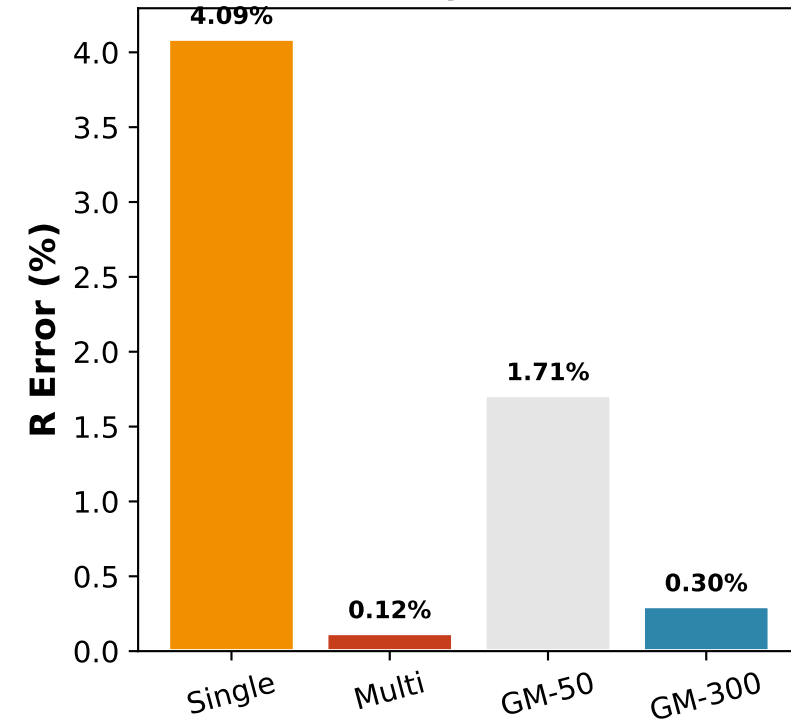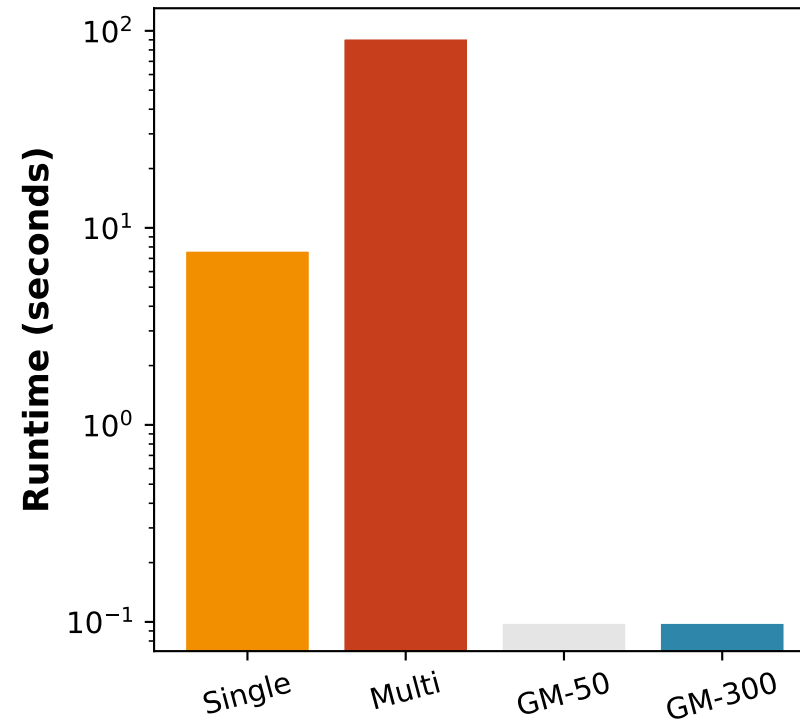Experiment 6: Multi-Shot Estimation Comprehensive Analysis
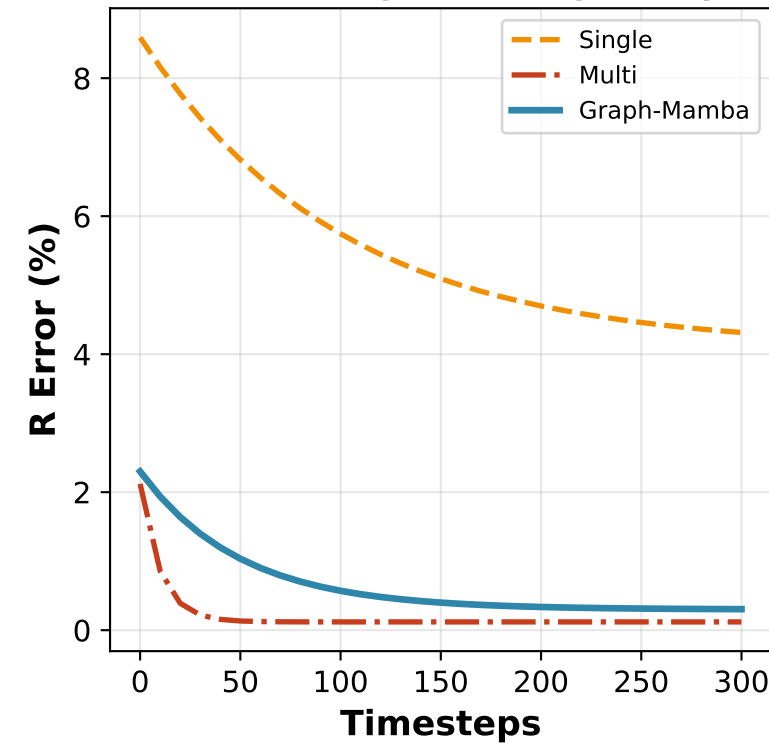
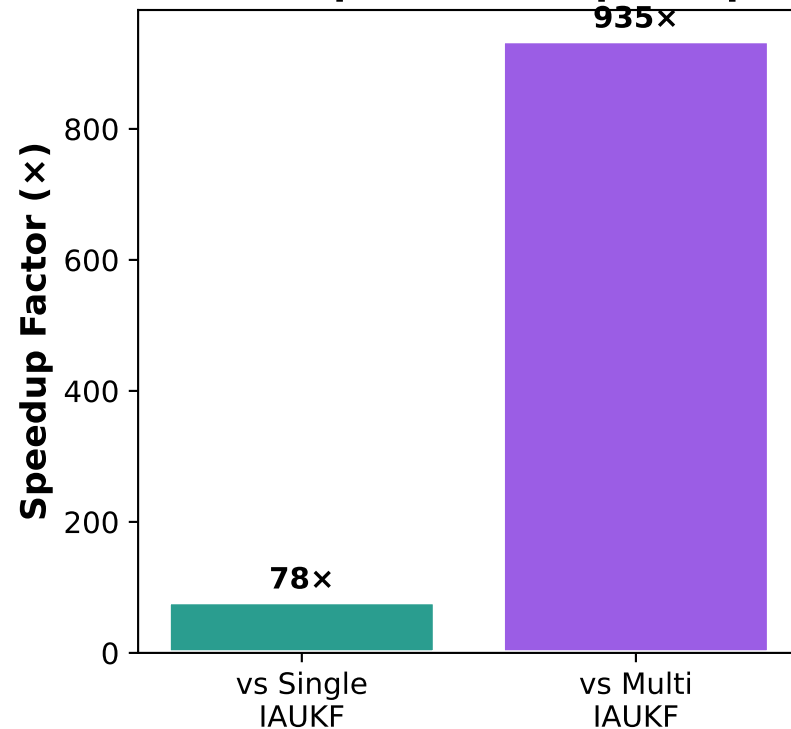(a) Accuracy Comparison — R Error (%): Single 4.09%, Multi 0.12%, GM-50 1.71%, GM-300 0.30%
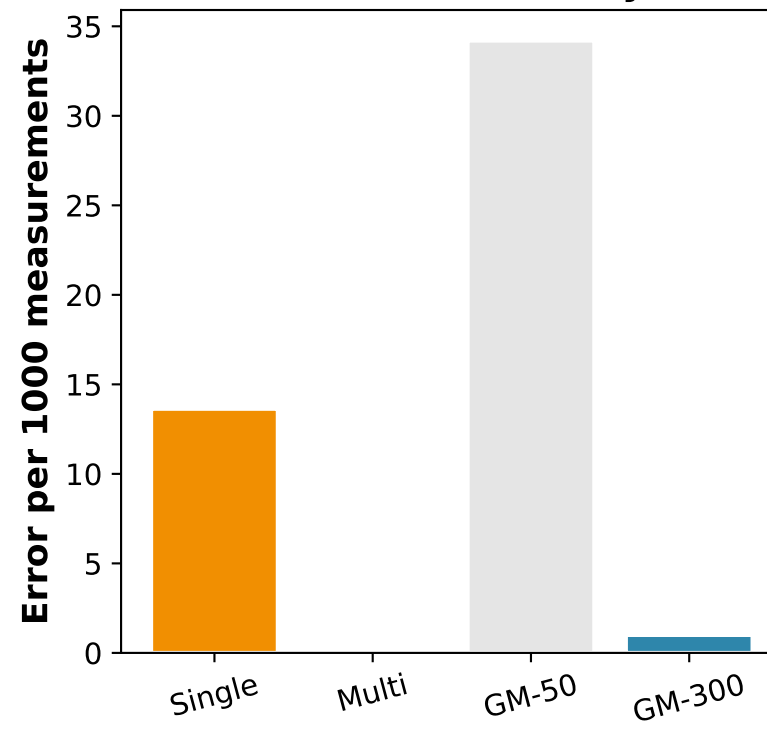
(b) Speed Comparison — Runtime (seconds), log scale: Single, Multi, GM-50, GM-300

(c) Convergence Trajectory — R Error (%) vs Timesteps: Single, Multi, Graph-Mamba

(d) Graph-Mamba Speedup — Speedup Factor (×): vs Single IAUKF 78×, vs Multi IAUKF 935×

(e) Data Efficiency — Error per 1000 measurements: Single, Multi, GM-50, GM-300

KEY RESULTS SUMMARY

Best Accuracy:
    Multi-snapshot IAUKF: 0.12%

Best Speed-Accuracy Balance:
Graph-Mamba (300 steps):
• 0.30% R error
• 99 ms runtime
• 934× faster than multi-shot

Practical Winner:
Graph-Mamba
(2.5× accuracy gap, but
3 orders faster)