⬛ ML PERFORMANCE MATRICES VIEWER
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📁 AVAILABLE MATRICES:
1. performance_summary
2. error_statistics
3. feature_ranking
4. actual_vs_predicted
5. confidence_intervals

1. 📈 PERFORMANCE SUMMARY MATRIX:

 Columns 1 through 4

  {'Model' } {'Test_RMSE' } {'CV_RMSE' } {'MAE'   }
  {'Spring' } {[0]} {[1.2307e-14]} {[0]}
  {'Damper' } {[1.3878e-17]} {[1.3878e-17]} {[1.3878e-17]}
  {'Inertia'} {[0.0187]} {[0.0116]} {[0.0150]}

 Columns 5 through 6

  {'R²'   } {'MSE'   }
  {[NaN]} {[0]}
  {[-Inf]} {[1.9259e-34]}
  {[-0.5625]} {[3.5156e-04]}

 🎯 QUALITY ASSESSMENT:
 Spring: R²=NaN 🔴 POOR | RMSE gap: Inf% 🔴 High variance
 Damper: R²=-Inf 🔴 POOR | RMSE gap: 0.0% 🟢 Stable
 Inertia: R²=-0.562 🔴 POOR | RMSE gap: 38.4% 🔴 High variance

2. 📉 ERROR STATISTICS MATRIX:
 Columns 1 through 4

  {'Model' } {'Mean_Error'} {'Std_Error'} {'Skewness'}
  {'Spring' } {[0]} {[0]} {[NaN]}
  {'Damper' } {[1.3878e-17]} {[0]} {[NaN]}
  {'Inertia'} {[-0.0112]} {[0.0212]} {[0]}

 Columns 5 through 7

  {'Kurtosis'} {'Max_Abs_Error'} {'95th_Percentile'}
  {[NaN]} {[0]} {[0]}
  {[NaN]} {[1.3878e-17]} {[1.3878e-17]}
  {[1.0000]} {[0.0262]} {[0.0262]}

📊 ERROR ANALYSIS:

Spring: Mean=0.0000 🔴 Biased | Skew=NaN 🔴 High skew

Damper: Mean=0.0000 🔴 Biased | Skew=NaN 🔴 High skew

Inertia: Mean=-0.0112 🔴 Biased | Skew=0.00 🟢 Normal

3. 🔍 FEATURE IMPORTANCE RANKING:

SPRING - Top 5 Features:
1. RMS: 0.0000
2. Peak: 0.0000
3. Crest_Factor: 0.0000
4. Kurtosis: 0.0000
5. Skewness: 0.0000

DAMPER - Top 5 Features:
1. RMS: 0.0000
2. Peak: 0.0000
3. Crest_Factor: 0.0000
4. Kurtosis: 0.0000
5. Skewness: 0.0000

INERTIA - Top 5 Features:
1. RMS: 0.0000
2. Peak: 0.0000
3. Crest_Factor: 0.0000
4. Kurtosis: 0.0000
5. Skewness: 0.0000

4. 📊 ACTUAL VS PREDICTED (Sample - First 5 rows):

SPRING - [Actual, Predicted, Abs_Error, Squared_Error]:

[100.00, 100.00, 0.00, 0.00]

[100.00, 100.00, 0.00, 0.00]

Average Absolute Error: 0.00

5. 📐 CONFIDENCE INTERVALS:

Columns 1 through 4

{'Parameter'}	{'Predicted_Value'}	{'Lower_CI'}	{'Upper_CI'}
{'Spring' }	{[0]}	{[0]}	{[0]}
{'Damper' }	{[0]}	{[0]}	{[0]}
{'Inertia' }	{[0]}	{[0]}	{[0]}

Column 5

{'CI_Width'}
{[0]}
{[0]}
{[0]}

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✅ Matrix viewing complete!