Meeting 7

PLS-PM Prediction Revised

04/22/2015

Adjusting the prediction function

Originally the prediction function *normalized* the test data based on its own mean and standard deviation, however Prof. Galit proposed to use the training data's mean and standard deviation for this normalization, the same way as we use those statistics to *de-normalize* the predictions.

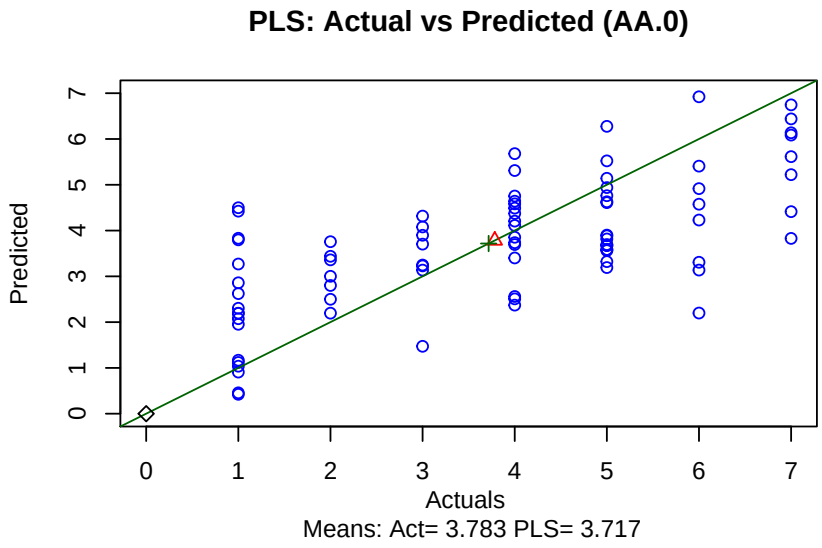
Because of these changes some of the main graphs we've seen before had to be done again, and this time we'll see them using the latest changes to the **graphUtils** Library.

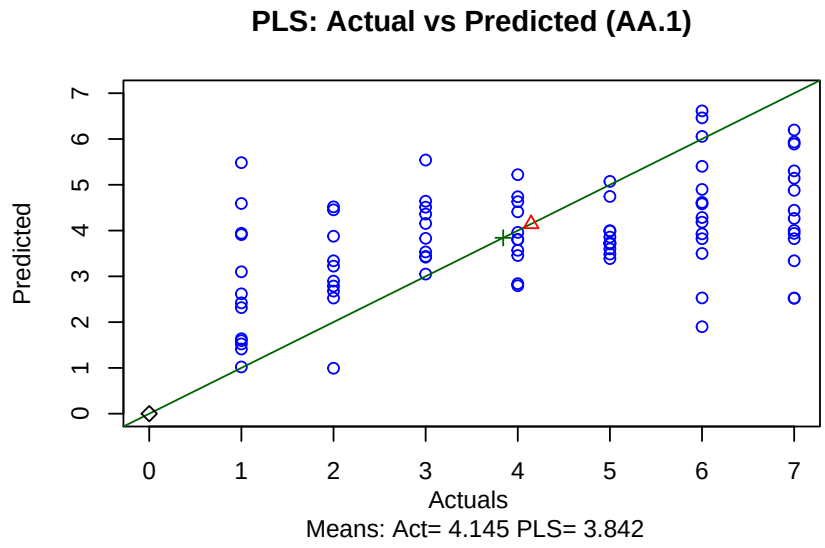
Outline

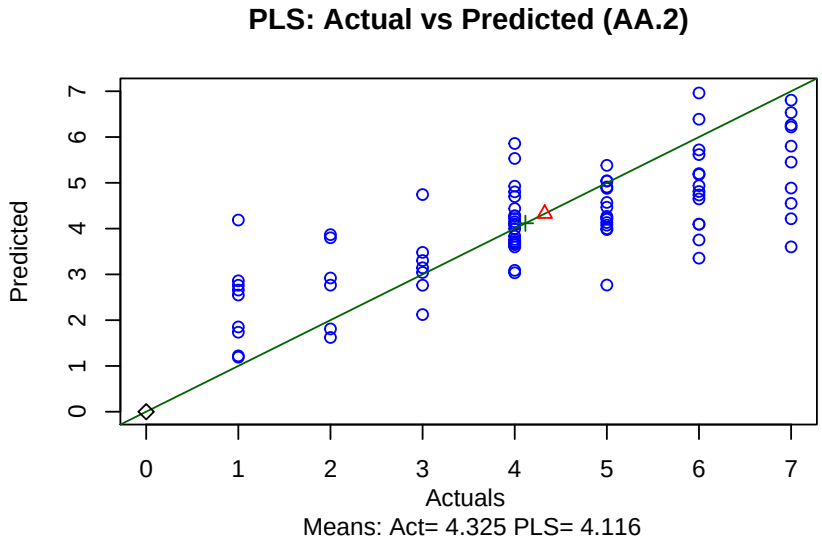
This is the information we'll be seeing today:

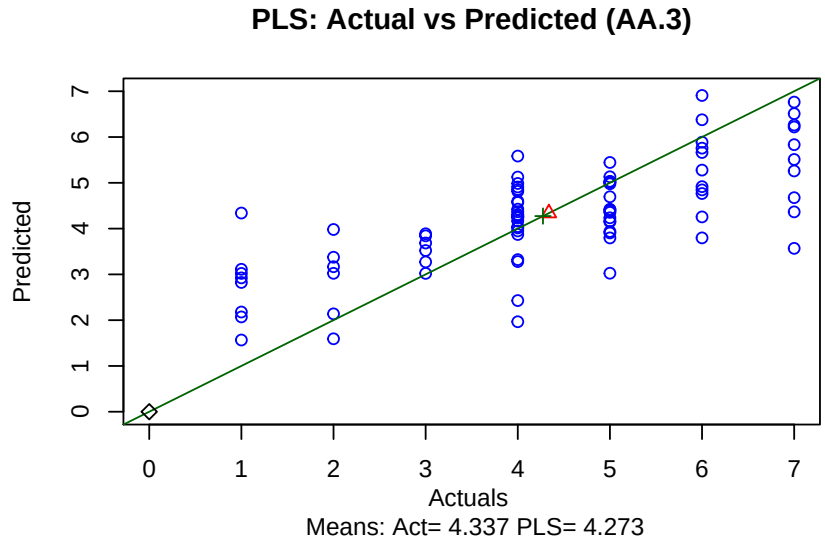
- PLS model: Actual vs Predicted Scatterplot
- PLS model: Prediction Residuals Histogram
- PLS vs Linear Regression: Joint Histogram
- PLS vs Neural Network: Joint Histogram
- Table of Statistics Comparing the three methods.
- Review Linear Model vs PLS with PCA as Output.

PLS model: Actual vs Predicted Scatterplot

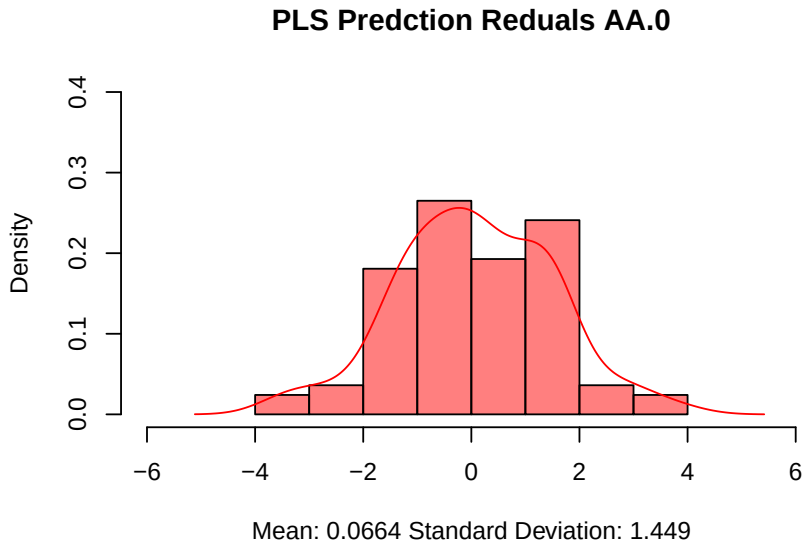




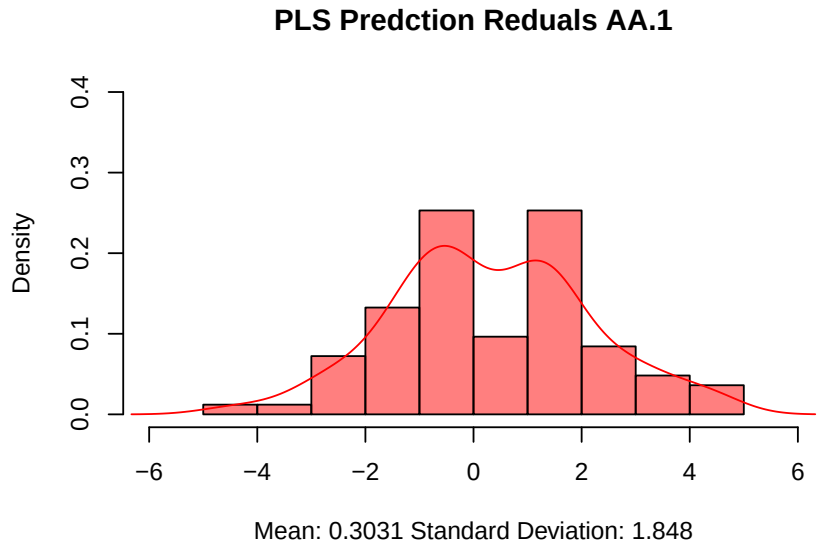




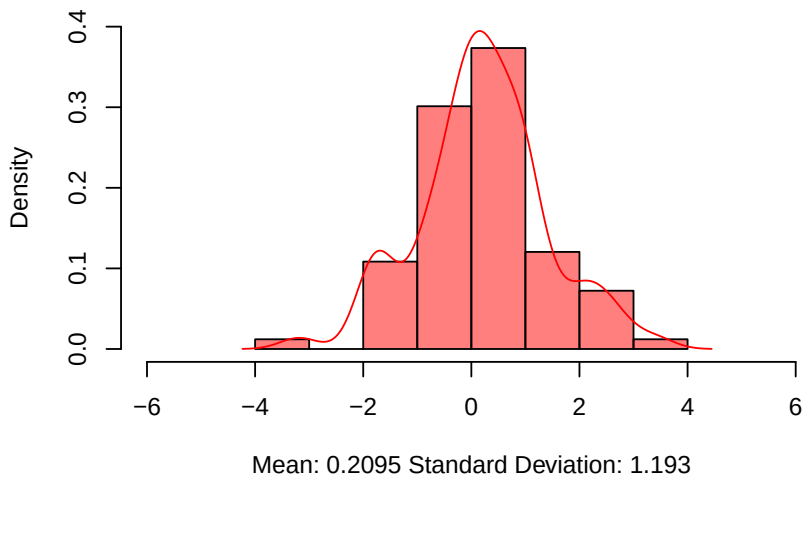
PLS model: Prediction Residuals Histogram



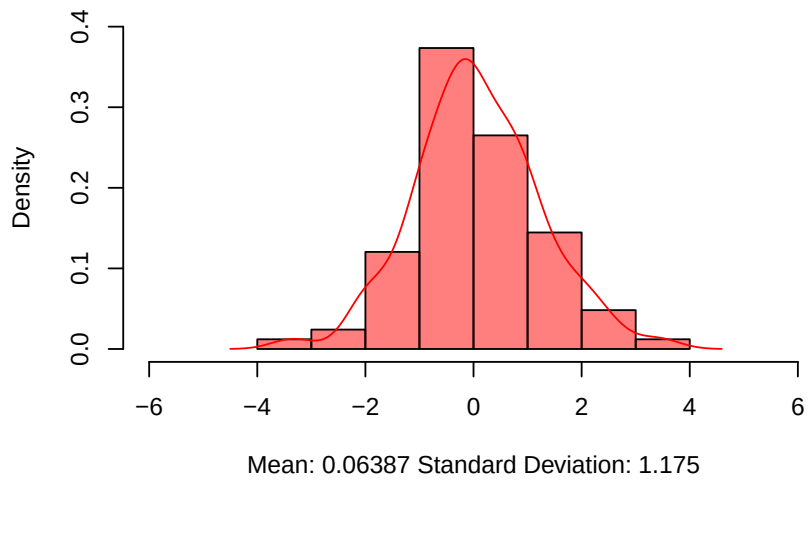
Mean: 0.0664 Standard Deviation: 1.449



Mean: 0.3031 Standard Deviation: 1.848

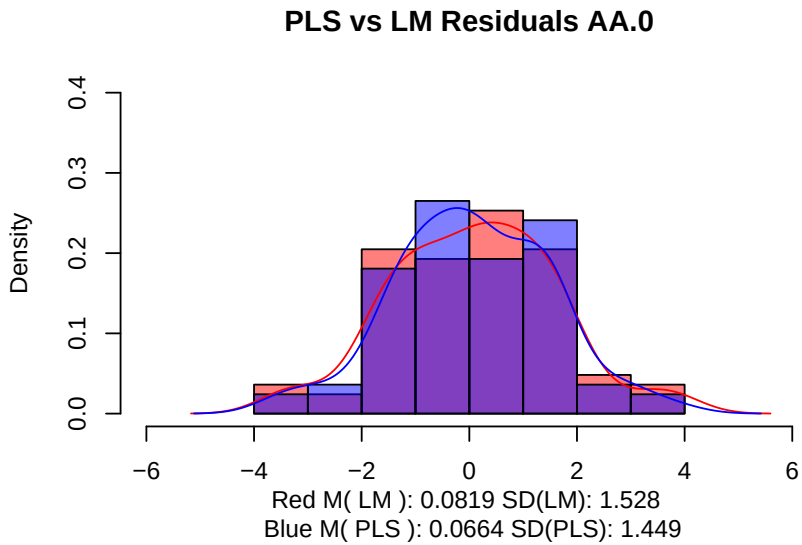


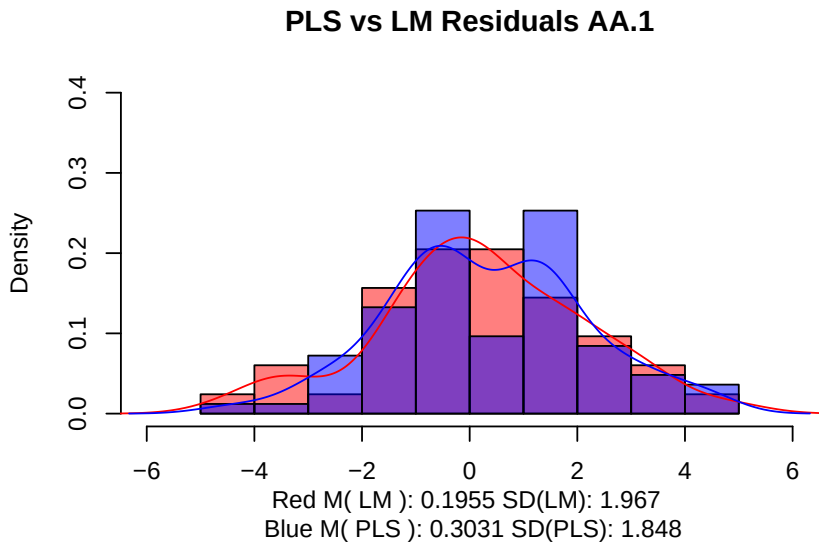
Mean: 0.2095 Standard Deviation: 1.193

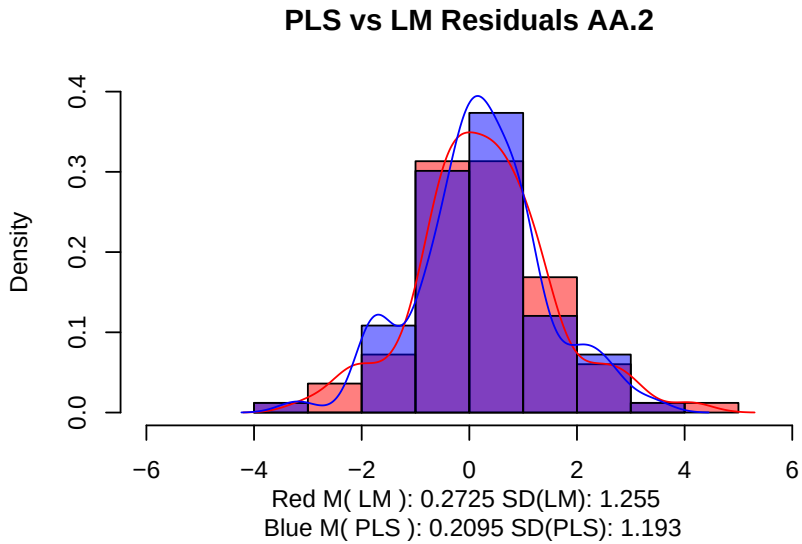


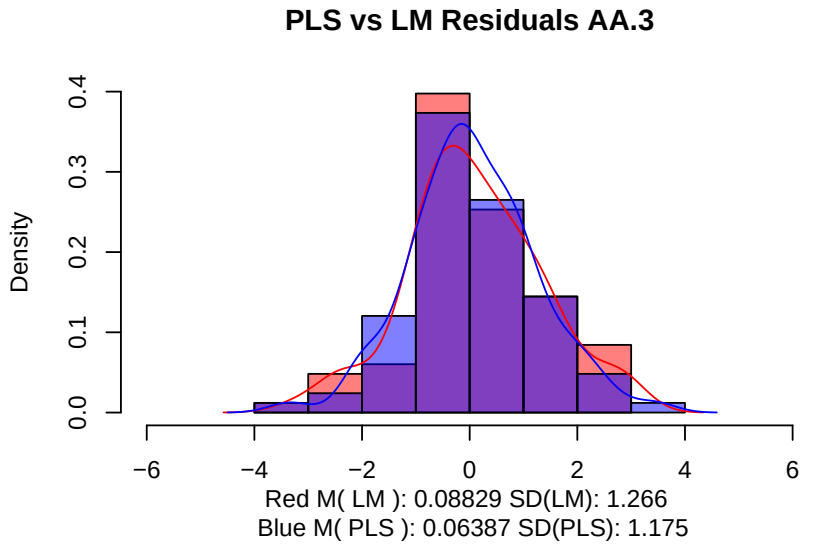
Mean: 0.06387 Standard Deviation: 1.175

PLS vs Linear Regression: Joint Histogram

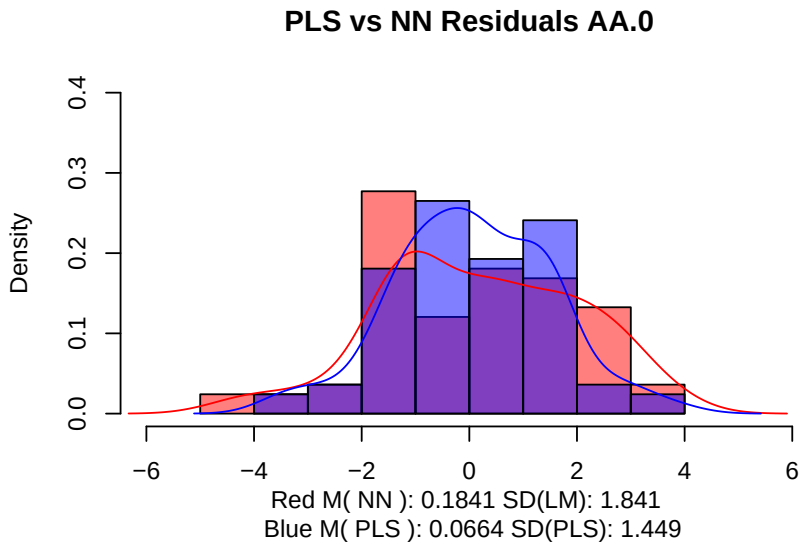


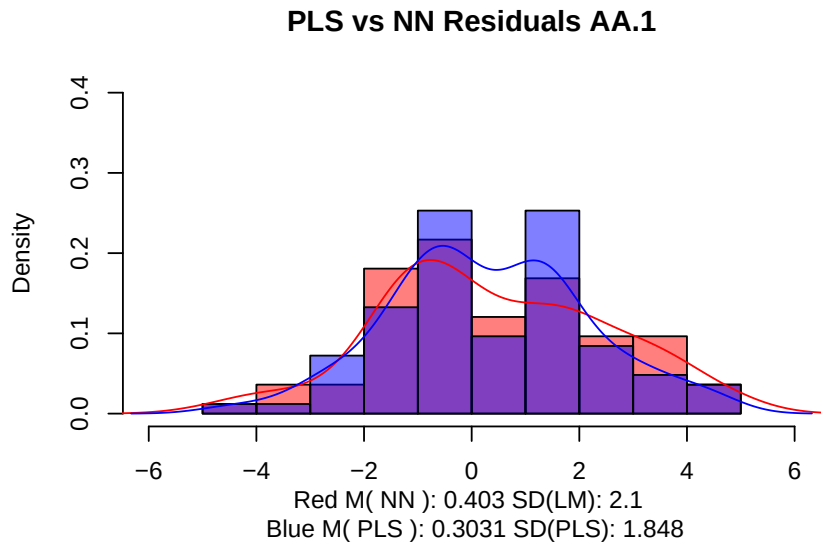


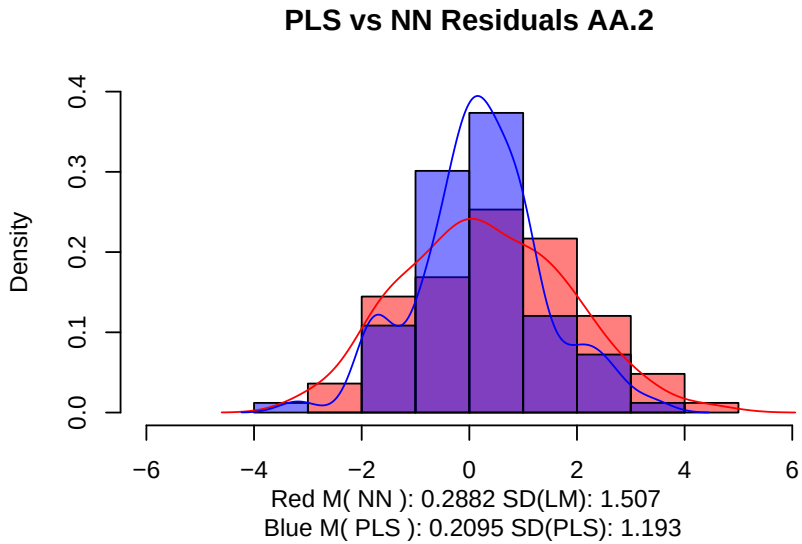


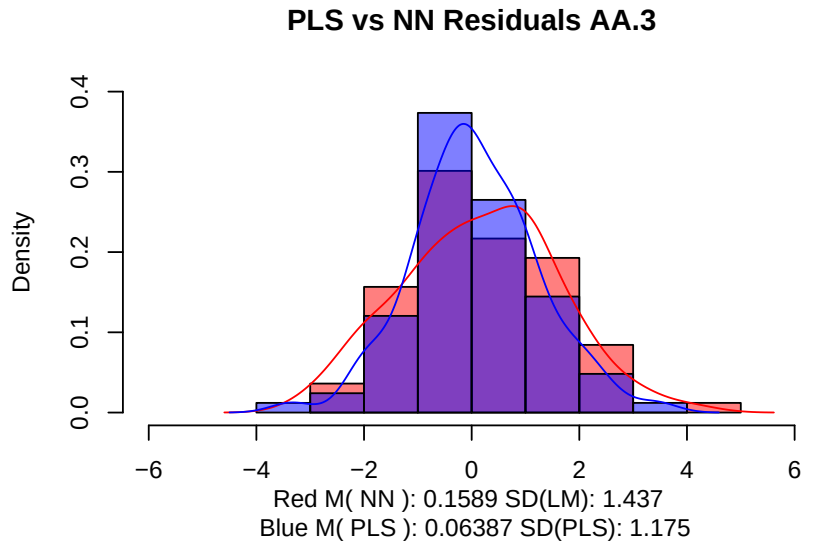


PLS vs Neural Network: Joint Histogram









Residuals Mean Summary LM, PLS and NN.

Item	Linear Model	PLS-PM	Neural Net
AA.0	0.0819	0.0664	0.1841
AA.1	0.1955	0.3031	0.403
AA.2	0.2725	0.2095	0.2882
AA.3	0.08829	0.06387	0.1589

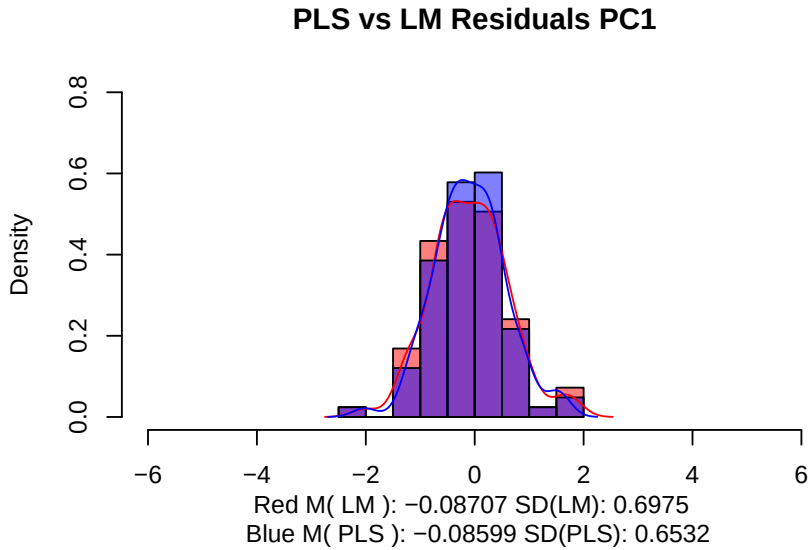
Residuals Standard Deviation Summary LM, PLS and NN.

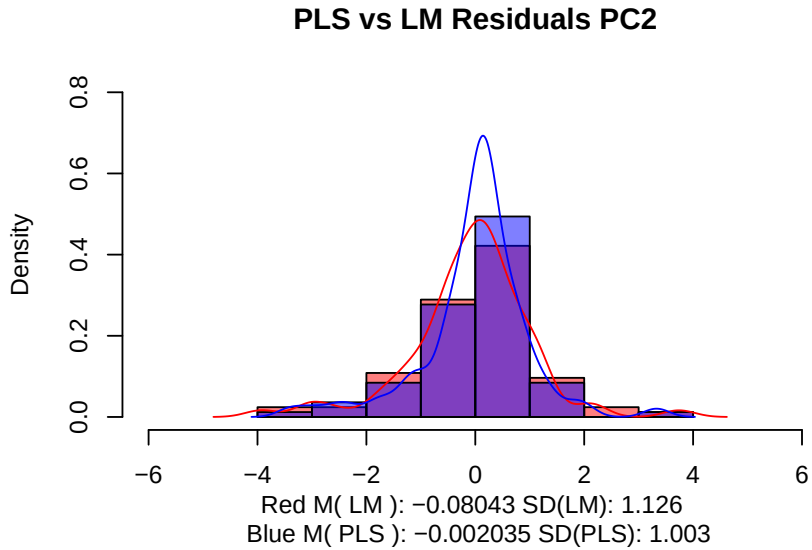
Item	Linear Model	PLS-PM	Neural Net
AA.0	1.528	1.449	1.841
AA.1	1.967	1.848	2.1
AA.2	1.255	1.193	1.507
AA.3	1.266	1.175	1.437

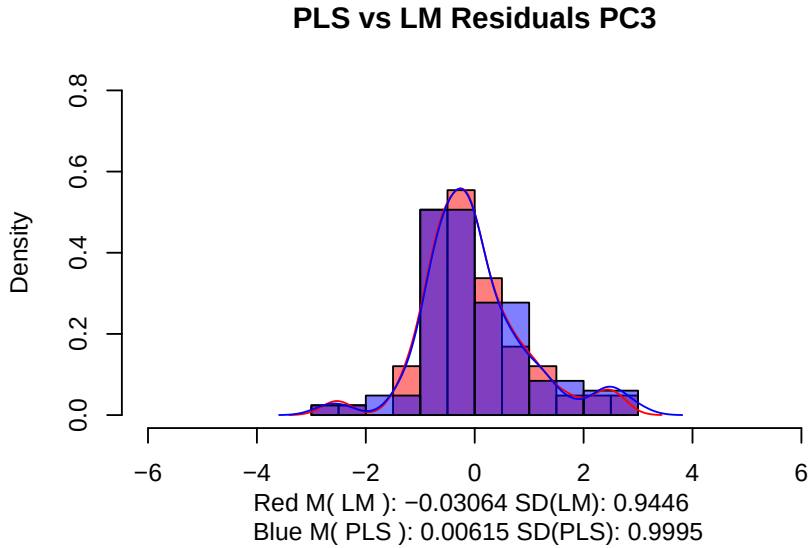
Actual Mean vs Predicted for LM, PLS and NN.

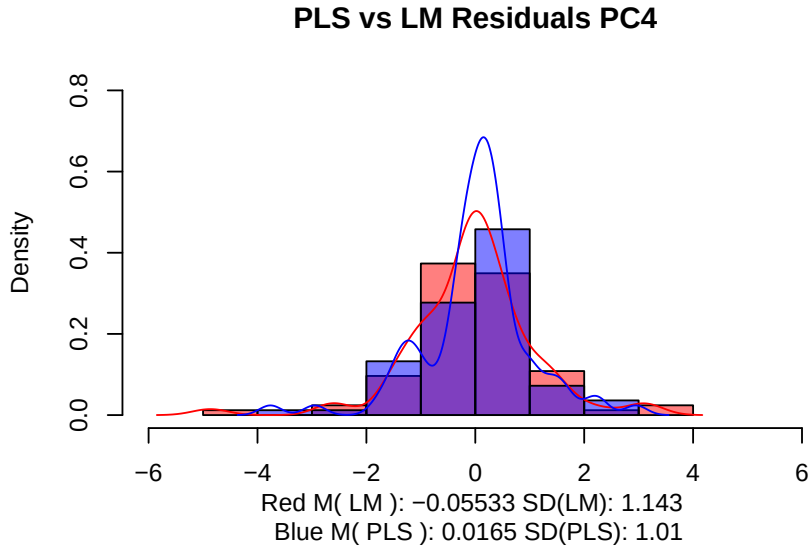
Item	Actual	Linear Model	PLS-PM	Neural Net
AA.0	3.783	3.701	3.717	3.599
AA.1	4.145	3.949	3.842	3.742
AA.2	4.325	4.053	4.116	4.037
AA.3	4.337	4.249	4.273	4.178

PLS vs Linear Regression: Joint Histogram for PCA









Residuals Mean and SD Summary LM vs PLS for PCA.

Item	LM (Mean)	PLS-PM (Mean)	LM (SD)	PLS-PM (SD)
PC1	-0.08707	-0.08599	0.6975	0.6532
PC2	-0.08707	-0.08599	1.126	1.003
PC3	-0.08043	-0.002035	0.9446	0.9995
PC4	-0.03064	0.00615	1.143	1.01