FNO with CFT-based Residual Correction: Breakthrough Performance in PDE Neural Operators
Performance Comparison Across Problem Dimensions **Method Overview** 43.8% 10⁰ 0.88471P Result Baseline FNO FNO-RC (Ours) 3.0% **Standard FNO Path** 0.22 improvement 145 (FFT-based) **Test Error** 10⁻¹ **CFT Residual Path** 73.7% (Continuous FT) 2 0.02181provement 10⁻² 0.0057 Final Output 1D Burgers (Seque dial) 3D Navie? Statistics of the St C FNO-RC (Ours) Error: 0.0057 **Problem Dimension & Type** Baseline FNO 00025 FNO-RC (Ours) Performance Gain Baseline FNO mprovement **80020** Error: 0.0218 .7% Average 10⁰ Our Experiment **Performance Summary** Revnolds 20005 4×10 **Improvement** riment) 3 × 10 1D Sequential G E 100 **Long-term Error Evolution** Training Convergence Spatial Error Distribution 08 60 Baseline FNO Baseline FNO eline FNO 40 10⁻¹ -RC (Ours) 2D FNO-RC (Ours) 0.04 -FNO-RC (Ours) 80% Test Loss (Log Scale) **Error Reduction** Spariotemporal Convergence 0.03 @ Epoch 300 Error Long-term 60% Stability 7 0.02 40% Training Stability 20% 0.01 Acctrafing 100 200 300 400 500 12 14 16 18 2D 10 3D High 1D Long-term Spatiotemporal Reynolds Sequential Stability Accuracy **Training Epochs Prediction Time Steps**