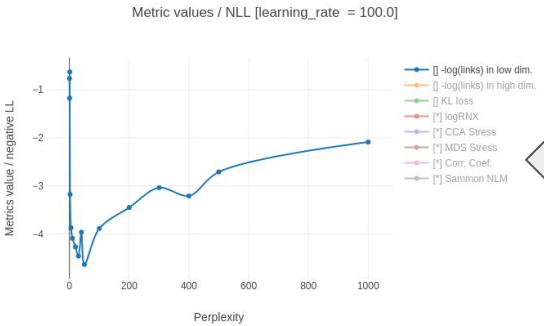
# Constraint validation with Metric scores

# Workflow

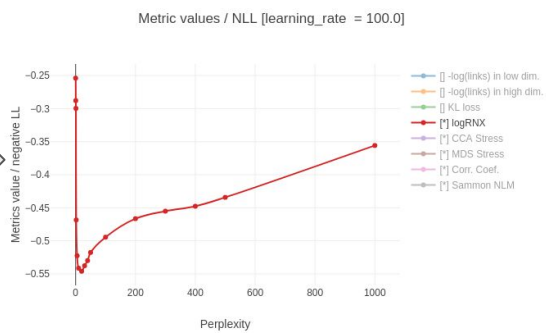
t-SNE embedding result
(original version)

Pairwise constraints
(generated from labels)

Metrics:
+ logRNX
+ CCA Stress
+ MDS Stress
+ Sammon's NLM
+ Correlation Coefficient

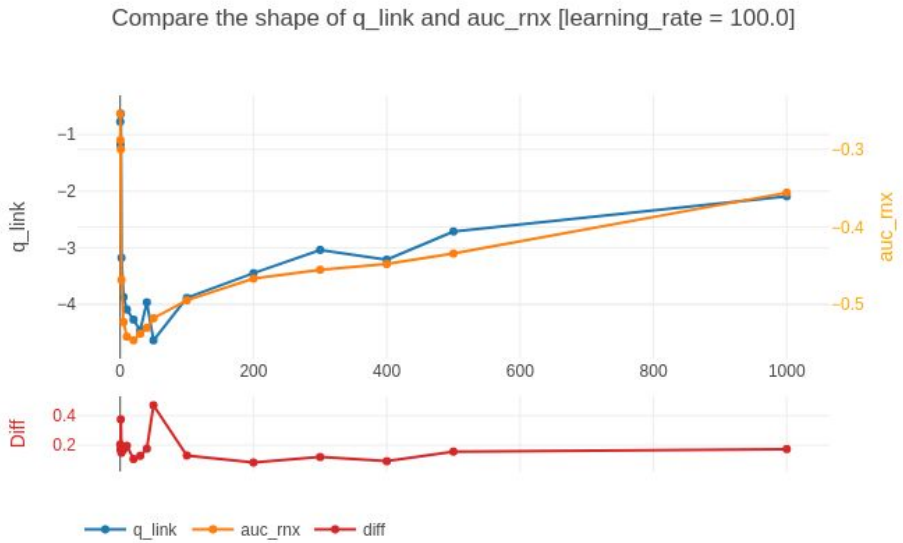



Are they have similar shape?

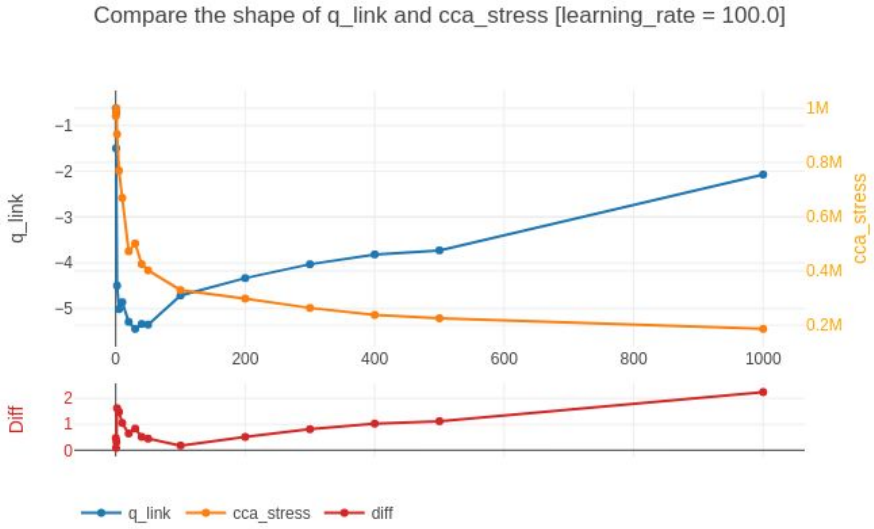


# Overview: Some good results

MNIST (with logRNX metric)

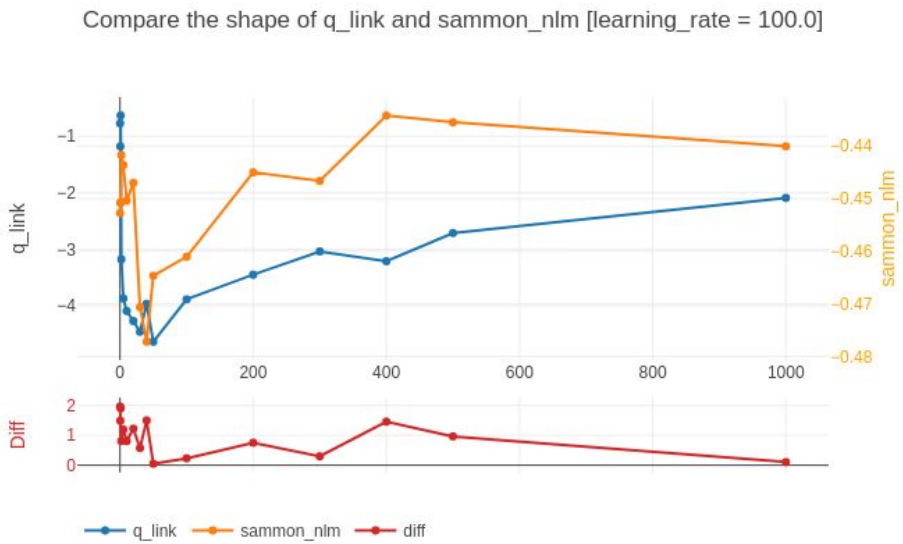



COIL20 (with CCA Stress metric)

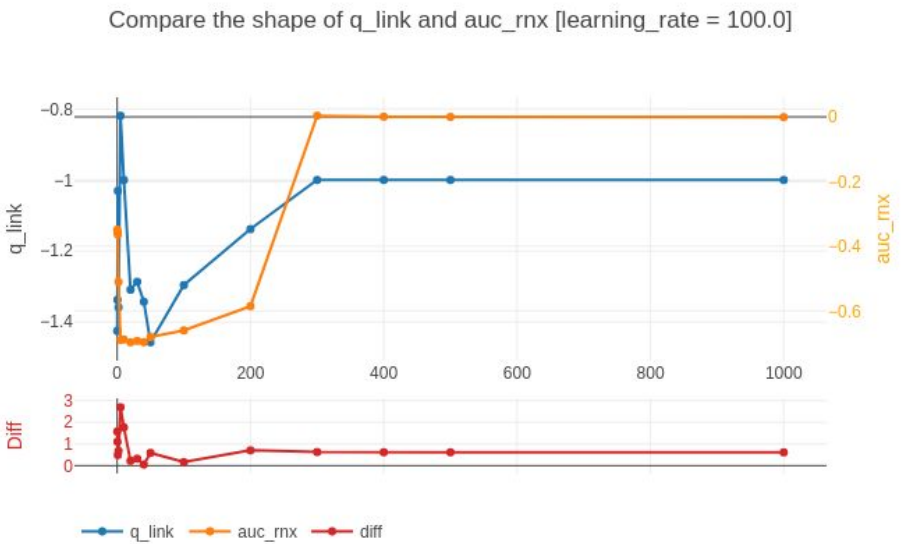


# Overview: Some not-so-good examples

MNIST (with Sammon NLM metric)

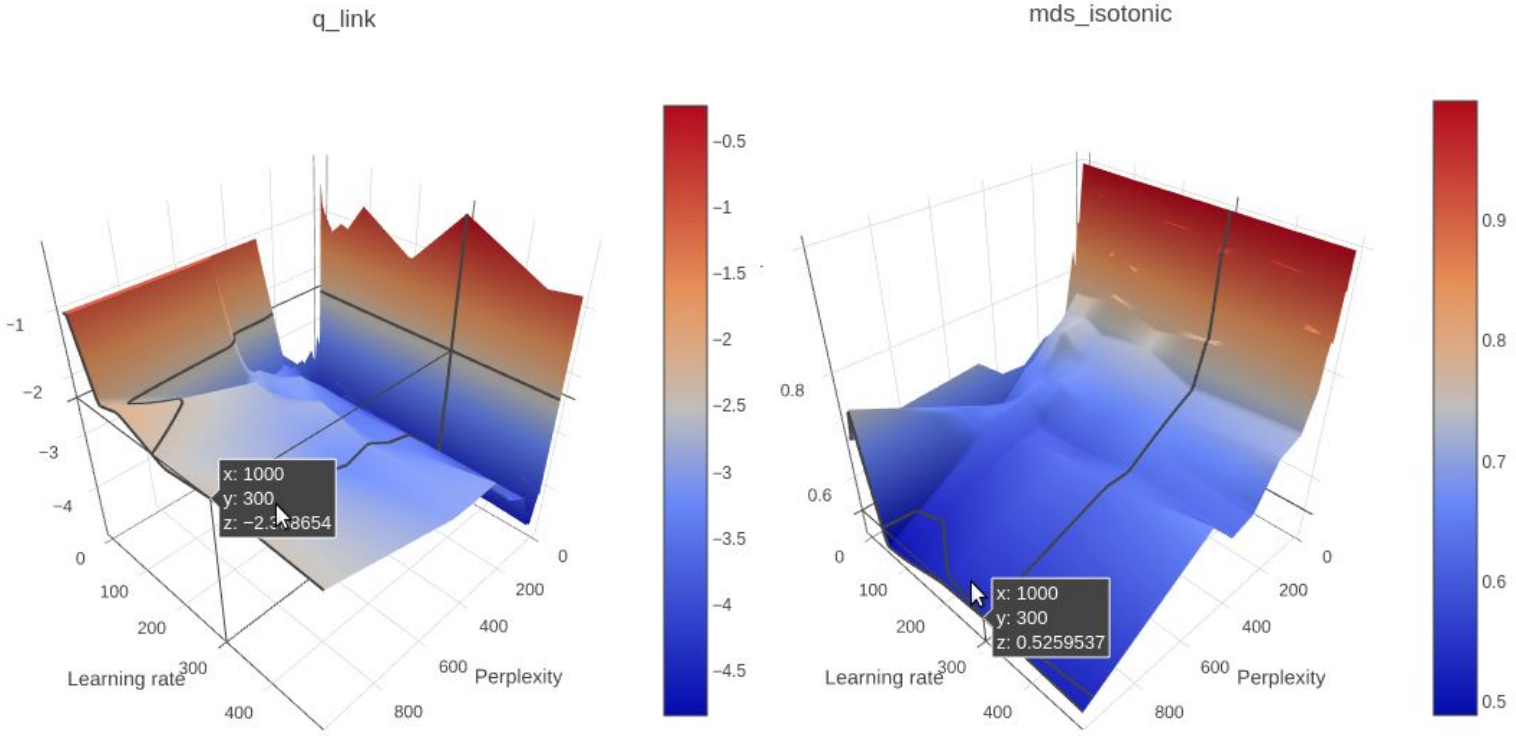



COUNTRY2015 (with logRNX metric)



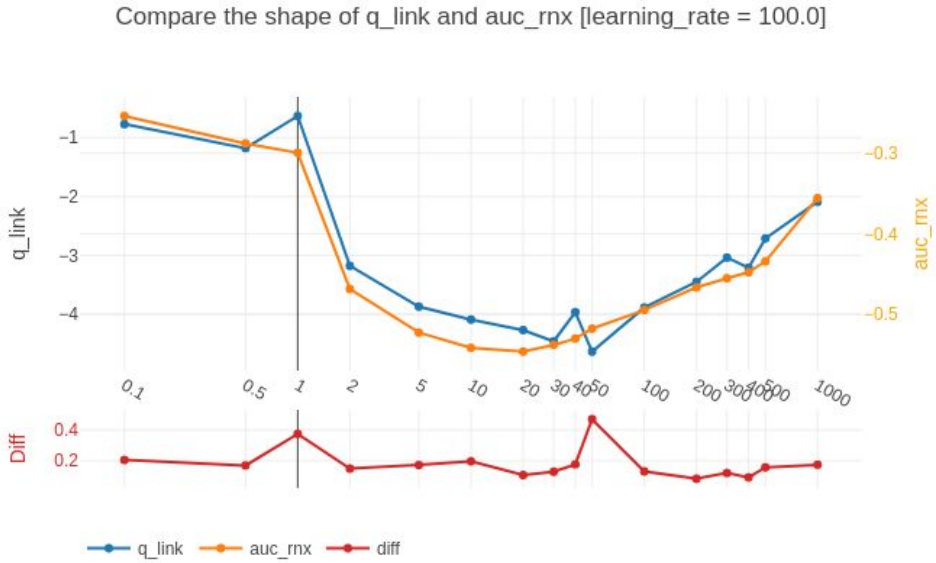
# No need to examine with all value of learning_rate

The surface of NLL (MNIST) and MDS Stress metric score (COIL20)

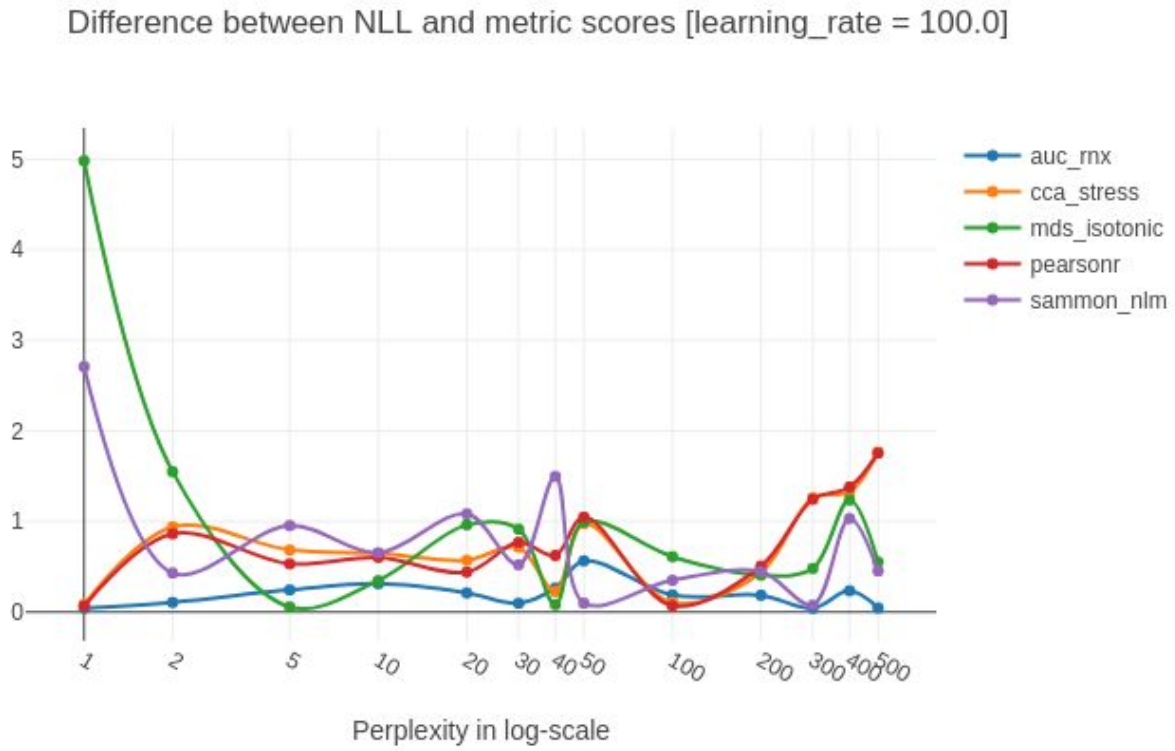


# Calculate the difference between NLL and Metric

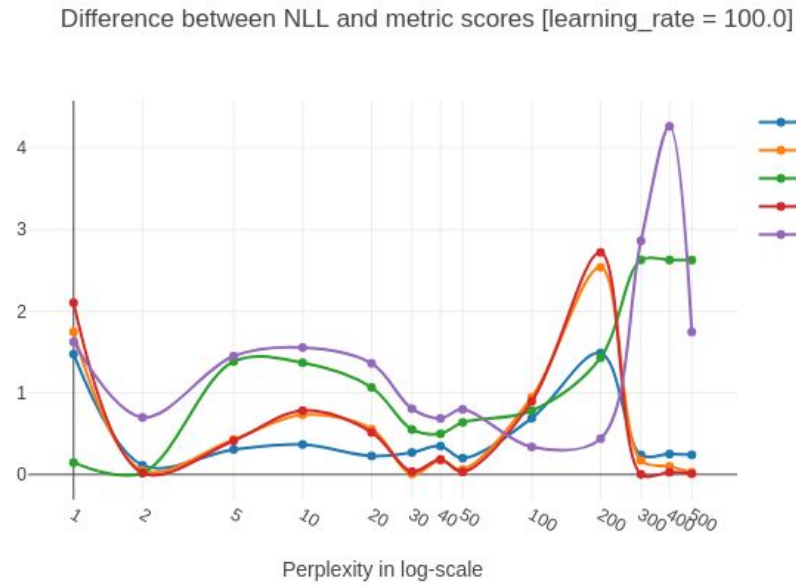
+ The values of NLL and Metric scores are first standardized (mean=0, std=1)
+ Calculate absolute value of the difference between NLL and a metric score
+ Plot the difference for each value of perplexity in range [1,500] (in the log-scale)

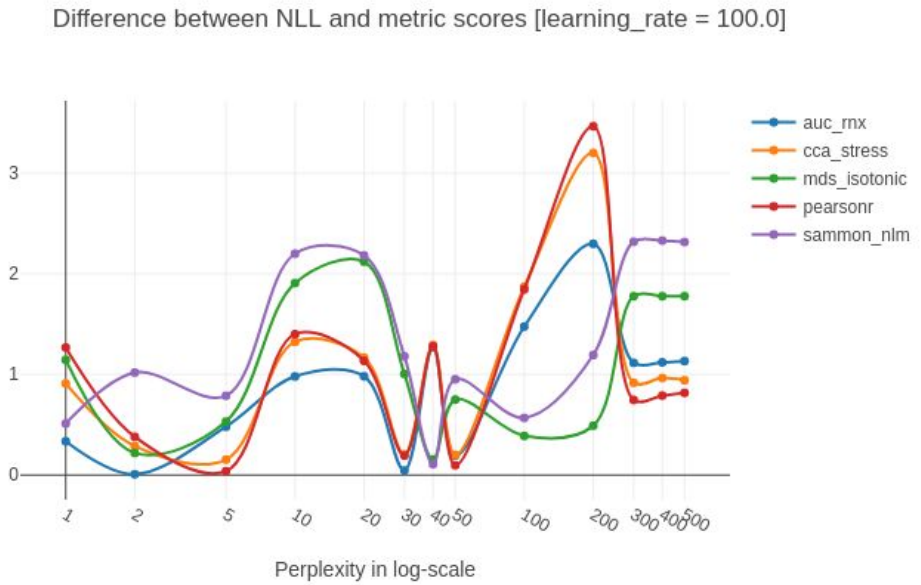


# MNIST

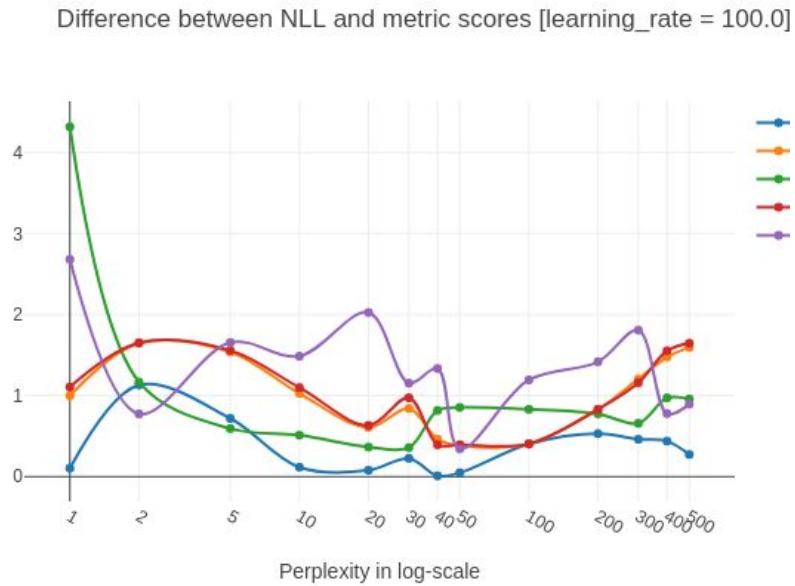

Difference between NLL and metric scores [learning_rate = 100.0]
auc_rnx
cca_stress
mds_isotonic
pearsonr
sammon_nlm
5
4
3
2
1
0
1
2
5
10
20
30
40
50
100
200
300
400
500
Perplexity in log-scale

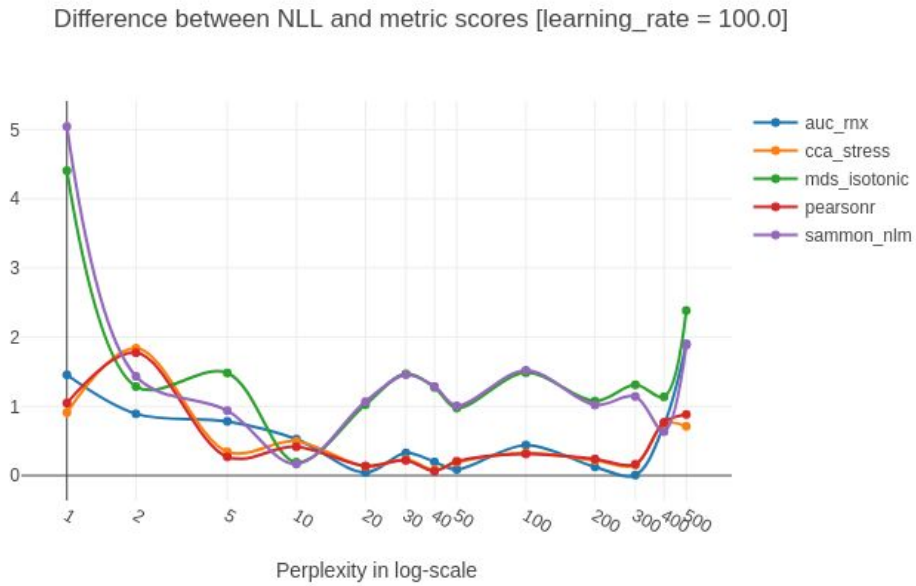
# COUNTRY1999 and COUNTRY2014



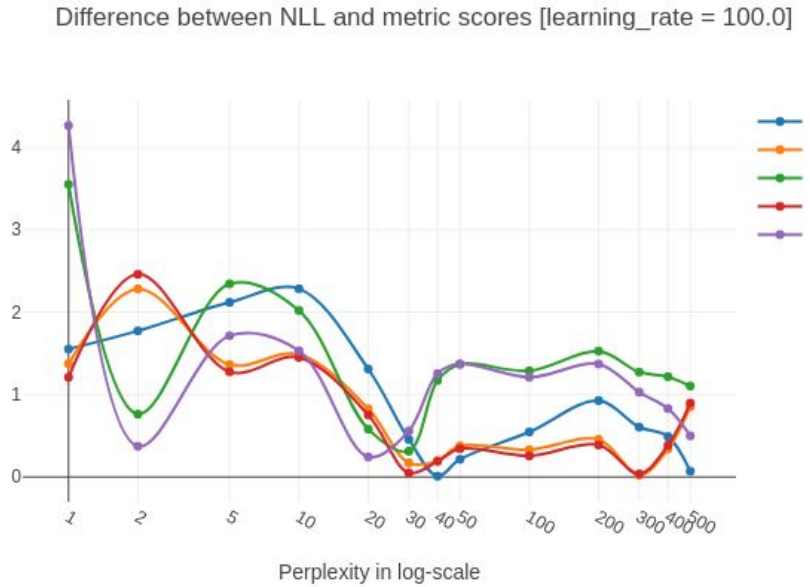



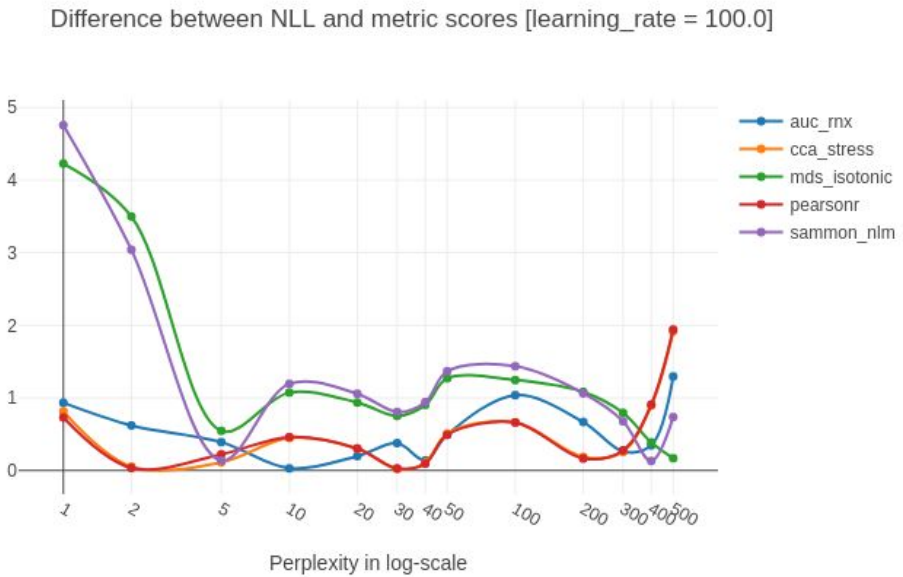
# COIL20 and CARS04



# DIABETES and BREAST_CANCER



# Compare Metric scores

Avg of each metric (normalized in [0,1]) over all values of perplexity in range [1, 500]