
```
clc
clear all
close all
warning off
load correlationdataset.mat
% part a
m=rank(X);
disp('part a: ')
disp(['rank is :',num2str(m)])
plot(X(:,1),X(:,m),'x')
xlabel('first column ')
ylabel('rank column ')
title('Plot with rank')
grid on
% part b
corr_=corr(X);
% find 1 correlation coefficients from first column
find_1=find(corr_(:,1)==1);
% find -1 correlation coefficients from first column
find_2=find(corr_(:,1)==-1);
figure
plot(X(:,1),X(:,find_1(2)),'r')
xlabel('first column ')
ylabel('Linear dependant with corr')
title('part b')
grid on
hold on
disp('part b:')
disp(['linear independent column with column 1
are :',num2str(find_1(2)),' and ', num2str(find_2)]])
plot(X(:,1),X(:,find_2),'b')
legend('corr = 1','corr = -1')
% rank function give the dimension of the vector space, so it is nor
% linear independent
% part c
[r,c]=size(corr_);
part_c=find(corr_>0.9 & corr_<1);
row=ceil(part_c(1)/r);
col=mod(part_c(1),r);
figure
plot(X(:,row),X(:,col),'x')
xlabel(['column ',num2str(row)])
ylabel(['column ',num2str(col)])
title('part c')
grid on
legend('corr = 0.9 to 0.99')
disp('part c:')
disp(['correlation coefficients greater than .9 and less than 1.0
bettwen columns :',num2str(row),' and ', num2str(col) ])
% from 0.9 to .99 function not behave like linear
% part d
part_d=find(corr_<0.01 & corr_>-0.01);
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figure
plot(X(:,1),X(:,part_d(1)),'x')
grid on
xlabel('column 1')
ylabel(['column ',num2str(part_d(1))])
title('part d')
legend('corr ~= 0')
disp('part d:')
disp(['correlation coefficients almost zero bettween
columns :',num2str(1),' and ', num2str(part_d(1)) ])
% data have no relation like linear and totally non linear relation
between
% col 1 and col 4. we have another column aslo with corr almost 4 but
i get
% it first one
% part e
part_e=find(corr_>0.4 & corr_<0.7);
row_e=ceil(part_e(1)/r);
figure
plot(X(:,row_e),X(:,c),'x')
grid on
xlabel(['column ',num2str(row_e)])
ylabel(['column ',num2str(c)])
title('part e')
legend('corr = 0.4 to 0.7')
disp('part e:')
disp(['correlation coefficients bettween 0.4 to 0.7
columns :',num2str(row_e),' and ', num2str(c) ])
% correlation coefficients bettween 0.4 to 0.7 data are like linear
with lot
% of range , not a full linear case
% part f
part_f=find(corr_<-0.4 & corr_> -0.7);
row_f=ceil(part_f(1)/r);
col_f=mod(part_f(1),r);
figure
plot(X(:,row_f),X(:,col_f),'x')
grid on
xlabel(['column ',num2str(row_f)])
ylabel(['column ',num2str(col_f)])
title('part f')
legend('corr = -0.4 to -0.7')
disp('part f: ')
disp(['correlation coefficients bettween -0.4 to -0.7
columns :',num2str(row_f),' and ', num2str(col_f) ])
% same result like part e but in opposite direction
% part g
corr_g_part=corr(Y);
% correlation coefficients is in both column and it means both column
have
% no relation
figure
plot(Y(:,1),Y(:,2))
grid on

```

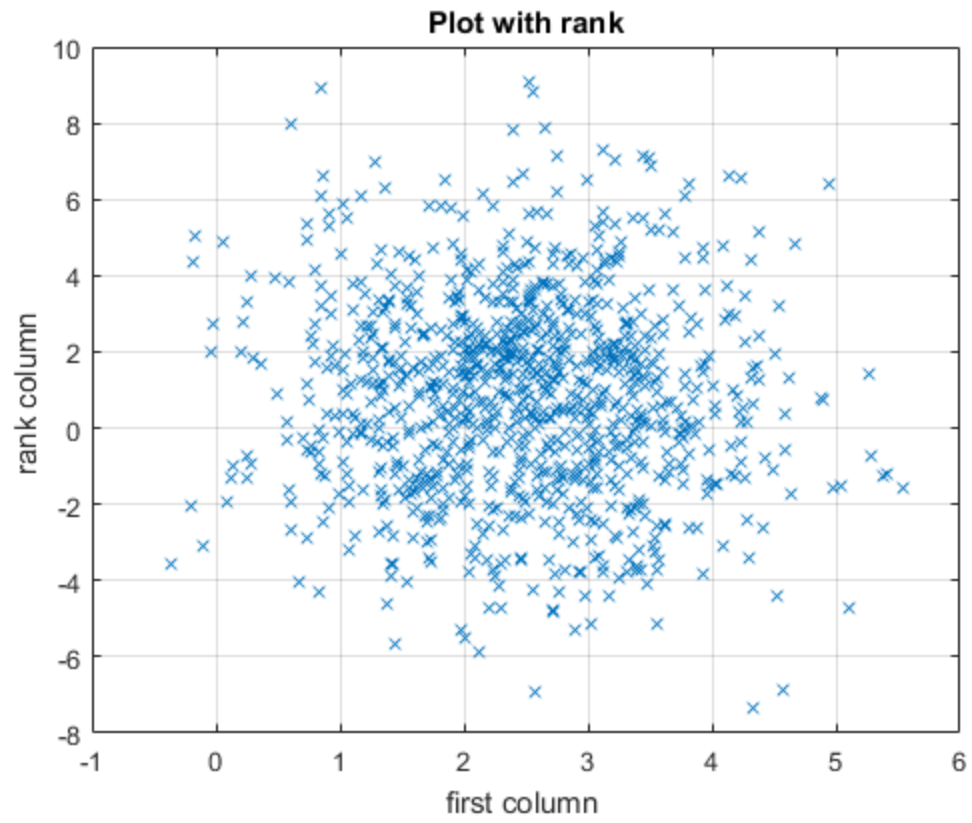
```

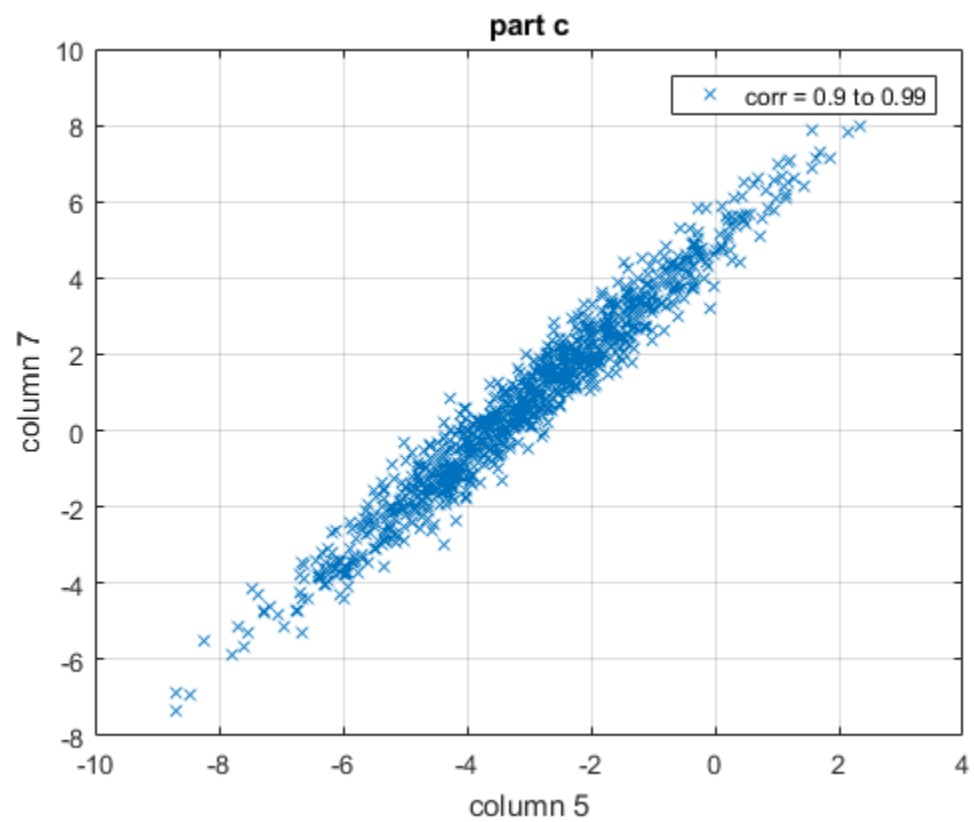
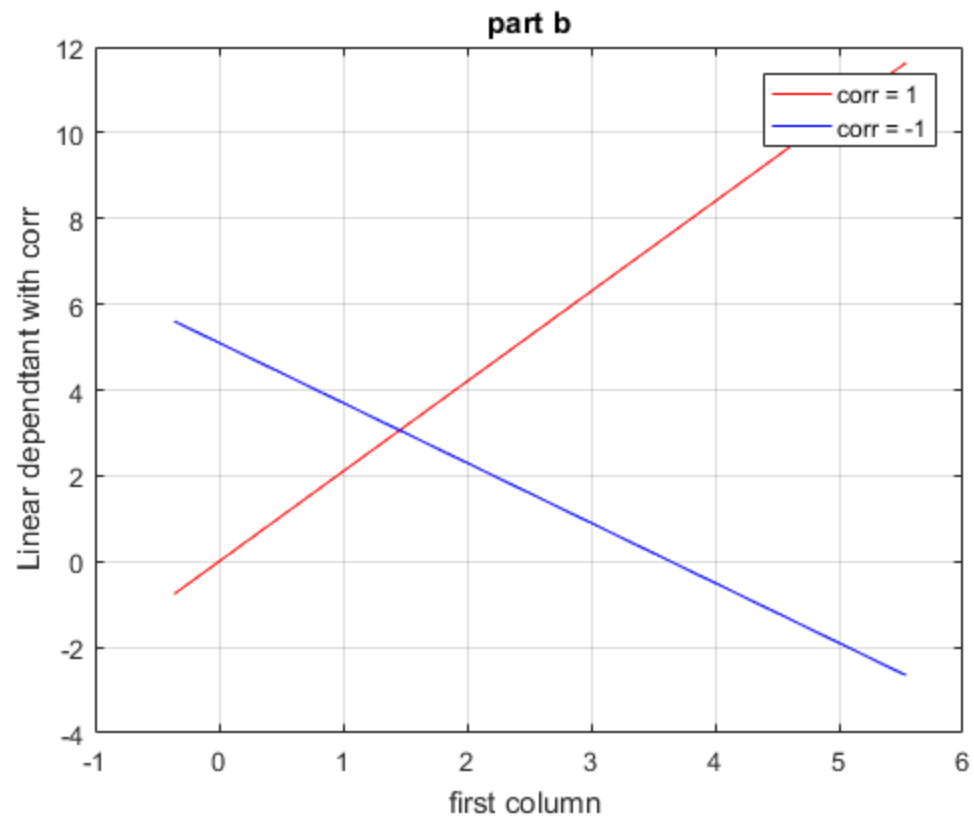
xlabel('Y column 1')
ylabel('Y column 2')
title('part g')
disp('part g:')
disp('correlation coefficients is 0 and it means both columns have no
relation')
% part h
corr_h_part=corr(Z);
% correlation coefficients is in both column and it means both column
have
% no relation
figure
plot(Z(:,1),Z(:,2))
grid on
xlabel('z column 1')
ylabel('z column 2')
title('part h')
disp('part h:')
disp('correlation coefficients is 0 and it means both columns have no
relation')
% remove last row
Z_update=Z(1:end-1,:);
corr_Z_Update=corr(Z_update);
% correlation coefficients is 1 and it means both columns have linear
relation
figure
plot(Z_update(:,1),Z_update(:,2))
xlabel('Update Z Col 1')
ylabel('Update Z Col 2')
title('Part h update Z')
grid on
disp('part h update Z:')
disp('correlation coefficients is 1 and it means both columns have
linear relation')

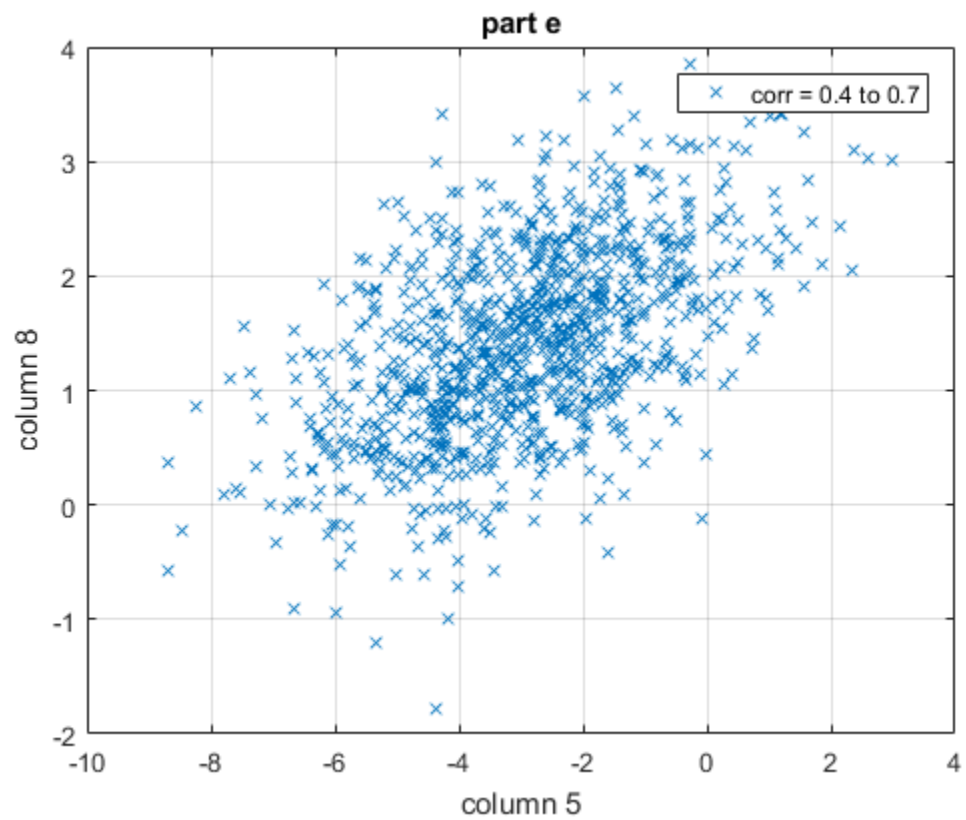
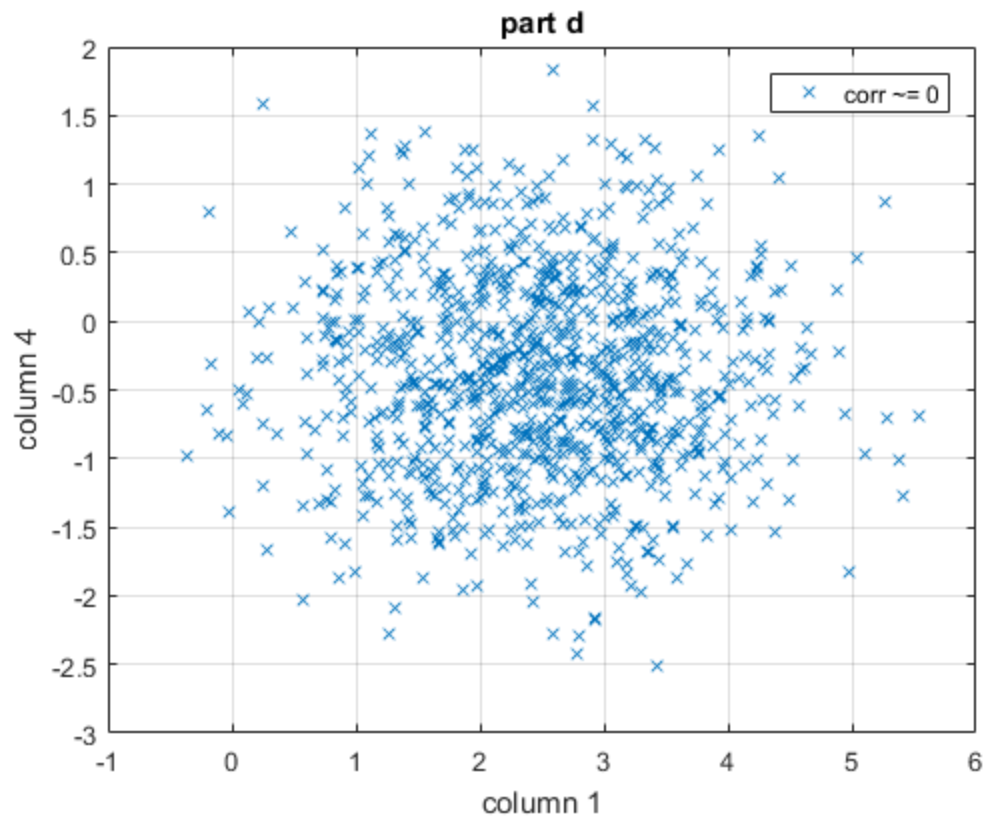
part a:
rank is :7
part b:
linear independent column with column 1 are :6 and 3
part c:
correlation coefficients greater than .9 and less than 1.0 bettween
columns :5 and 7
part d:
correlation coefficients almost zero bettween columns :1 and 4
part e:
correlation coefficients bettween 0.4 to 0.7 columns :5 and 8
part f:
correlation coefficients bettween -0.4 to -0.7 columns :2 and 5
part g:
correlation coefficients is 0 and it means both columns have no
relation
part h:
correlation coefficients is 0 and it means both columns have no
relation

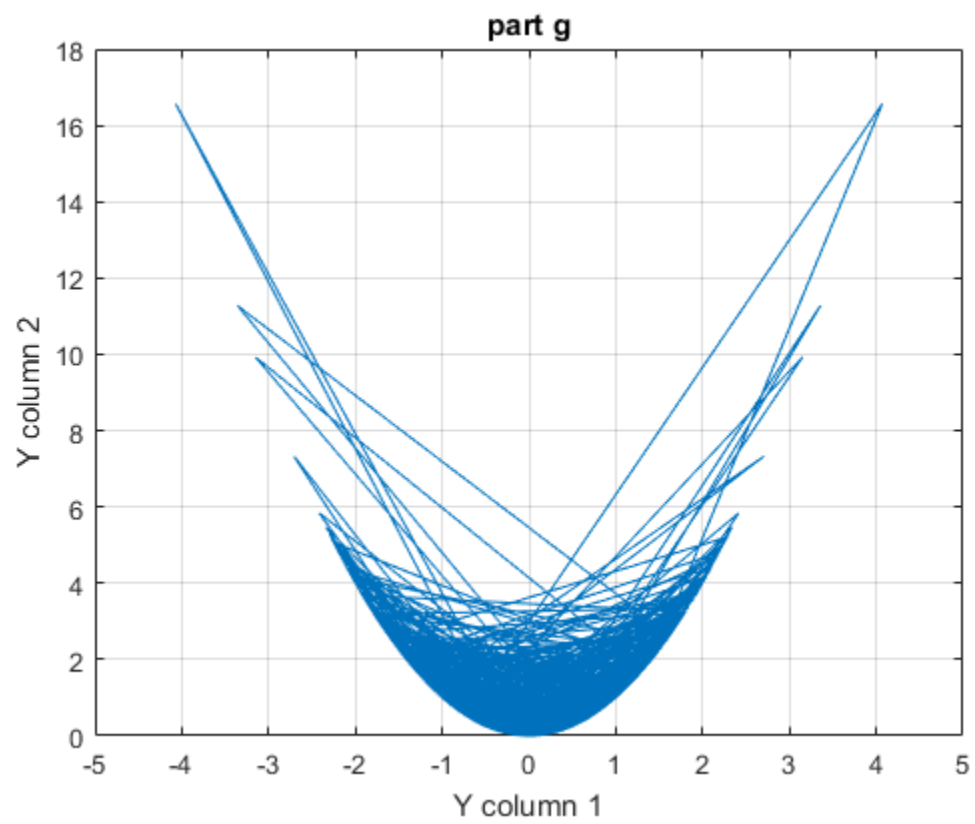
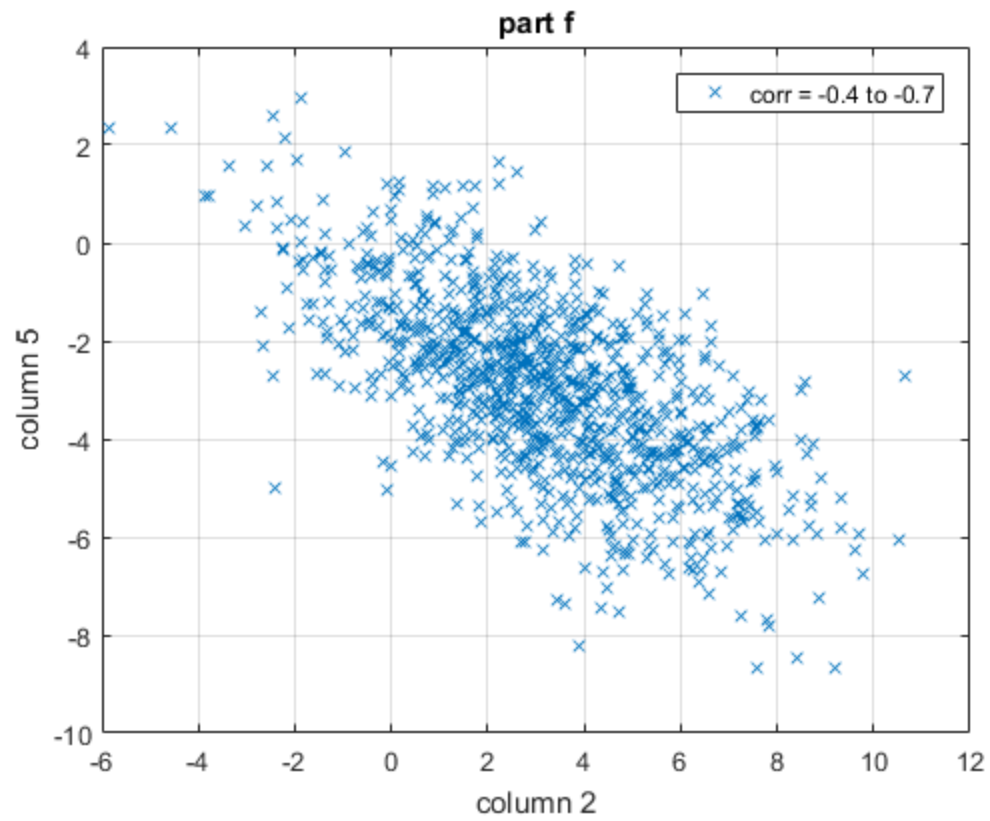
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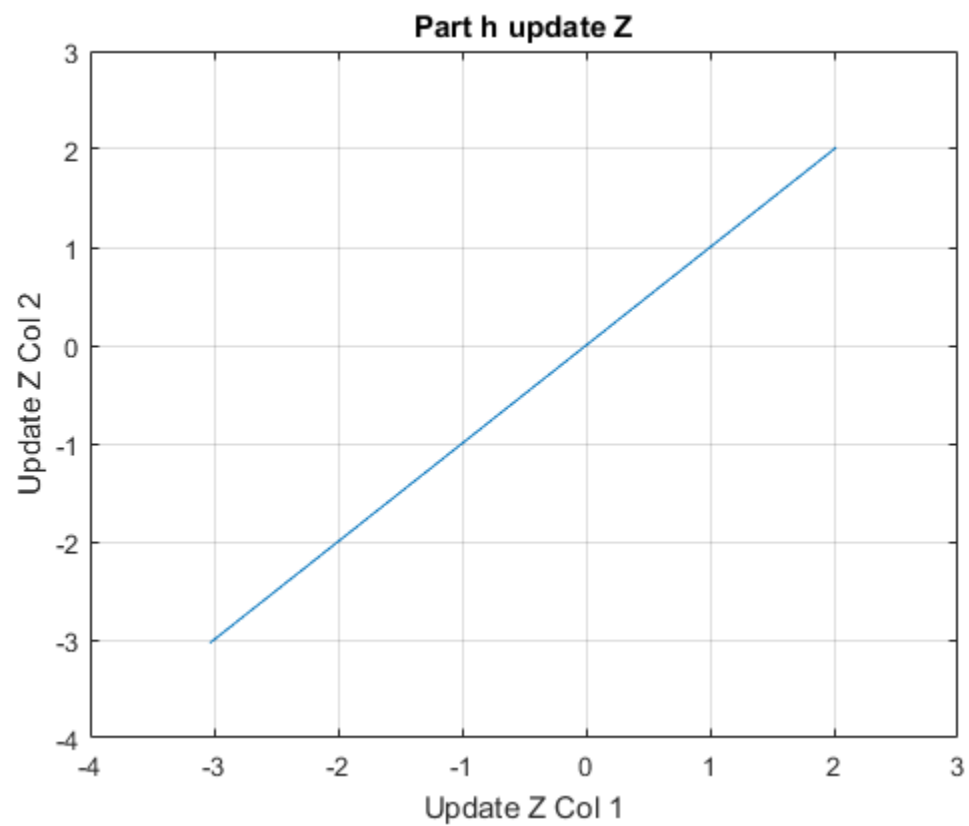
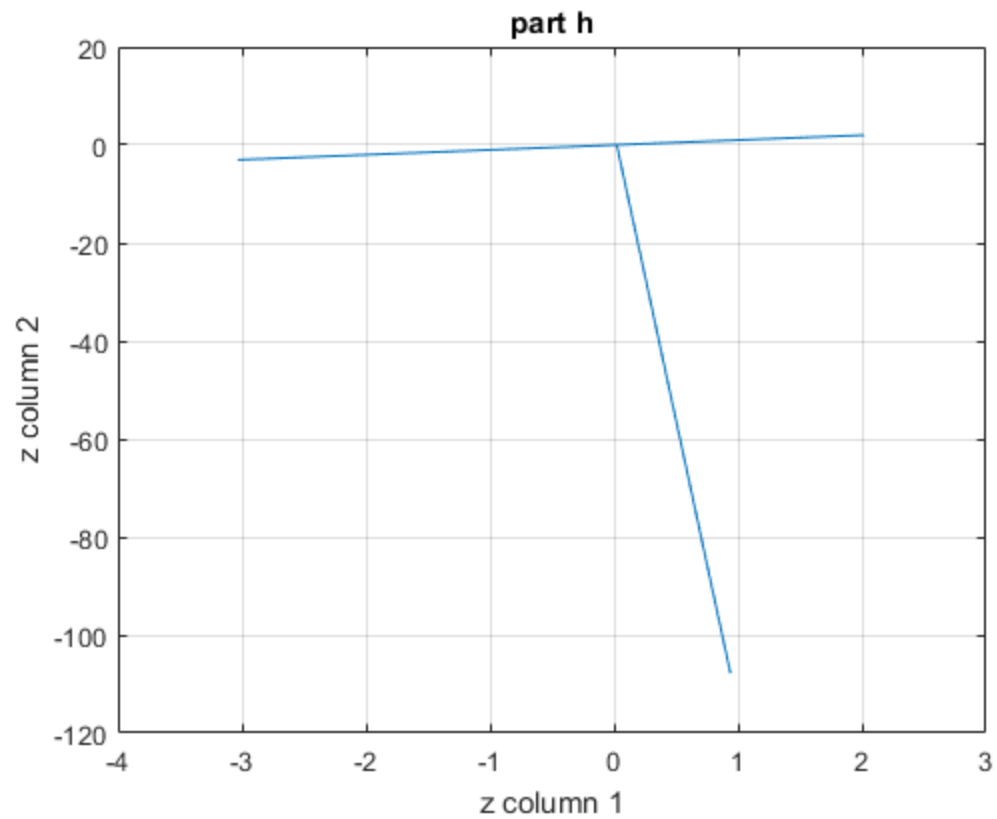
part h update Z :
correlation coefficients is 1 and it means both columns have linear
relation











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