Mini Project # 5 **Due: Nov. 05/2025**

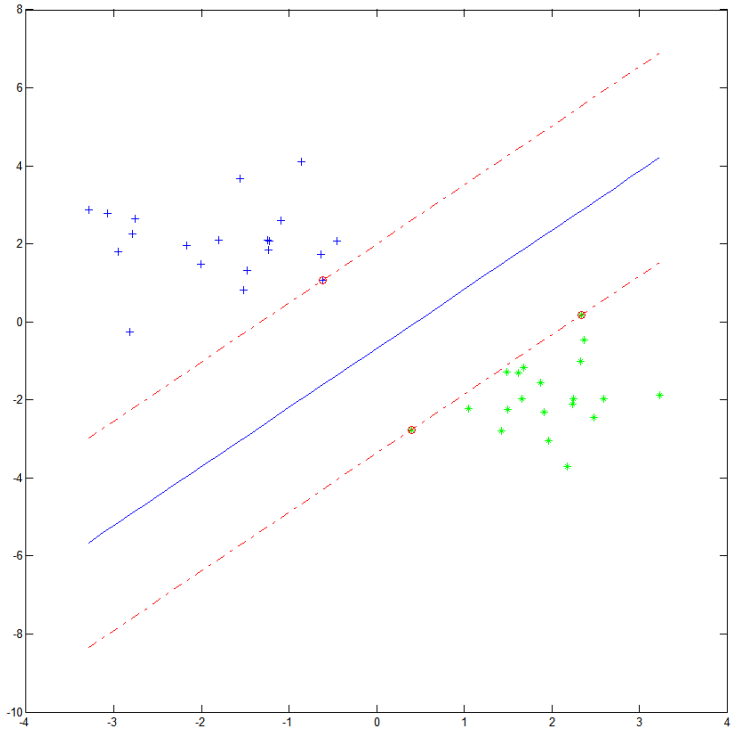
1. Implement a support vector machine to separate and classify the two linearly separable sets given in the data file SVM_data.mat available on Canvas.

Find and show the classifying line. How many support vectors do you have? Mark your support vectors.

Hint: You can use the following Matlab code to read the data file (you can use the same approach to read the file in Python or other programming languages):

```
clear all ;
load('SVM_data.mat','x','y') ;
[m, n] = size(x);
figure()
plot(x(1:m/2,1),x(1:m/2,2),'+');
hold on
plot(x((m/2)+1:m,1),x((m/2)+1:m,2),'rO');
pbaspect([1 1 1])
```

Solution:



2. Implement a kernel-based support vector machine to separate and classify the two non-linearly separable sets given in the data file SVM_data_nonlinear.mat available on Canvas.

Find and show the classifying line. How many support vectors do you have? Mark your support vectors.

Hint: You can use the following Matlab code to read the data file:

```
clear all ;
load('SVM_data_nonlinear.mat','x','y') ;
[m, n] = size(x);

figure()
plot(x(1:m/2,1),x(1:m/2,2),'+');
hold on
plot(x((m/2)+1:m,1),x((m/2)+1:m,2),'rO');
pbaspect([1 1 1])
```

Solution: