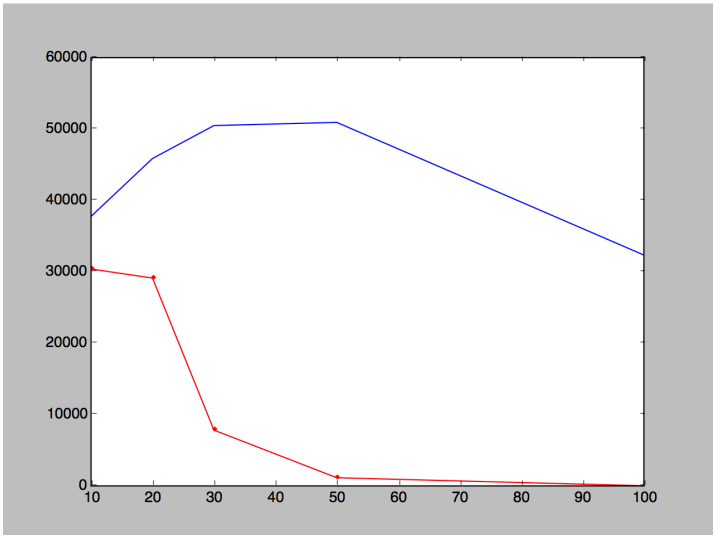
2. Matrix Regularization

(The redline represent the E_{in}, while the blueline represents the E_{out})

Question D:

Without regularization. As latent factor increase, the E_{in} continually decreases as the learning model better study the training set. While for E_{out} , it increases and then decreases after that.



Question E:

With regularization: compared with results in question D. the E_{out} becomes more insensitive to the change of latent factor k. I think this is due to the introduction of regularization which makes the learning process less relay on the specific training dataset.