Adaptive Learning Strategy - True K
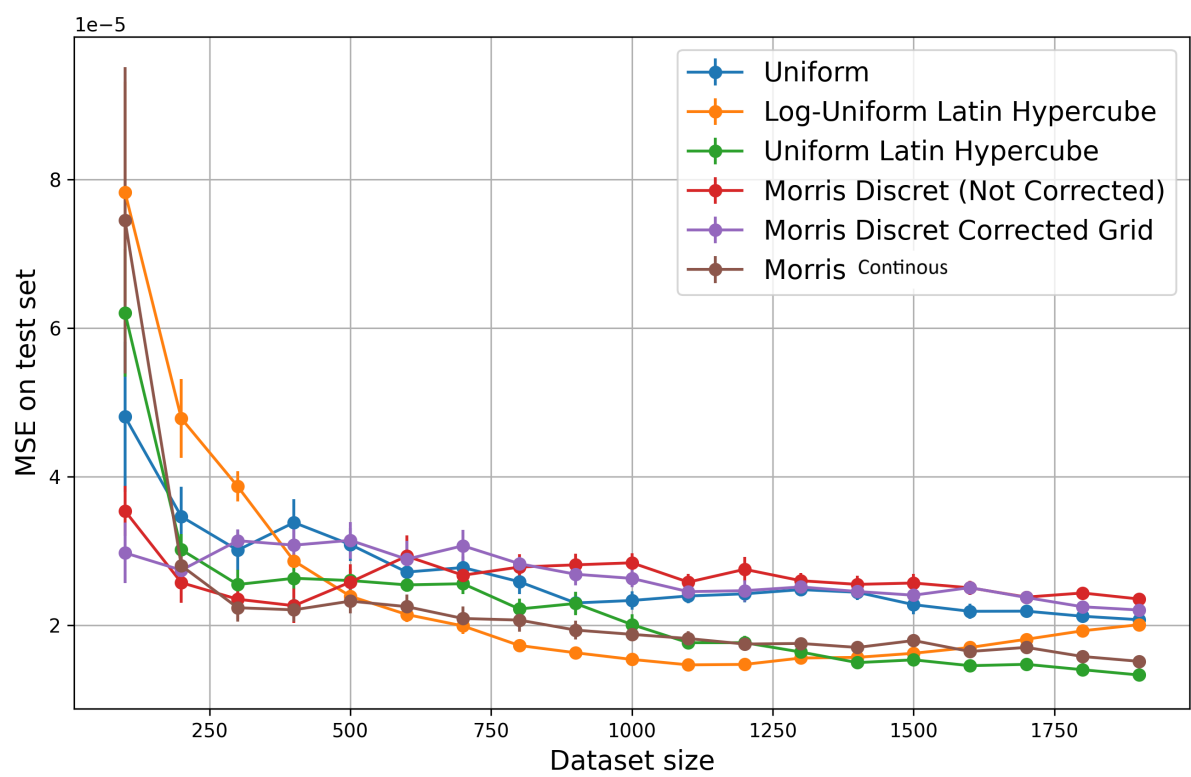
01/10/2025

Performance measured by K prediction accuracy only - not overall MSE across all outputs.Learning - K Estimation Performance

K-Centered Adaptive Learning Results

This analysis focuses on **K estimation performance** - measuring how different sampling strategies predict the true rate coefficient values.

Sampling Strategy Comparison

Performance measured by K prediction accuracy only - not overall MSE across all outputs.

Key Observations

The results show performance ranking across different sampling methods when evaluated specifically on rate coefficient estimation:

1. **Uniform Latin Hypercube** - Best traditional sampling method
2. **Morris Continous** - Close second among traditional methods
3. **Log Uniform Latin Hypercube**
4. **Uniform** -
5. **Morris Discrete**

K-Centered Adaptive Learning Analysis

K-Centered Adaptive Learning: Test MSE Performance
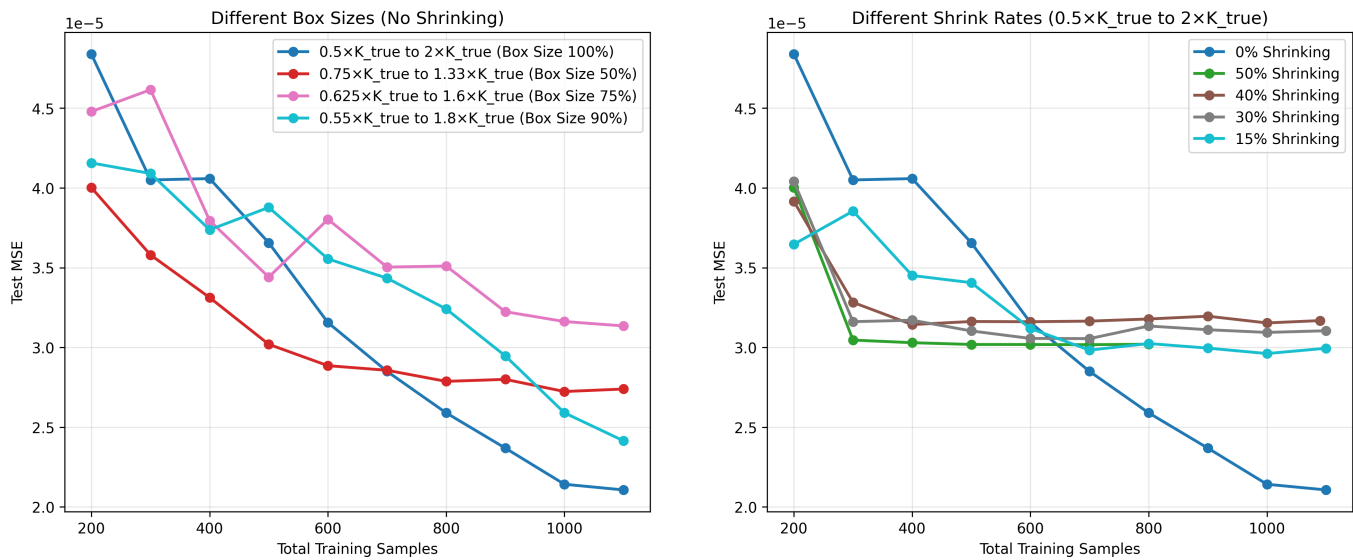
Key Insights

Focusing on areas near K_true has no positive impact on model performance (Why??)

Box Size Analysis (Left Plot)

- **Larger boxes perform better**: 0.5×K_true to 2×K_true (Box Size 100%) shows best performance
- **Smaller boxes degrade performance**: Reducing the bounding box consistently worsens results
- **Counter-intuitive finding**: Focusing sampling closer to true K values does not improve K prediction accuracy

Shrink Rate Analysis (Right Plot)

- **No shrinking is optimal**: 0% shrinking (maintaining full box size) performs best
- **Adaptive shrinking degrades performance**: All shrinking strategies (15%, 30%, 40%, 50%) show worse results
- **Diminishing returns**: Higher shrinking rates provide progressively worse performance

Next - TRY Neural Network Verify Latin Hypercube Sampling - Try covering the space in a much better way