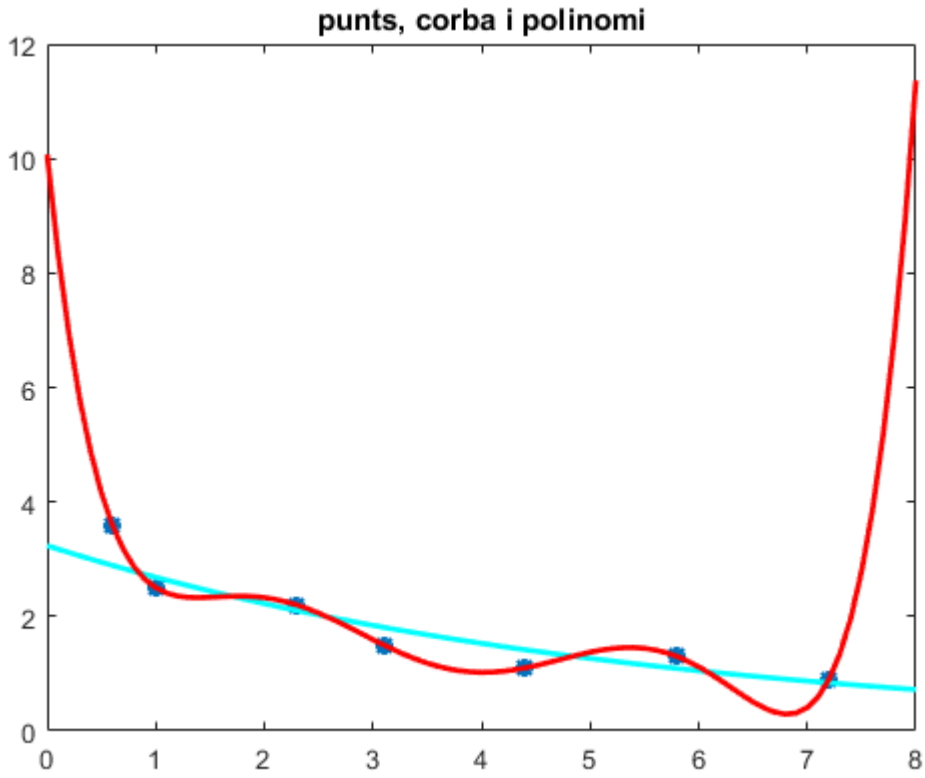
```
cr =
  -0.187589607148458   1.174378198406432
residu_corba =
   0.888240945170722
```



polinomi interpolador

```
disp('polinomi')
coef_pol=polyfit(X,Y,6)
ZZ=0:0.1:8;
pol=polyval(coef_pol,ZZ);
e = Y-polyval(coef_pol,X);residu_pol=norm(e)
figure(3),plot(X,Y,'*',Z,corba,'cyan',ZZ,pol,'r','LineWidth',2),title('punts, corba i polinomi')
```

```
polinomi
coef_pol =
  Columns 1 through 3
   0.008768429234765  -0.203592629008861   1.827952993729808
  Columns 4 through 6
  -7.994376842187513  17.670487904027560 -18.882922908171693
  Column 7
  10.073683052376149
residu_pol =
     1.168641897862965e-12
```



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