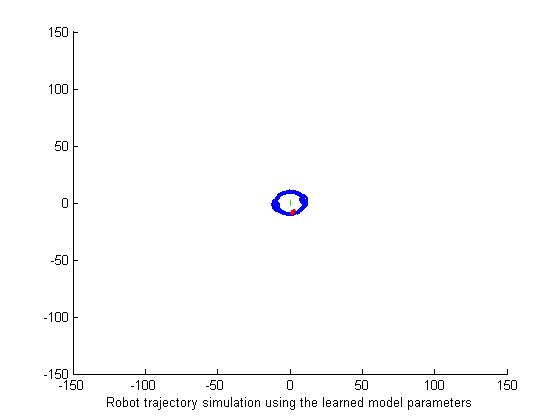
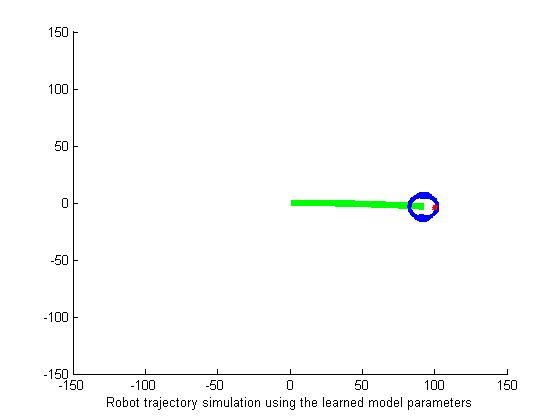
# Exercise 1

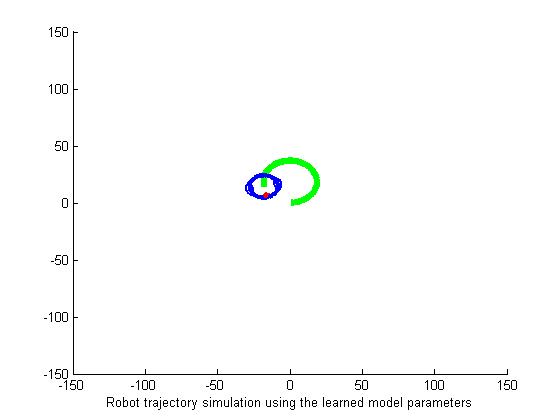
1. K = 2

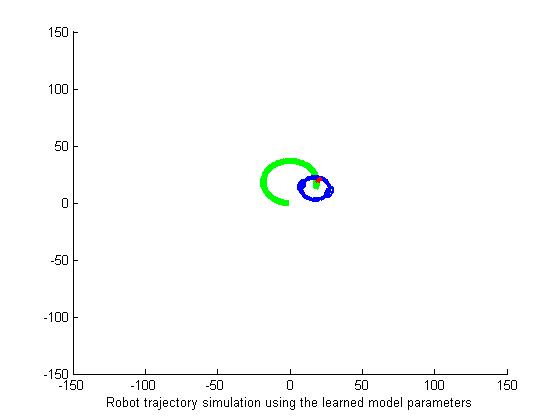
P1 = 5, P2 = 3

The resulting plots are as follows:





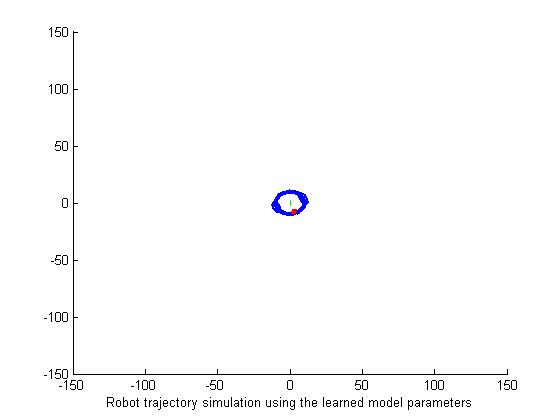


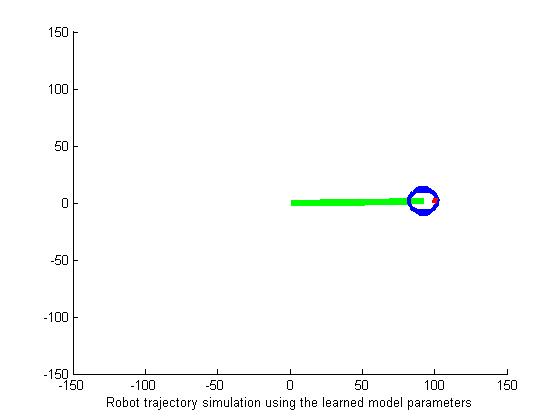


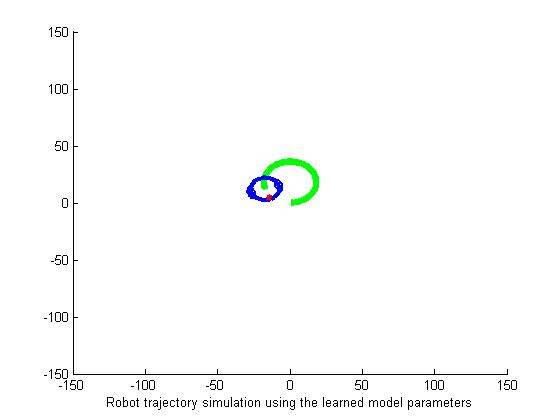
1. K = 5

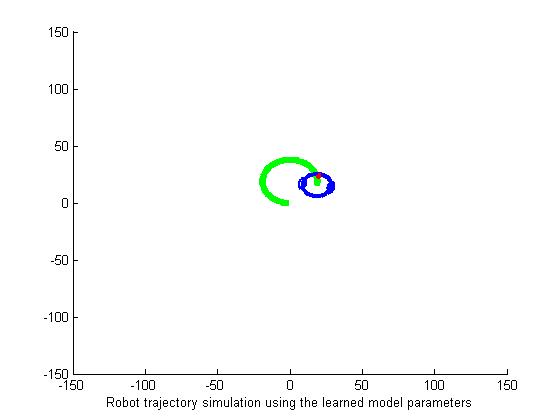
P1 = 4, P2 = 1

The resulting plots are as follows:





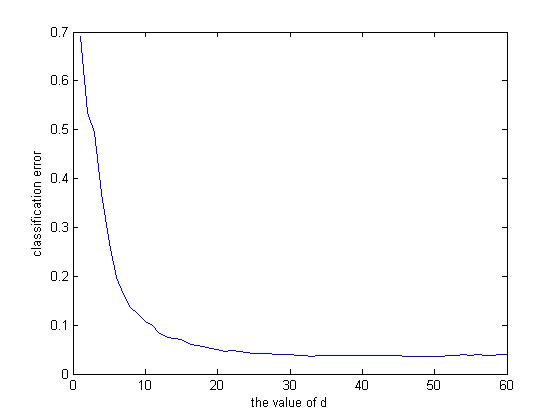




# Exercise 2

The optimal value of **d is 48**. The minimal **classification error is 0.0362**. The **confusion matrix** is as follows:

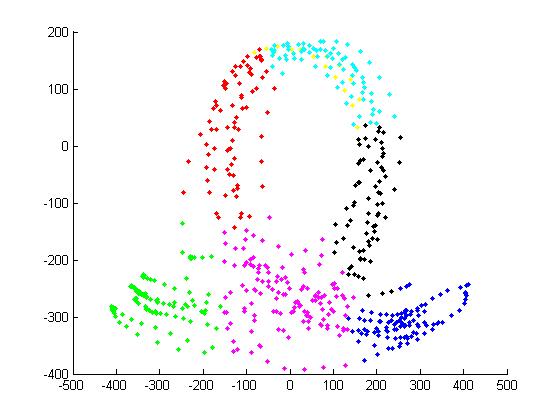
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 970 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 5 | 0 |
| 0 | 1098 | 11 | 1 | 2 | 1 | 1 | 0 | 21 | 0 |
| 3 | 0 | 1001 | 3 | 3 | 0 | 2 | 1 | 18 | 1 |
| 2 | 0 | 8 | 972 | 0 | 5 | 0 | 2 | 17 | 4 |
| 1 | 0 | 3 | 0 | 964 | 0 | 3 | 2 | 3 | 6 |
| 2 | 0 | 1 | 18 | 0 | 859 | 2 | 0 | 10 | 0 |
| 8 | 1 | 1 | 0 | 3 | 13 | 924 | 0 | 8 | 0 |
| 1 | 2 | 31 | 1 | 2 | 3 | 0 | 956 | 13 | 19 |
| 3 | 0 | 7 | 10 | 1 | 5 | 1 | 1 | 941 | 5 |
| 5 | 1 | 10 | 7 | 10 | 2 | 0 | 6 | 15 | 953 |



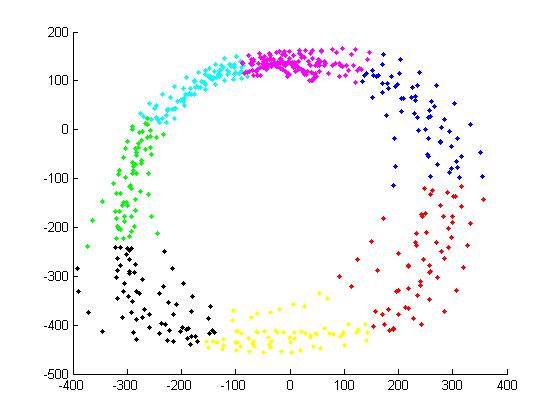
Classification errors

# Exercise 3

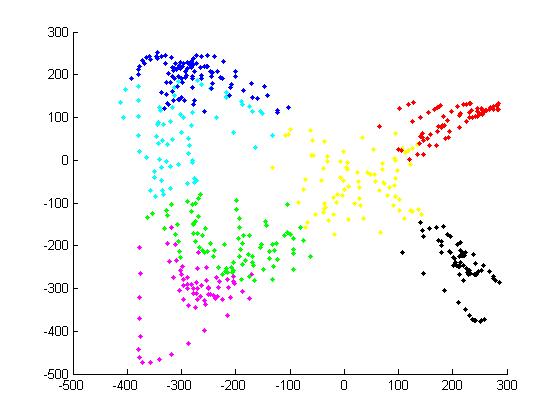
1. K-Means



Gesture\_l

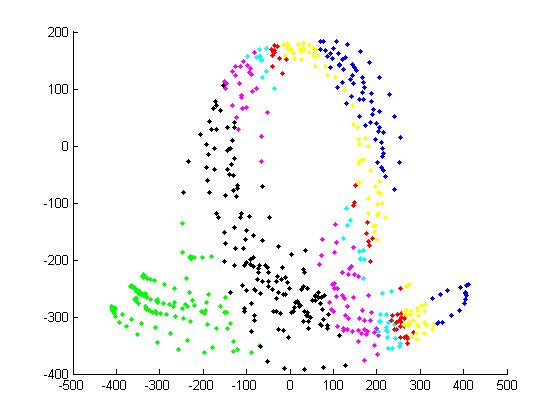


Gesture\_o

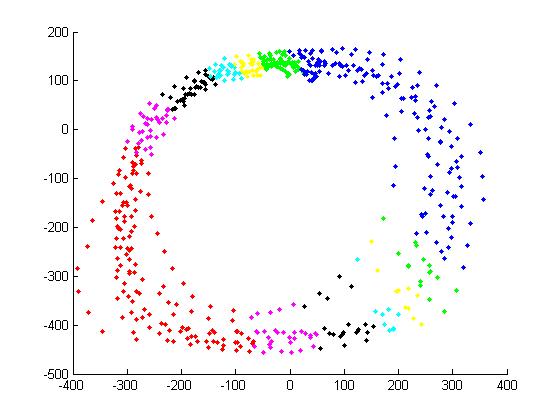


Gesture\_x

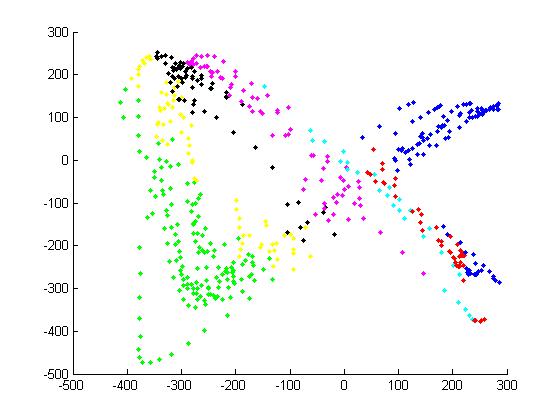
1. Nub



Gesture\_l



Gesture\_o



Gesture\_x