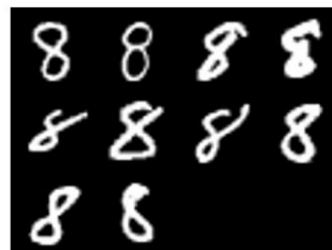
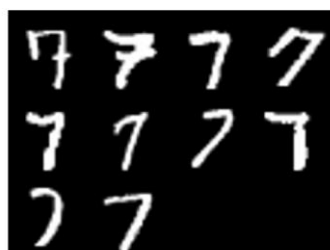
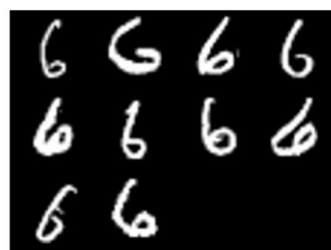
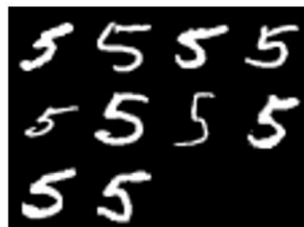
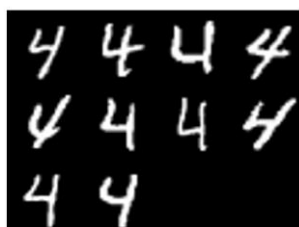
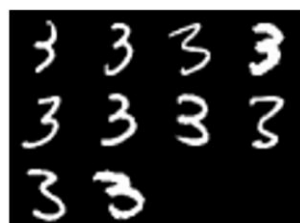
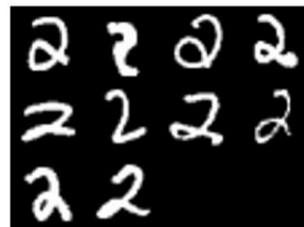
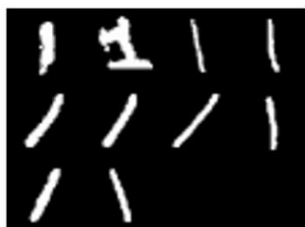
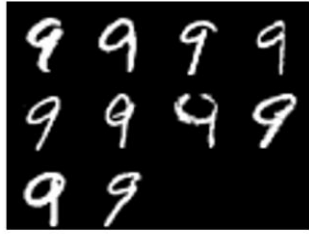
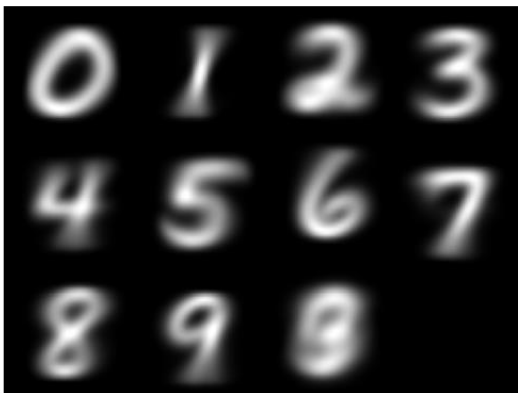


## Task 1.1

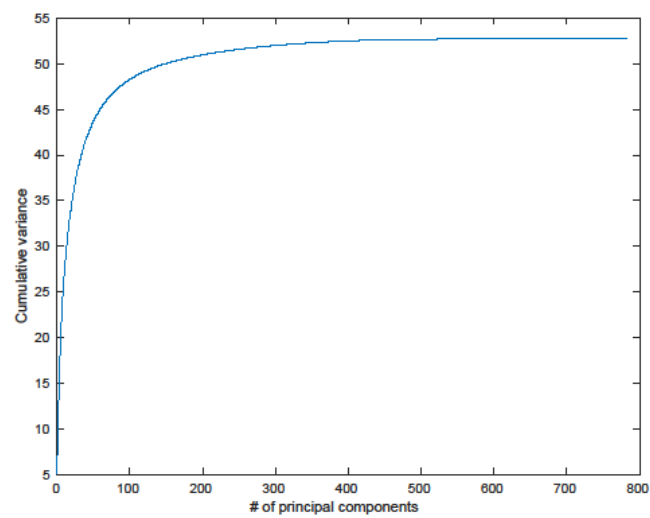




Task 1.2



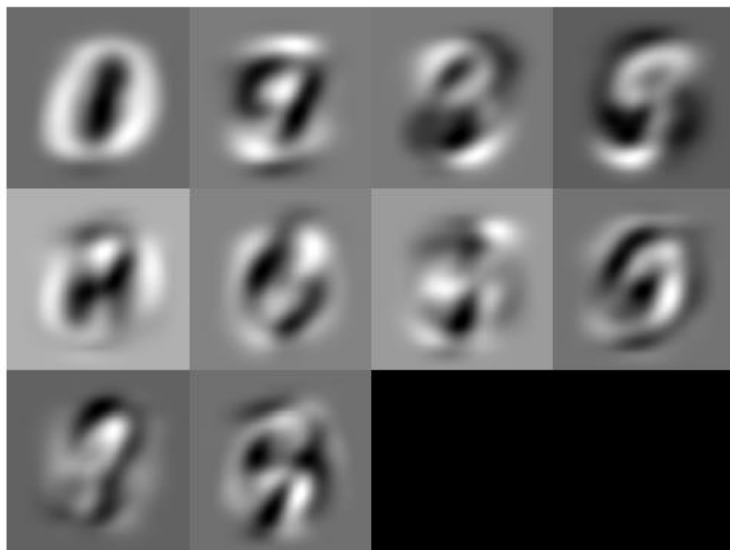
Task 1.3



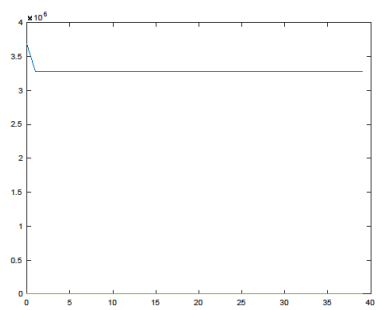
Minimum numbers of PCA dimensions to cover 70%, 80%, 90%, 95% of the total variance:

70%	26
80%	44
90%	87
95%	154

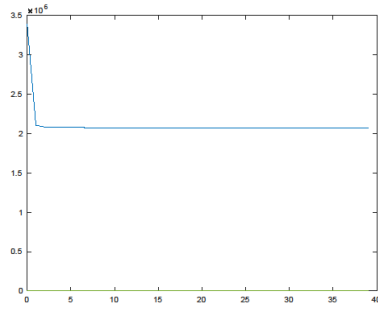
# Task 1.4



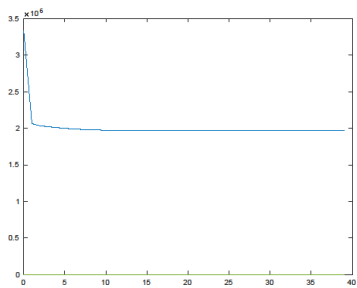
Task 1.5



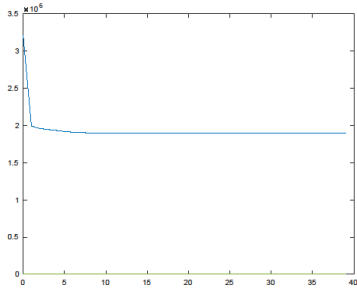
$k = 1$



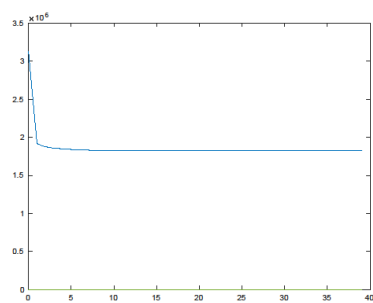
$k = 2$



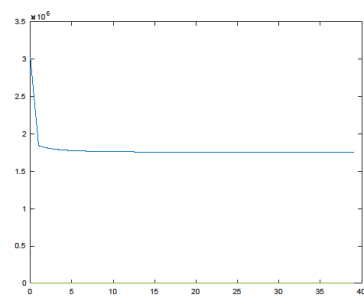
$k = 3$



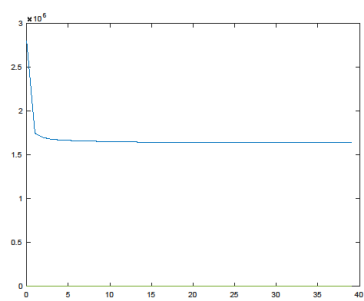
$k = 4$



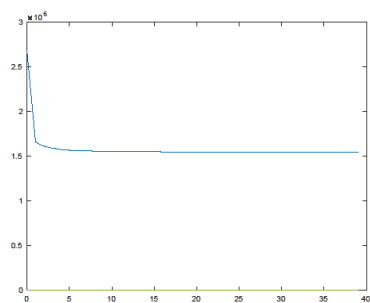
$k = 5$



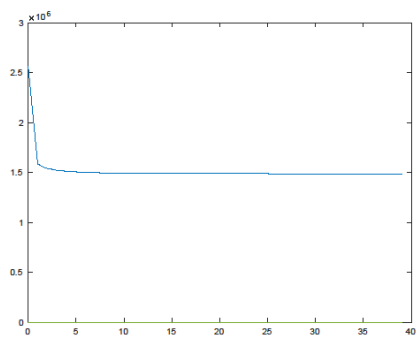
$k = 7$



$k = 10$



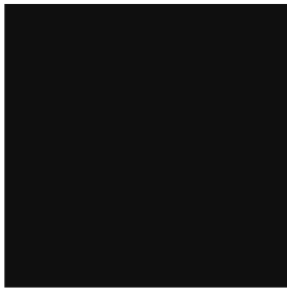
$k = 15$



$k = 20$

1	0.4063 seconds
2	7.9140 seconds
3	16.5779 seconds
4	23.7223 seconds
5	13.6603 seconds
7	54.3033 seconds
10	46.9965 seconds
15	180.9382 seconds
20	128.6670 seconds

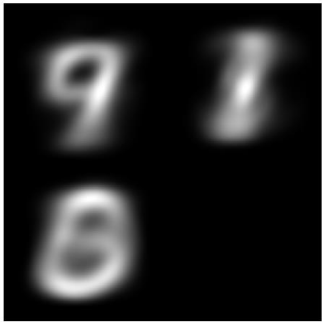
Task 1.6



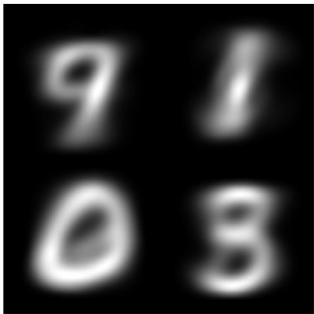
$k = 1$



$k = 2$

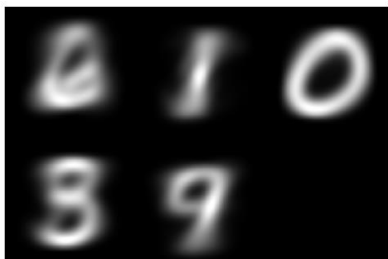


$k = 3$

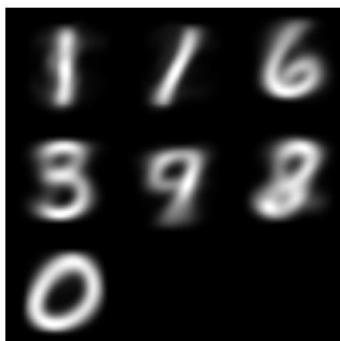


$k = 4$

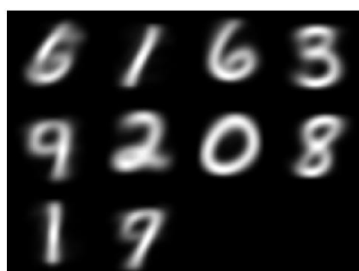




$k = 5$



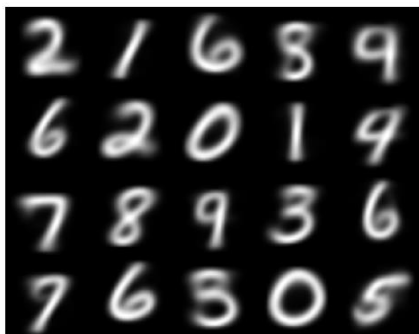
$k = 7$



$k = 10$

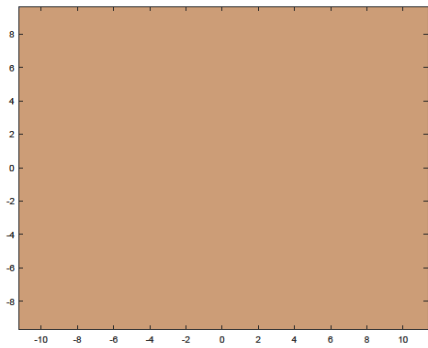


$k = 15$

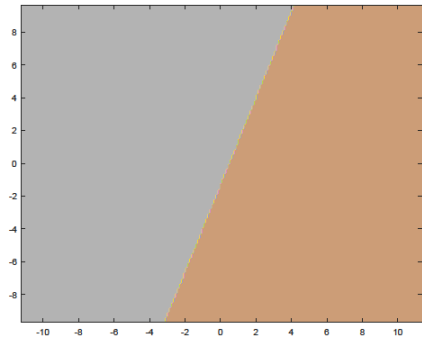


$k = 20$

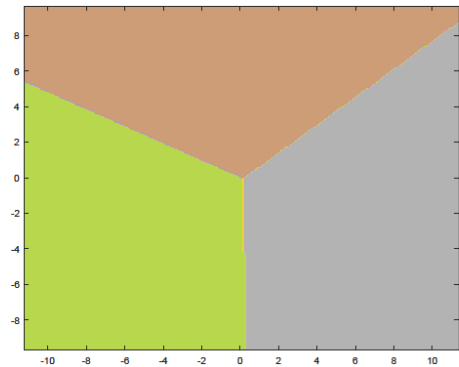
Task 1.7



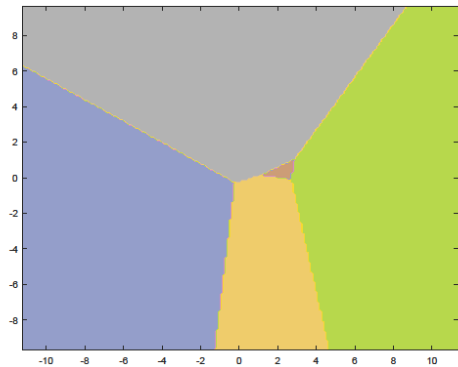
$k = 1$



$k = 2$



$k = 3$



$k = 5$



$k = 10$

