TAIB Stress-Test: Extended Operational Appendix

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1 Results

This section presents the most significant **extreme operational regimes** identified during the *TAIB Stress-Test*. The reported values highlight scenarios in which informational bus saturation and accumulated latency produce large deviations with respect to reference models. These deviations are not numerical failures, but explicit indicators of operational breakdown under high load and complexity.

Table 1: Stress-Test Audit Summary: TAIB vs Standard Models

Scenario	**Reference (GR/QM)**	**TAIB**	**ΔPred %**	σ_{bus}
Kerr ($b = 3.0$)	1.333 rad	87.712 rad	6478.4%	1.07×10^{11}
Kerr ($b = 10.0$)	0.400 rad	0.442 rad	10.5%	9.5×10^{9}
N-Qubits ($N = 50$)	$F = 1.0$	$F = 0.62$	−38.0%	4.1×10^{15}

Additional note: Large values of ΔPred % and σ_{bus} indicate regimes of informational saturation and operational coherence loss. These values do not represent model failures, but explicit limits of predictability under high informational load and system complexity.

The complete datasets corresponding to 10,000 simulation cycles are available in the supplementary material (Dataset_S1.csv).

2 Appendices

2.1 Latency Kernel Logic

The following code excerpt illustrates the minimal operational implementation of the EML (Latency Model Evaluation) kernel used throughout the stress tests. This implementation captures the logarithmic saturation behavior central to TAIB and is intended for auditability rather than as a closed-form theoretical solution.

```
# --- Core Algorithm: Latency Computation ---
# Minimal operational implementation for saturation management.
# This expression represents the EML kernel used for stress-testing
# and does not claim uniqueness as a closed-form solution.

import numpy as np

def compute_eml_latency(f_loc, a_const, epsilon):
    try:
        # Fundamental logarithmic TAIB relationship
        return 1.0 * (1.0 + (1.0 / epsilon) * np.log1p(f_loc / a_
           const))
    except FloatingPointError:
        return float('inf')
```

2.2 Supplementary Material

All datasets generated during the *TAIB Stress-Test* are provided in the file `Dataset_S1.csv`. The dataset includes explicit headers and entries for prediction deviation (ΔPred %), bus saturation (σ_{bus}), signal jitter, and computation time, enabling independent reproduction and comparative analysis. The full implementation code, benchmark scripts, and version-controlled updates are available in the public GitHub repository:

`https://github.com/JoseLGamio/TAIB-Stress-Test/tree/main`

2.3 Operational Notes

All simulations were executed on commodity hardware without the use of specialized accelerators or high-performance computing infrastructure. This highlights the operational efficiency of the TAIB framework and facilitates independent replication and peer auditing.

Metric calculations, including ΔPred % and σ_{bus}, follow the definitions provided in the Main Report and are included here for transparency and reproducibility.