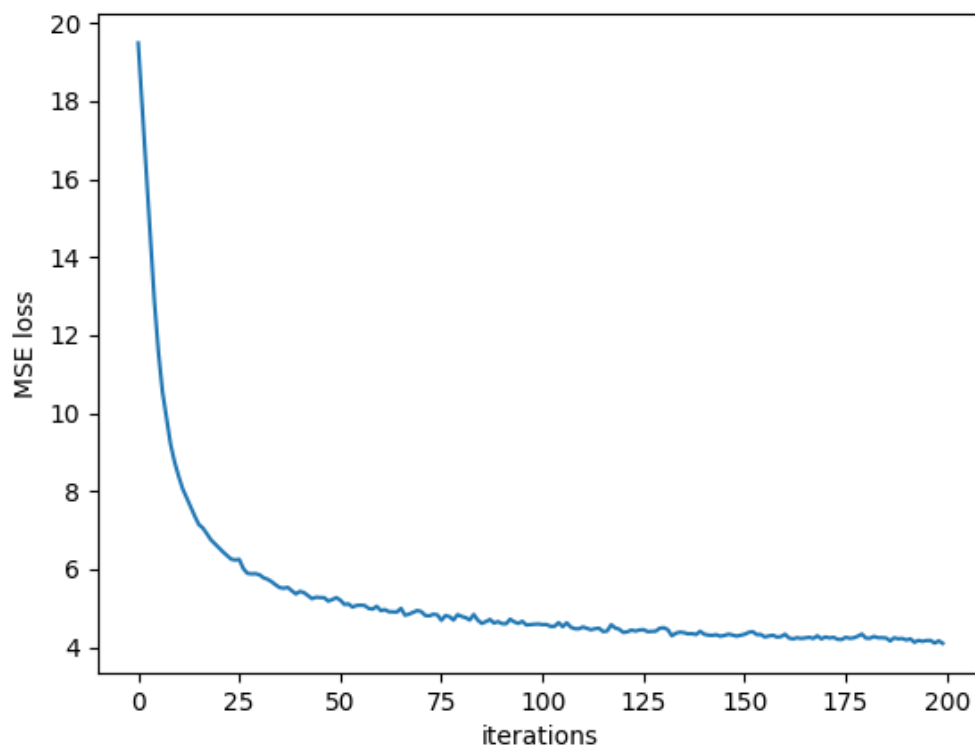


### Homework 3. Collaborative Filtering 2016312761 여혁수 report

In SGD function, I defined learning rate named 'alpha' to 0.1, and also defined regularization parameter named 'beta' to 0.01. In train function, rank size is needed which means the number of nonzero singular value. I defined this named as 'K'.

I train all the model for same time of iterations 200.

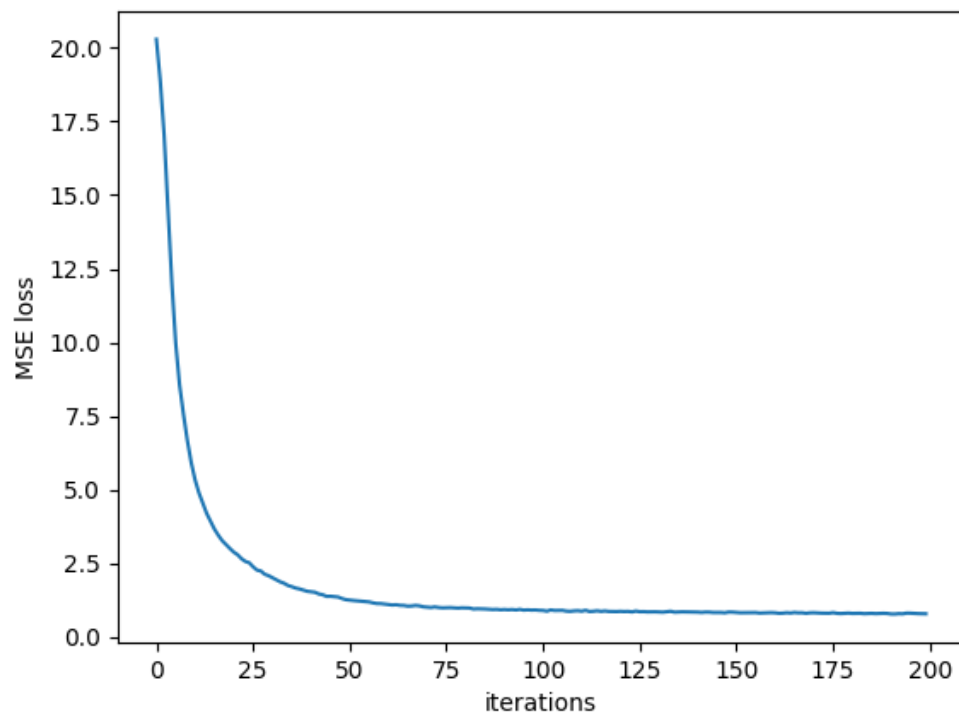
➤ Training data, rank size  $K = 5$



Converged after 200 iterations~

Final MSEs on test data = 5.2778

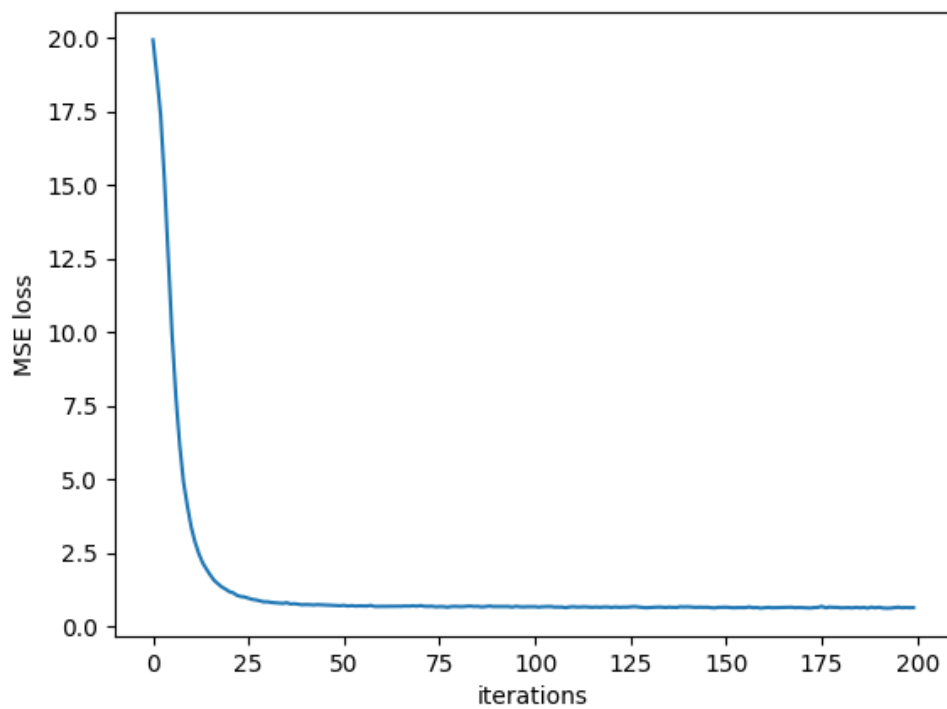
- Training data, rank size  $K = 10$



Converged after 80 iterations~

Final MSEs on test data = 4.3374

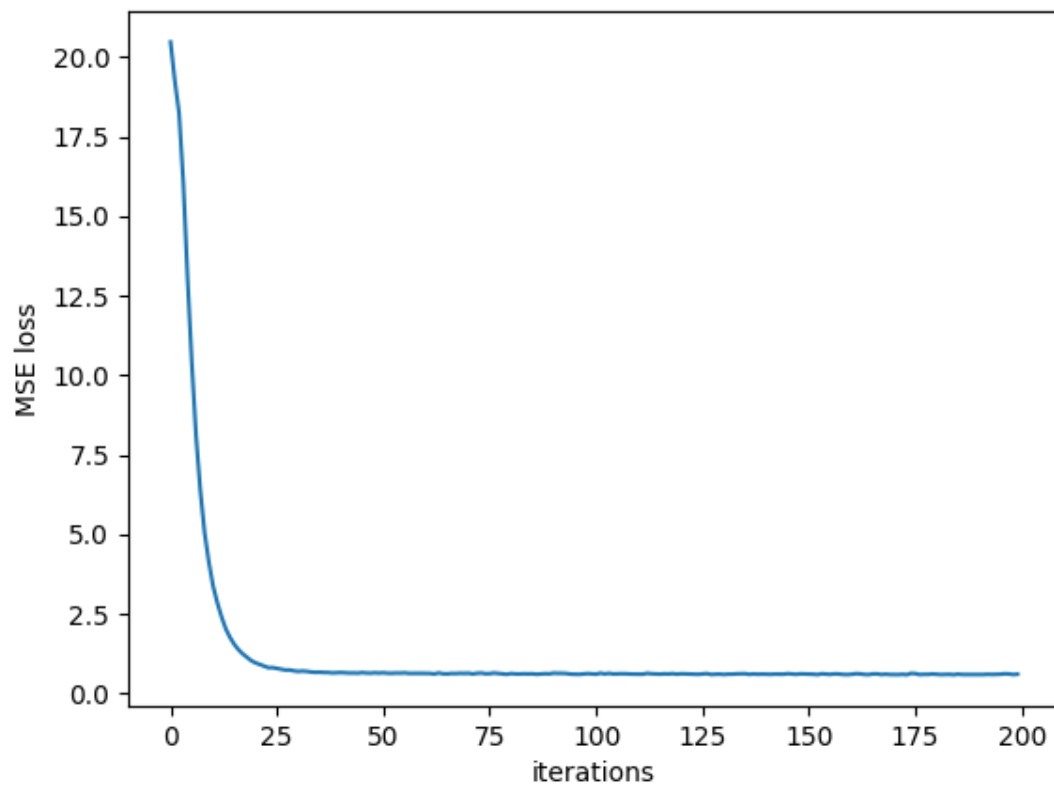
- Training data, rank size  $K = 15$



Converged after 50 iterations~

Final MSEs on test data = 4.0078

➤ Training data, rank size  $K = 20$



Converged after 30 iterations~

Final MSEs on test data = 3.3181