

Hardcoded vs Qiskit Pipeline Comparison Summary

generated_utc: 2026-02-14T00:29:22.746399+00:00

all_pass: False

l_values: [2, 3]

trajectory_comparison_basis: trotter trajectories start from
each pipeline's selected initial_state_source (default: vqe)

thresholds:

```
{'doublon_trotter_max_abs_delta': 0.001,  
 'energy_trotter_max_abs_delta': 0.001,  
 'fidelity_max_abs_delta': 0.0001,  
 'ground_state_energy_abs_delta': 1e-08,  
 'n_dn_site0_trotter_max_abs_delta': 0.005,  
 'n_up_site0_trotter_max_abs_delta': 0.005}
```

hardcoded_qiskit_import_isolation:

```
{'offending_imports': [],  
 'pass': True,  
 'qiskit_imports': [{'line': 307, 'module': 'qiskit'},  
                    {'line': 308, 'module': 'qiskit.circuit.library'},  
                    {'line': 309, 'module': 'qiskit.primitives'},  
                    {'line': 310, 'module': 'qiskit.quantum_info'},  
                    {'line': 311, 'module': 'qiskit.synthesis'},  
                    {'line': 312, 'module': 'qiskit_algorithms'},  
                    {'line': 313, 'module': 'qiskit_algorithms.minimum_eigensolvers'}],  
 'qpe_adapter_range': {'end_line': 409, 'start_line': 292}}
```

Delta metric definitions:

```
 $\Delta F(t) = |F_{hc}(t) - F_{qk}(t)|$   
 $\Delta E_{trot}(t) = |E_{trot\_hc}(t) - E_{trot\_qk}(t)|$   
 $\Delta n_{up0}(t) = |n_{up0\_hc}(t) - n_{up0\_qk}(t)|$   
 $\Delta n_{dn0}(t) = |n_{dn0\_hc}(t) - n_{dn0\_qk}(t)|$   
 $\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$ 
```

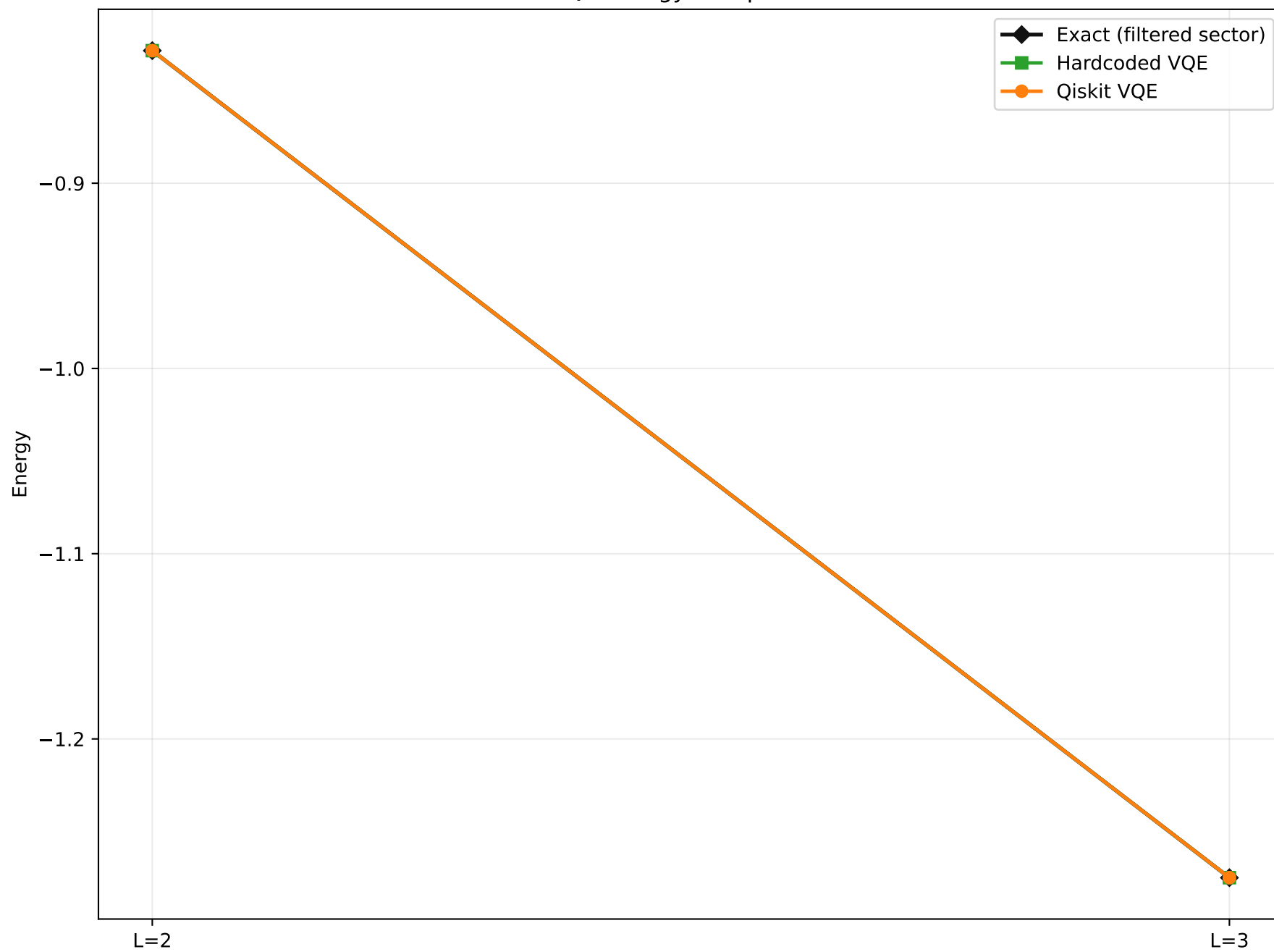
$F_{\text{pipeline}}(t)$ is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

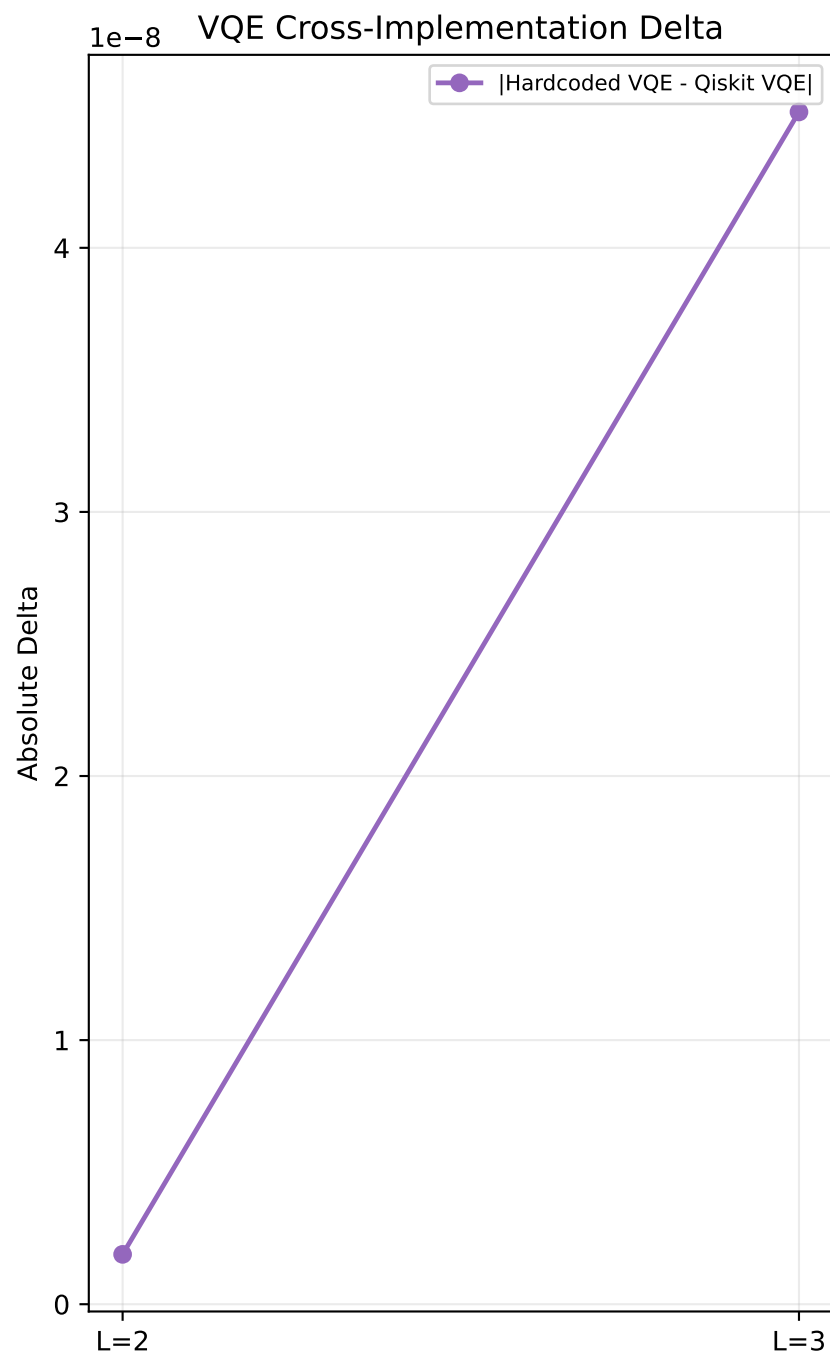
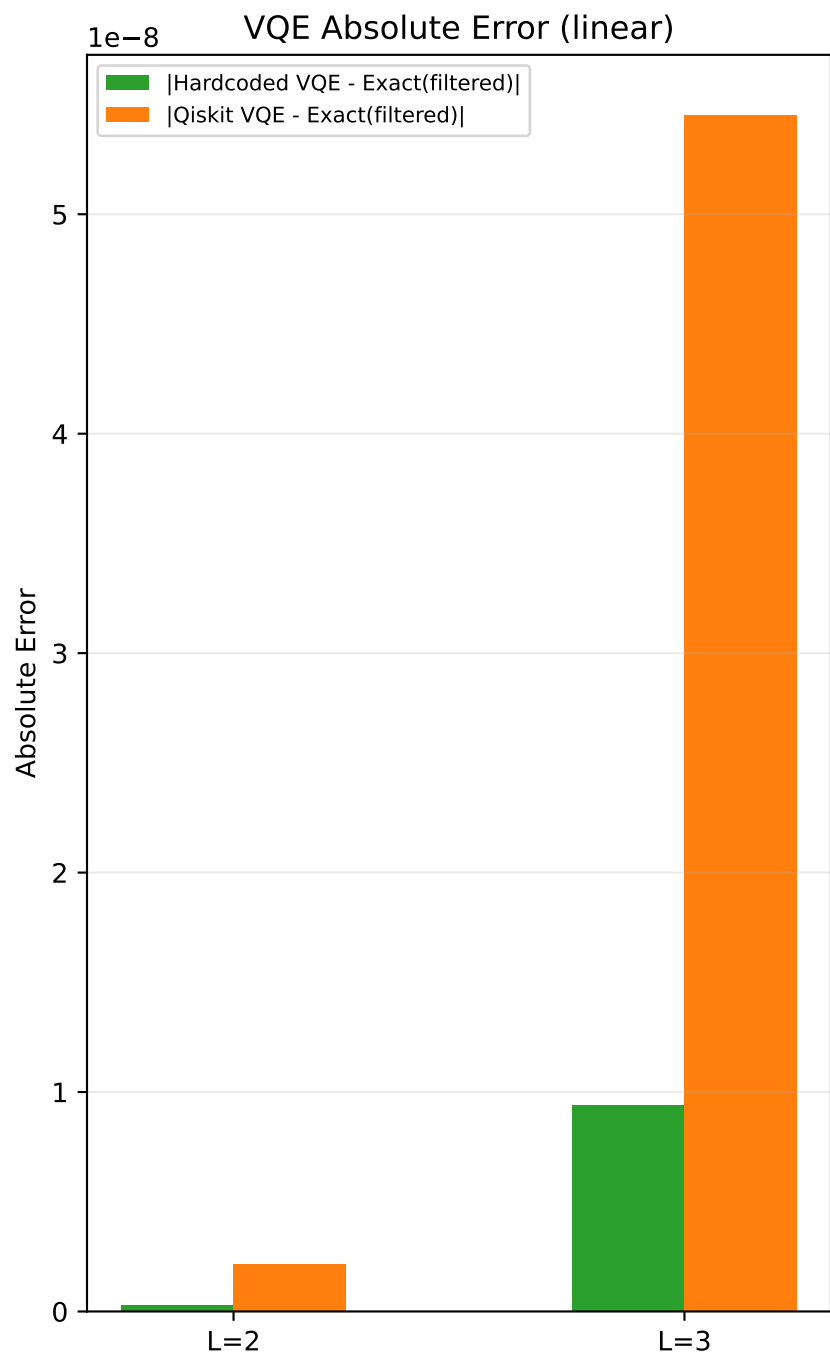
Per-L pass flags:

L=2 pass=True metrics_json=/Users/jakestrobels/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L2_metrics.json

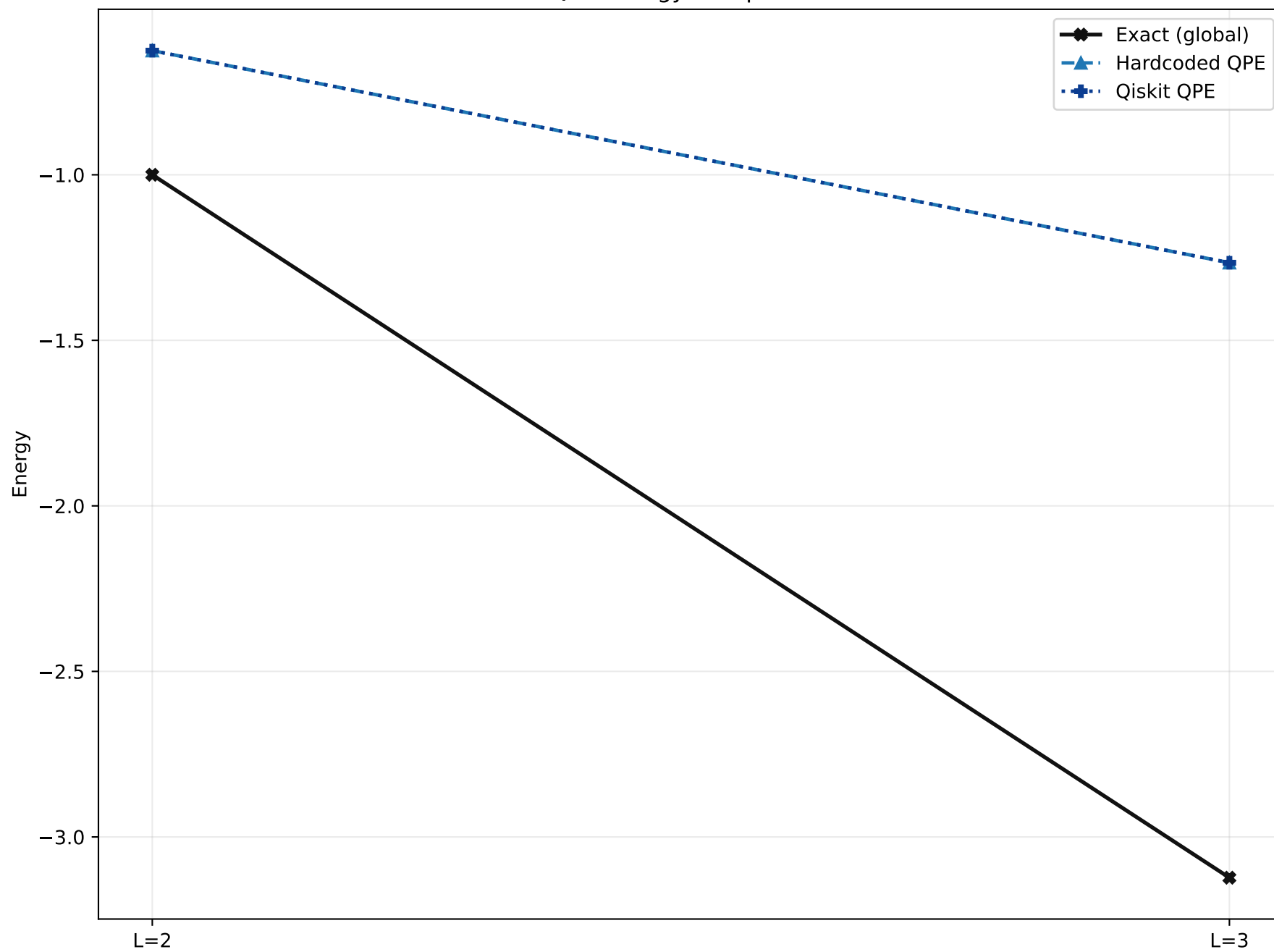
L=3 pass=False metrics_json=/Users/jakestrobels/Downloads/Testing-For-Trying-Again-main_copy-testforatestcuziknothing/artifacts/hardcoded_vs_qiskit_pipeline_L3_metrics.json

VQE Energy Comparison

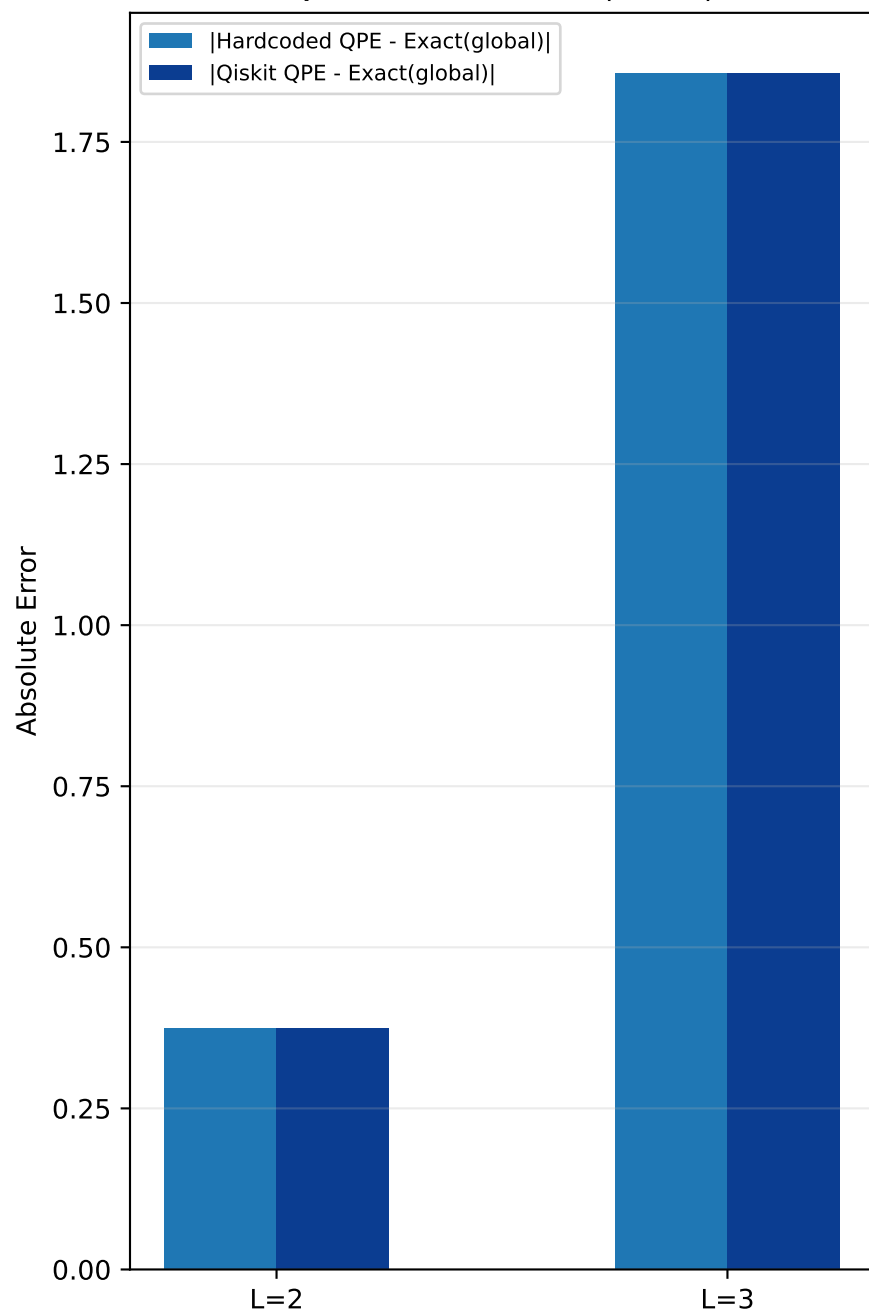




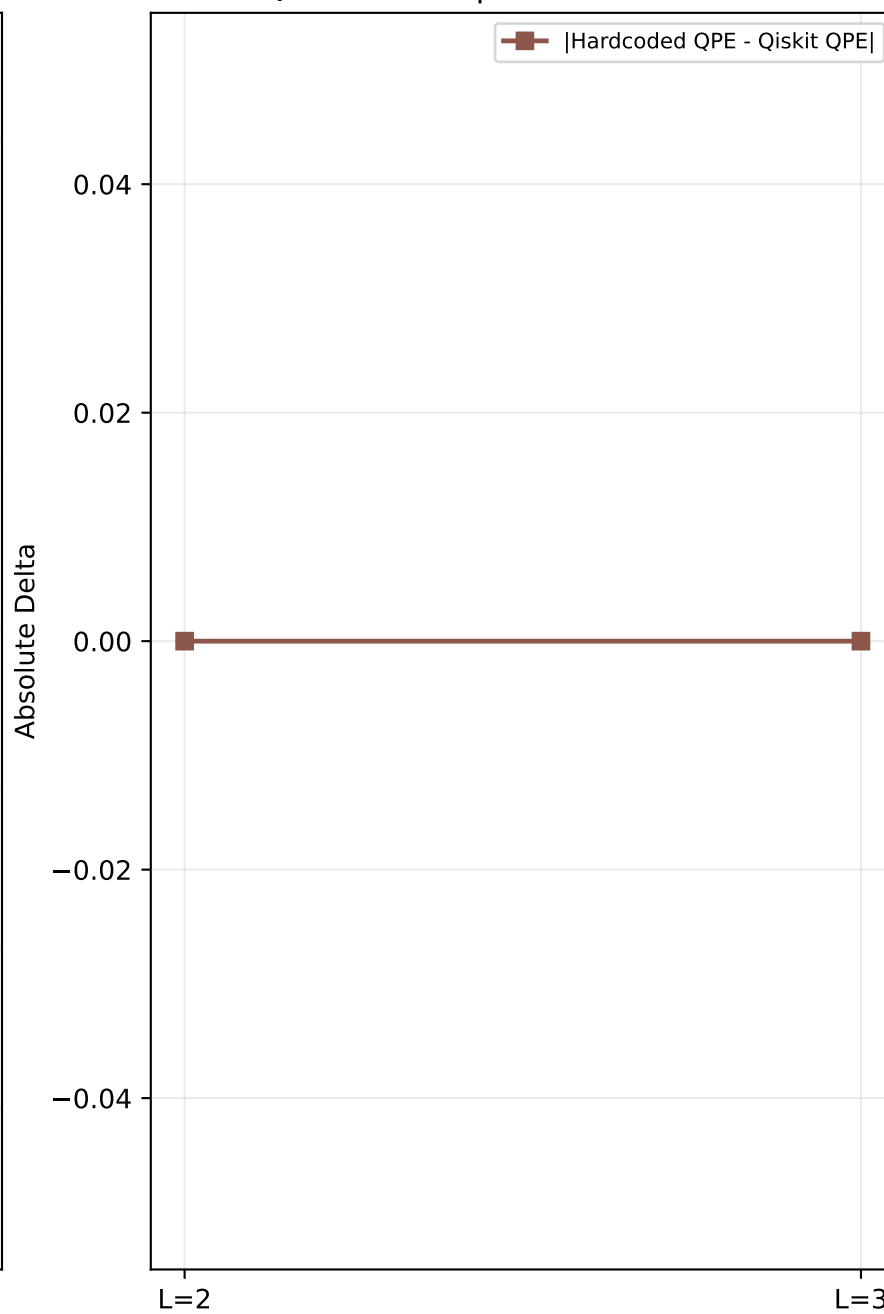
QPE Energy Comparison



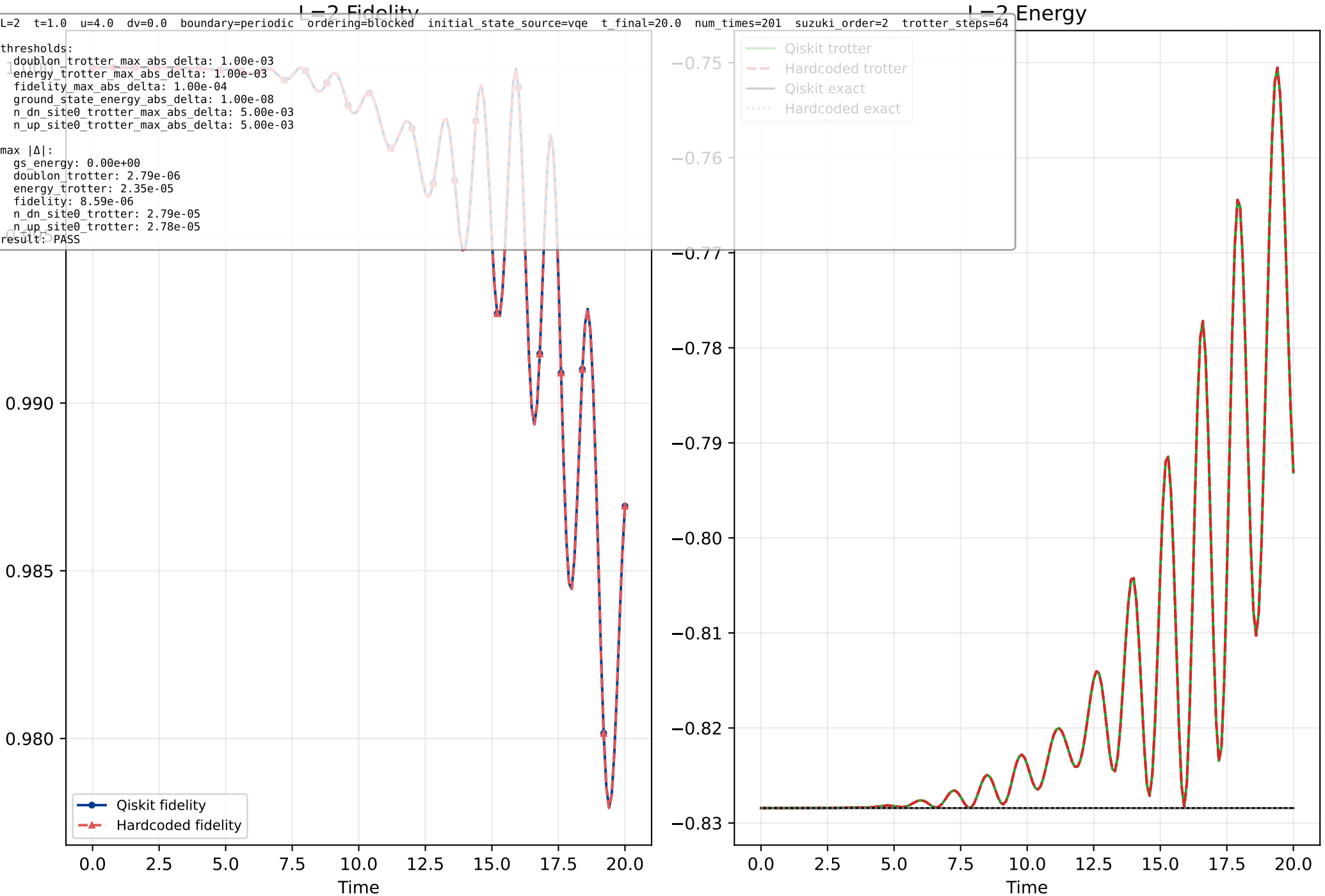
QPE Absolute Error (linear)



QPE Cross-Implementation Delta



Bundle Page: L=2 Fidelity & Energy



Bundle Page: L=2 Occupations & Doublon (auto-zoomed)

L=2 Site 0 n_{up}

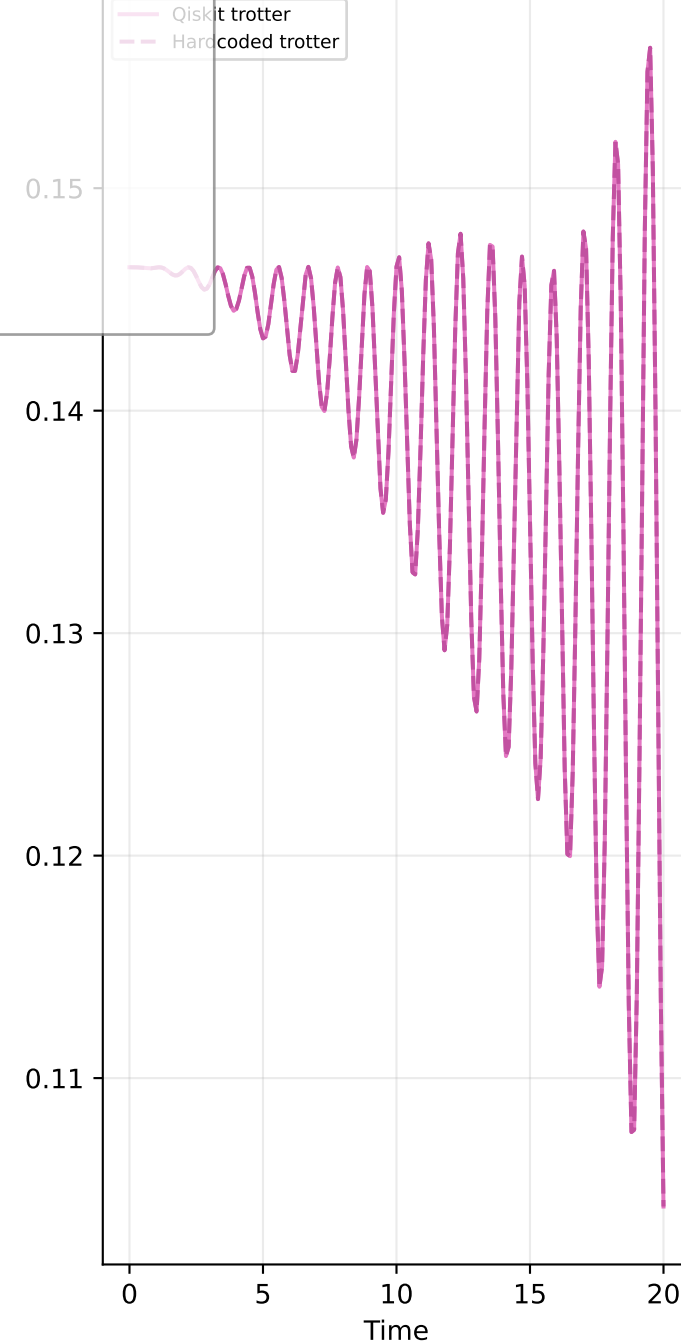
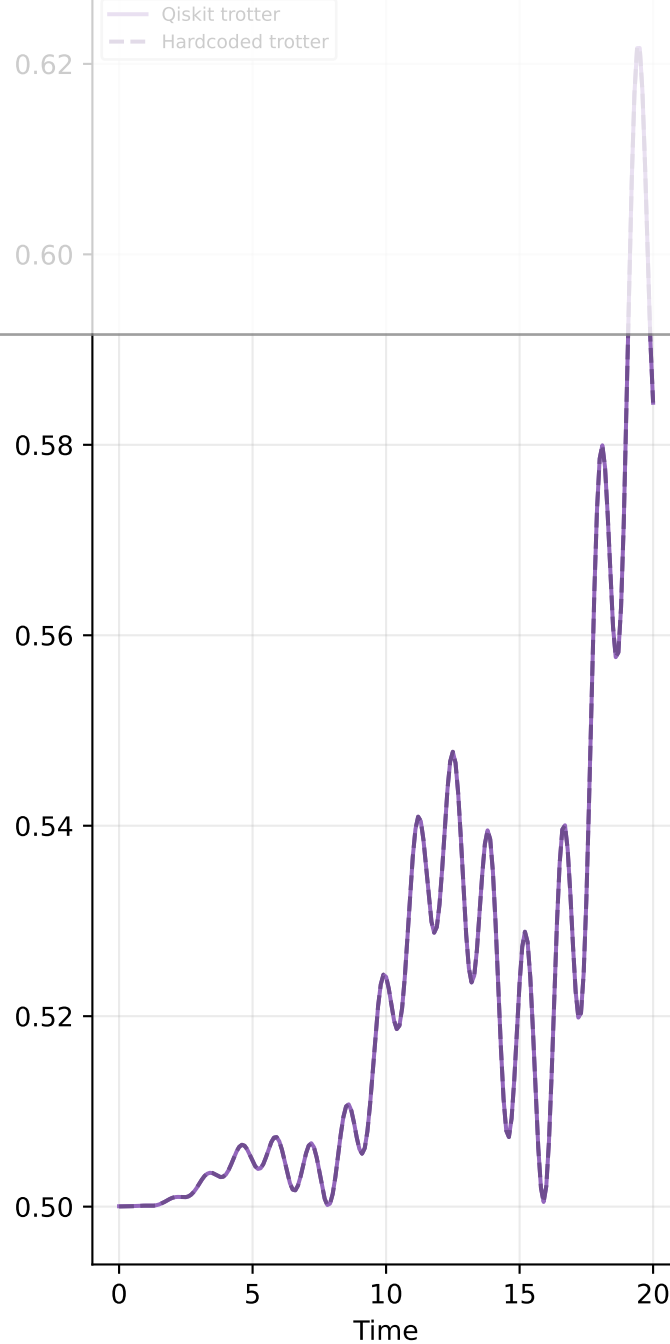
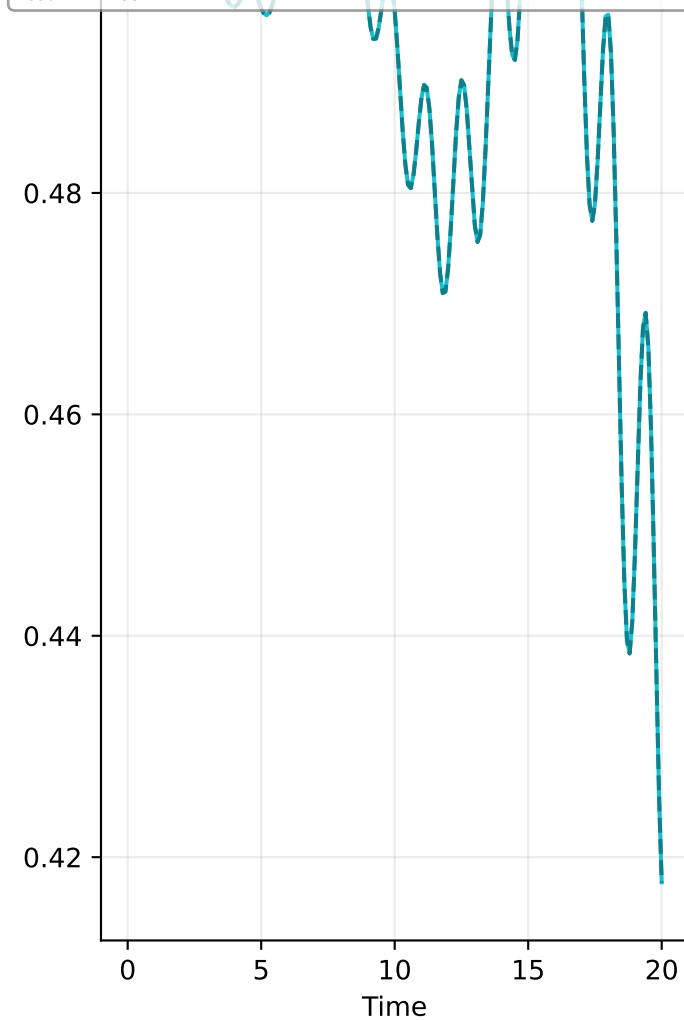
L=2 Site 0 n_{dn}

L=2 Doublon

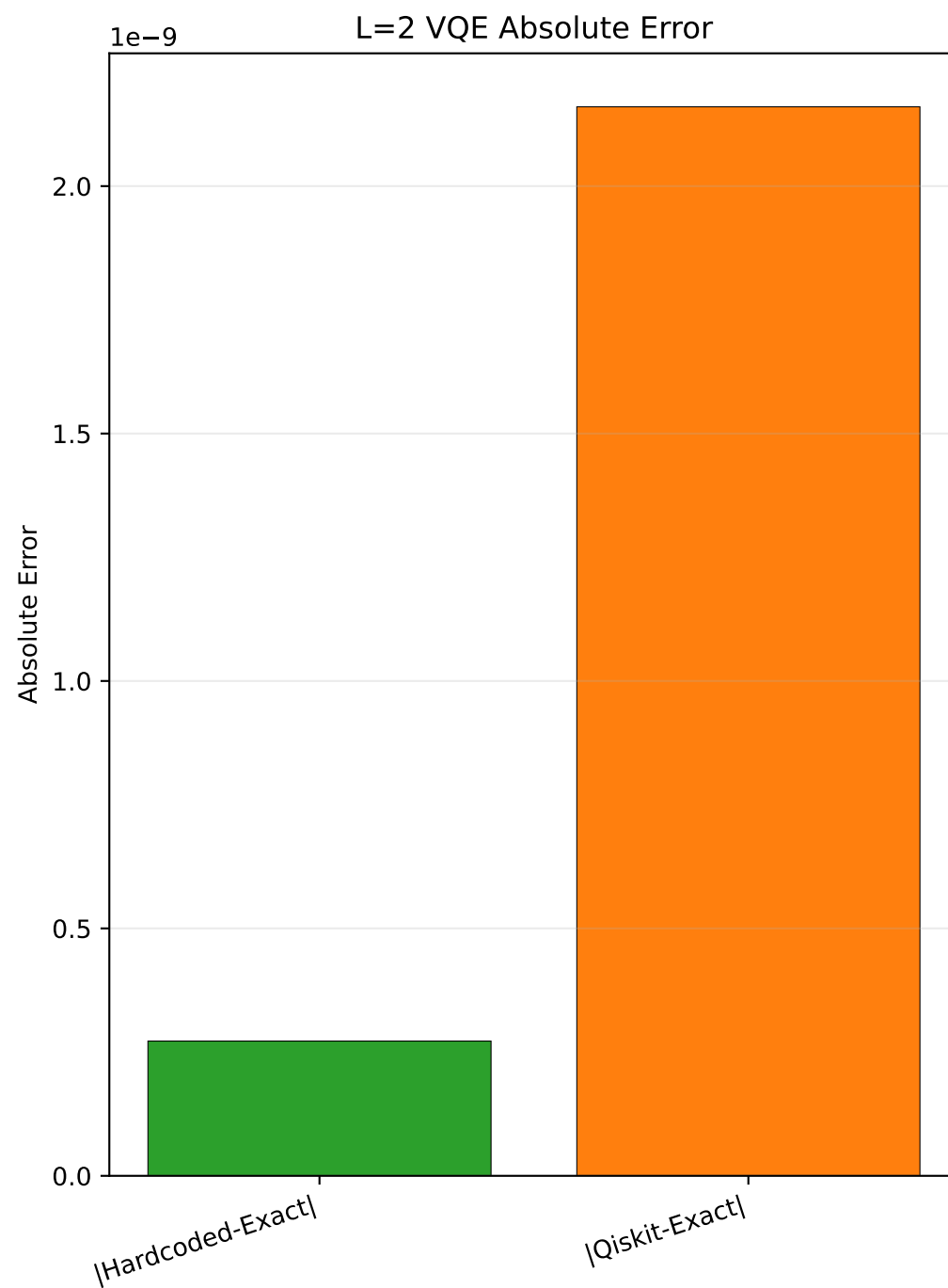
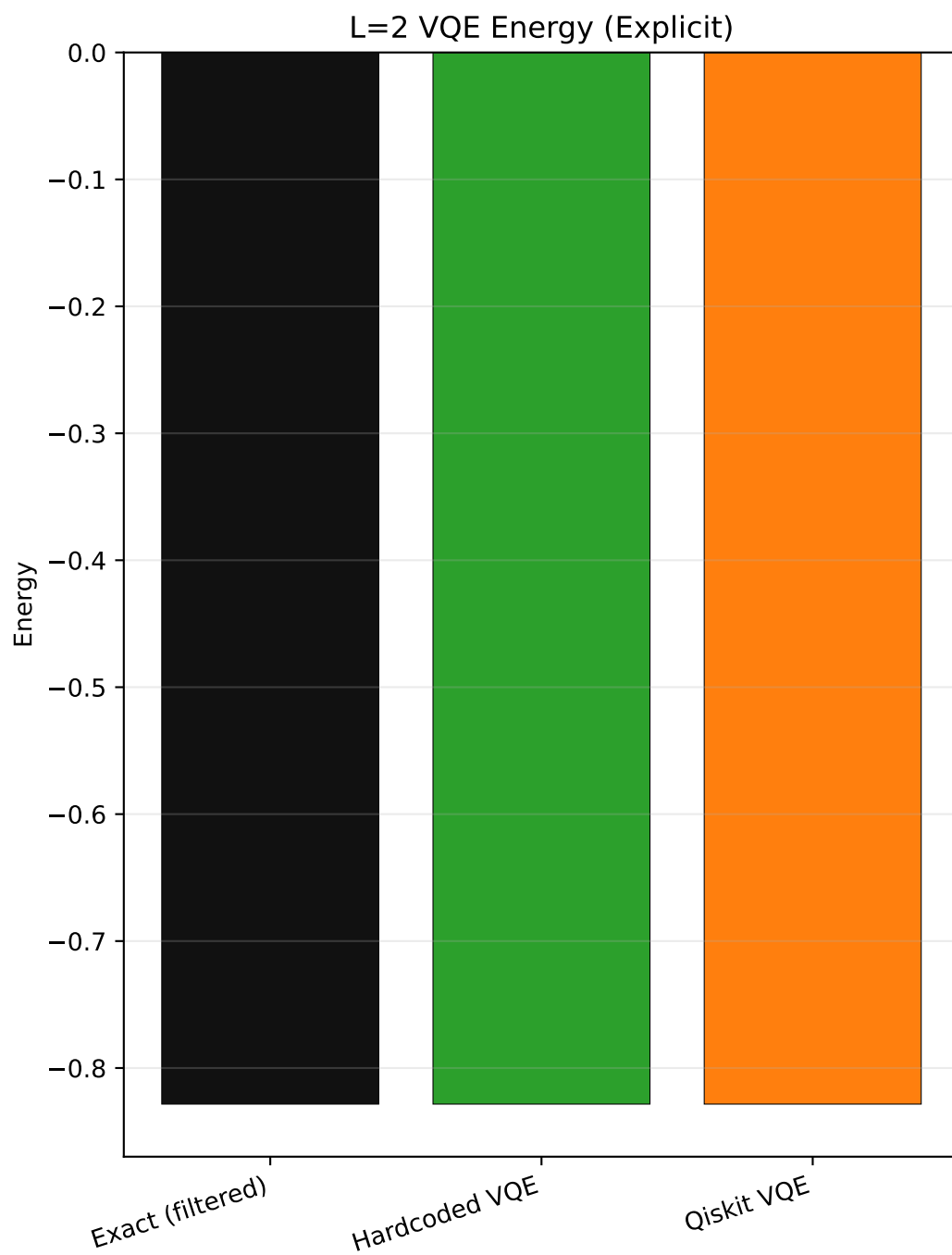
L=2 t=1.0 u=4.0 dv=0.0 boundary=periodic ordering=blocked initial_state_source=vqe t_final=20.0 num_times=201 suzuki_order=2 trotter_steps=64

thresholds:
 Qiskit trotter
 doublon_trotter_max_abs_delta: 1.00e-03
 energy_trotter_max_abs_delta: 1.00e-03
 fidelity_max_abs_delta: 1.00e-04
 ground_state_energy_abs_delta: 1.00e-08
 n_dn_site0_trotter_max_abs_delta: 5.00e-03
 n_up_site0_trotter_max_abs_delta: 5.00e-03

max $|\Delta|$:
 gs_energy: 0.00e+00
 doublon_trotter: 2.79e-06
 energy_trotter: 2.35e-05
 fidelity: 8.59e-06
 n_dn_site0_trotter: 2.79e-05
 n_up_site0_trotter: 2.78e-05
 result: PASS



VQE is a separate quantity from the Trotter $t=0$ value; do not infer VQE energy from trajectory plots.



Bundle Delta Diagnostics L=2

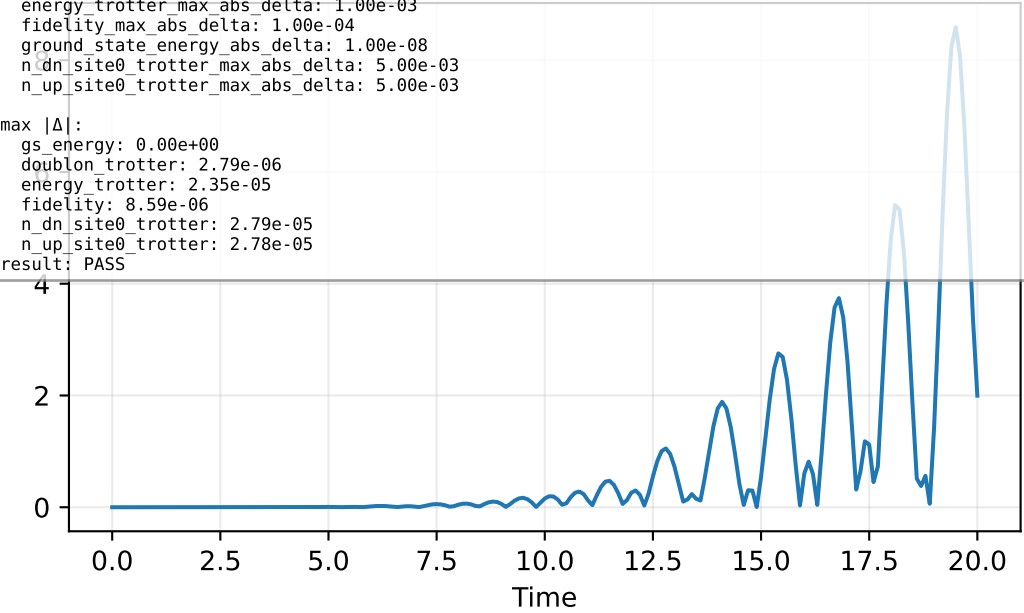
$\Delta X(t) = |X_{hc}(t) - X_{qk}(t)|$, where $X_{pipeline}(t)$ is that pipeline's stored trajectory value.

L=2 t=1.0 u=4.0 dv=0.0 boundary=periodic ordering=blocked initial_state_source=vqe t_final=20.0 num_times=201 suzuki_order=2 trotter_steps=64

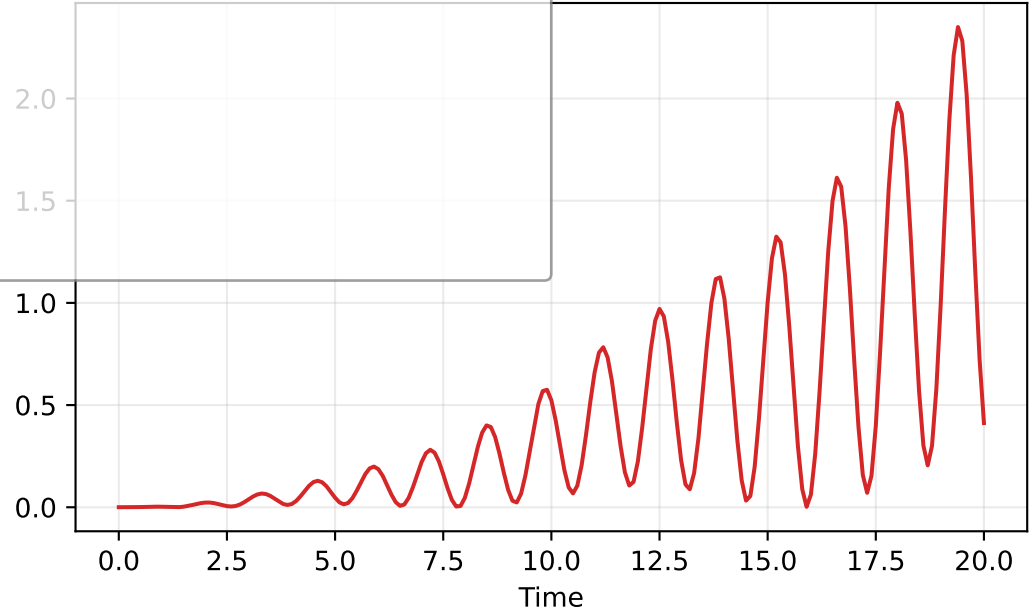
thresholds:
doublon_trotter_max_abs_delta: 1.00e-03
energy_trotter_max_abs_delta: 1.00e-03
fidelity_max_abs_delta: 1.00e-04
ground_state_energy_abs_delta: 1.00e-08
n_dn_site0_trotter_max_abs_delta: 5.00e-03
n_up_site0_trotter_max_abs_delta: 5.00e-03

max $|\Delta|$:
gs_energy: 0.00e+00
doublon_trotter: 2.79e-06
energy_trotter: 2.35e-05
fidelity: 8.59e-06
n_dn_site0_trotter: 2.79e-05
n_up_site0_trotter: 2.78e-05
result: PASS

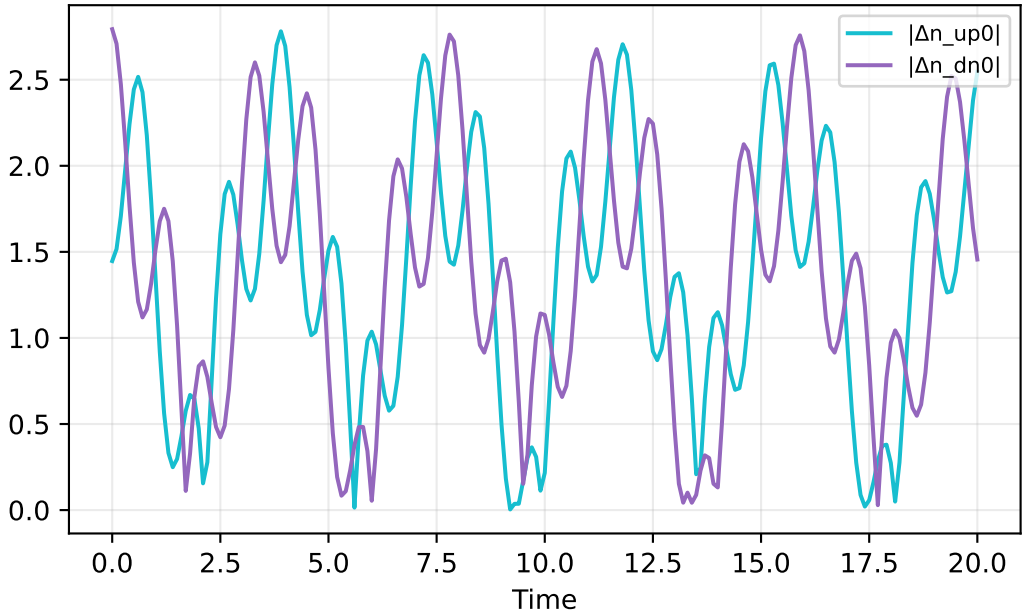
$|\Delta F(t)|$



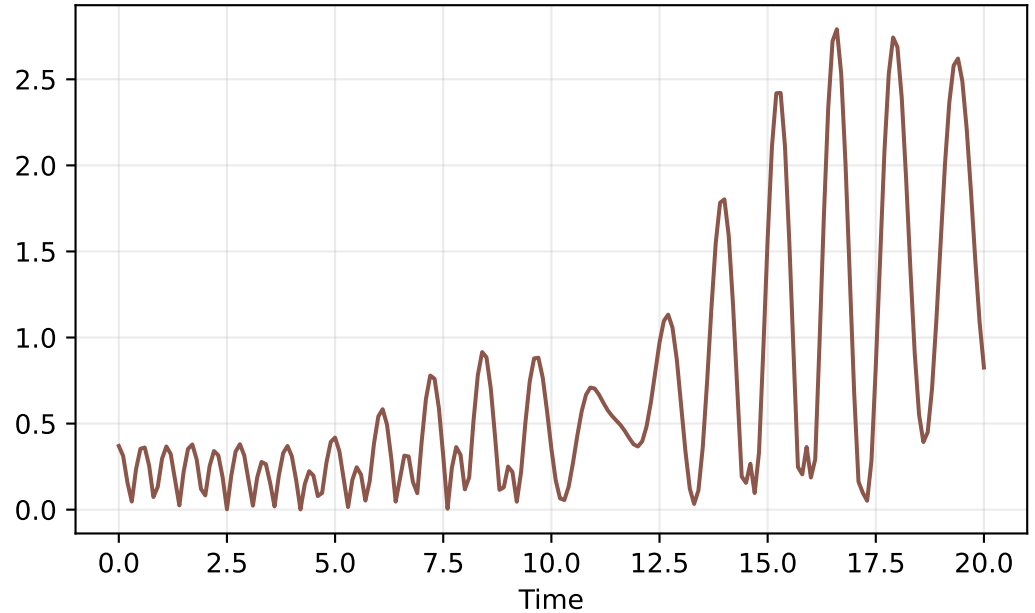
$|\Delta E_{trot}(t)|$



$|\Delta n_{up0}(t)|$ and $|\Delta n_{dn0}(t)|$



$|\Delta D(t)|$



Bundle metrics page L=2

Trotterization comparison uses each path's configured initial state.

For VQE-init runs, both exact(t) and trotter(t) start from the VQE ansatz state.

Delta metric definitions:

$$\Delta F(t) = |F_{hc}(t) - F_{qk}(t)|$$

$$\Delta E_{trot}(t) = |E_{trot_{hc}}(t) - E_{trot_{qk}}(t)|$$

$$\Delta n_{up0}(t) = |n_{up0_{hc}}(t) - n_{up0_{qk}}(t)|$$

$$\Delta n_{dn0}(t) = |n_{dn0_{hc}}(t) - n_{dn0_{qk}}(t)|$$

$$\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$$

$F_{pipeline}(t)$ is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

ground_state_energy_abs_delta = 0.0

fidelity max/mean/final = 8.59377818263063e-06 / 8.005364268005184e-07 / 1.9968946775028584e-06

energy_trotter max/mean/final = 2.3499154368722408e-05 / 4.296069546226253e-06 / 4.121644446297701e-06

n_up_site0_trotter max/mean/final = 2.781282510533334e-05 / 1.3631273238300274e-05 / 2.545305309981094e-05

n_dn_site0_trotter max/mean/final = 2.7934482115687942e-05 / 1.3868963351504503e-05 / 1.4557018242267183e-05

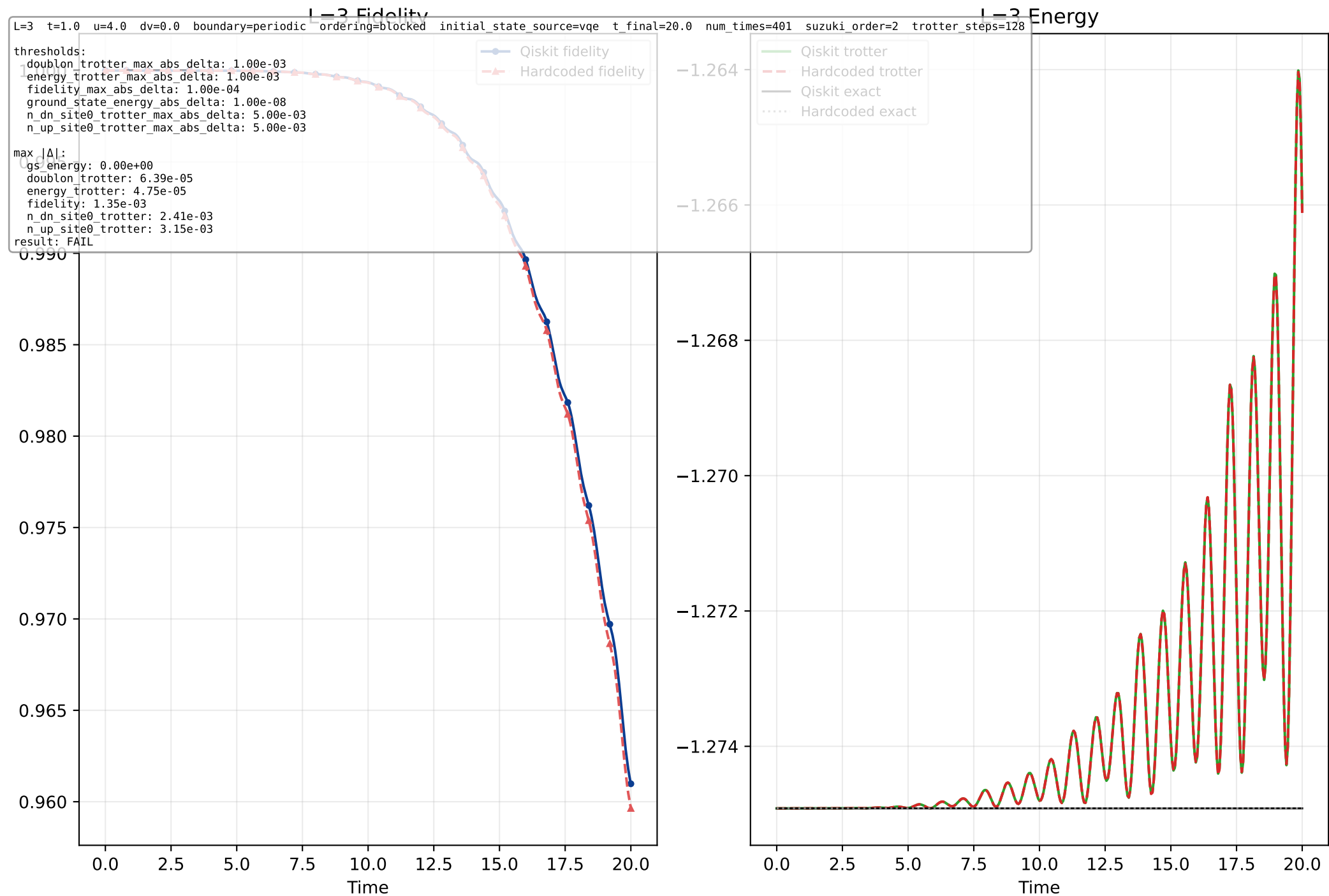
doublon_trotter max/mean/final = 2.7910871213676636e-06 / 6.794619643993374e-07 / 8.256188262223407e-07

checks:

```
{'doublon_trotter_max_abs_delta': True,
 'energy_trotter_max_abs_delta': True,
 'fidelity_max_abs_delta': True,
 'ground_state_energy_abs_delta': True,
 'n_dn_site0_trotter_max_abs_delta': True,
 'n_up_site0_trotter_max_abs_delta': True}
```

PASS = True

Bundle Page: L=3 Fidelity & Energy



Bundle Page: L=3 Occupations & Doublon (auto-zoomed)

L=3 Site 0 n_{up}

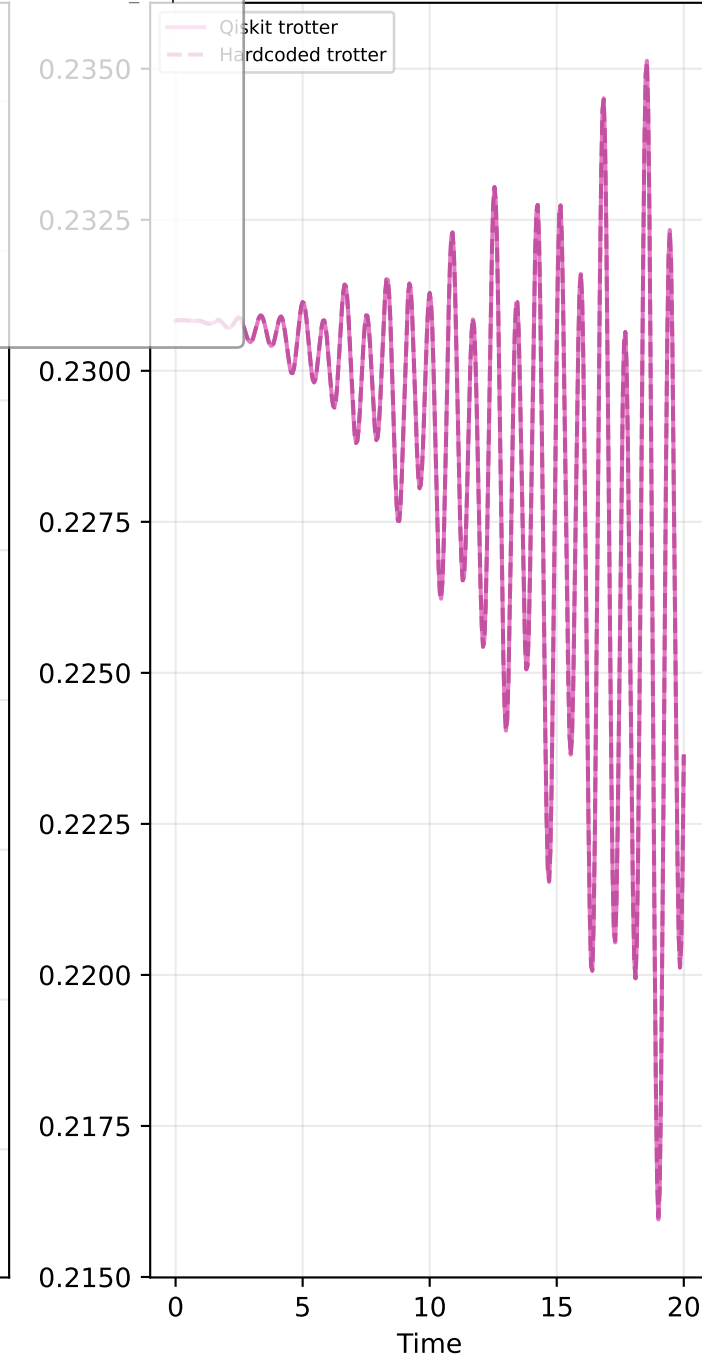
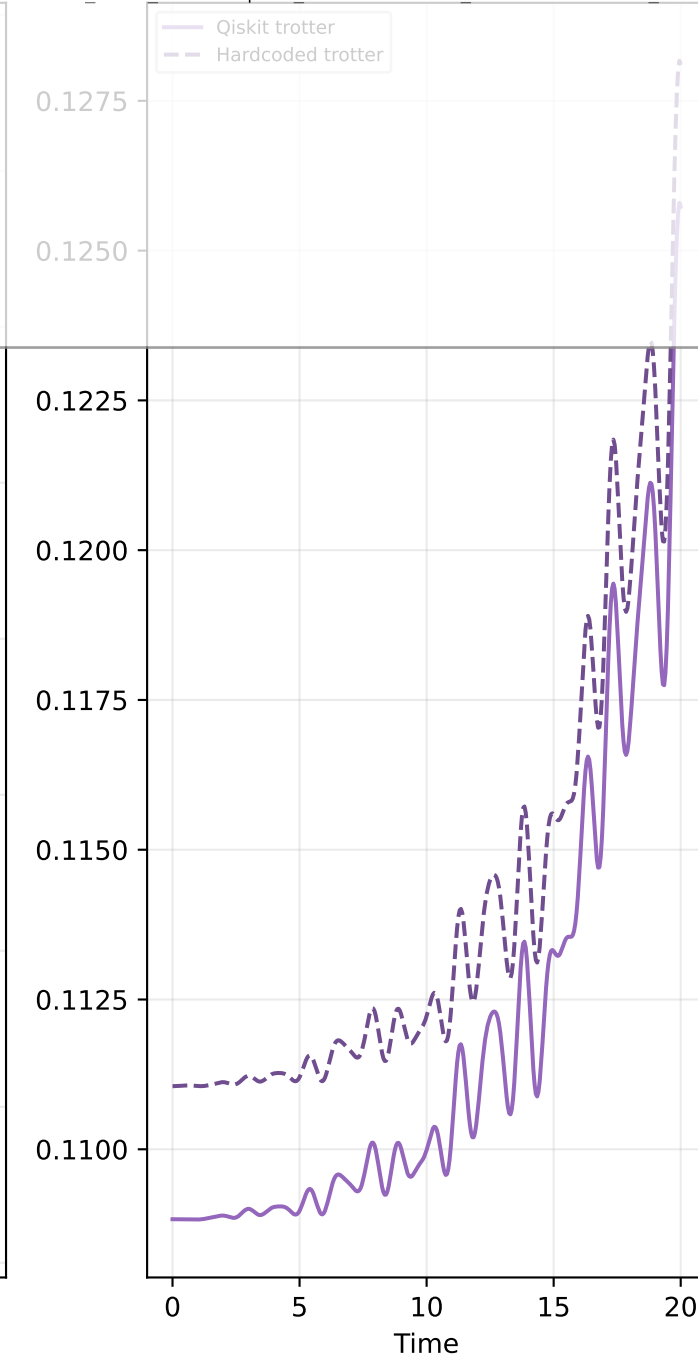
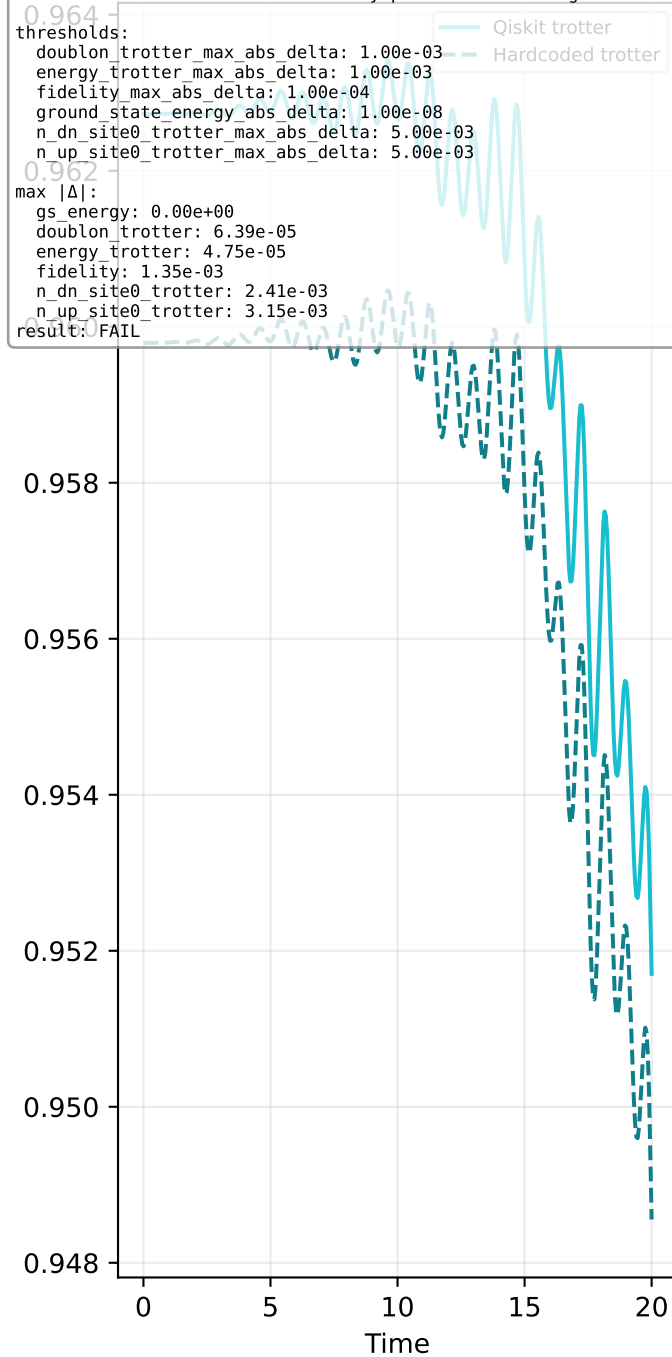
L=3 Site 0 n_{dn}

L=3 Doublon

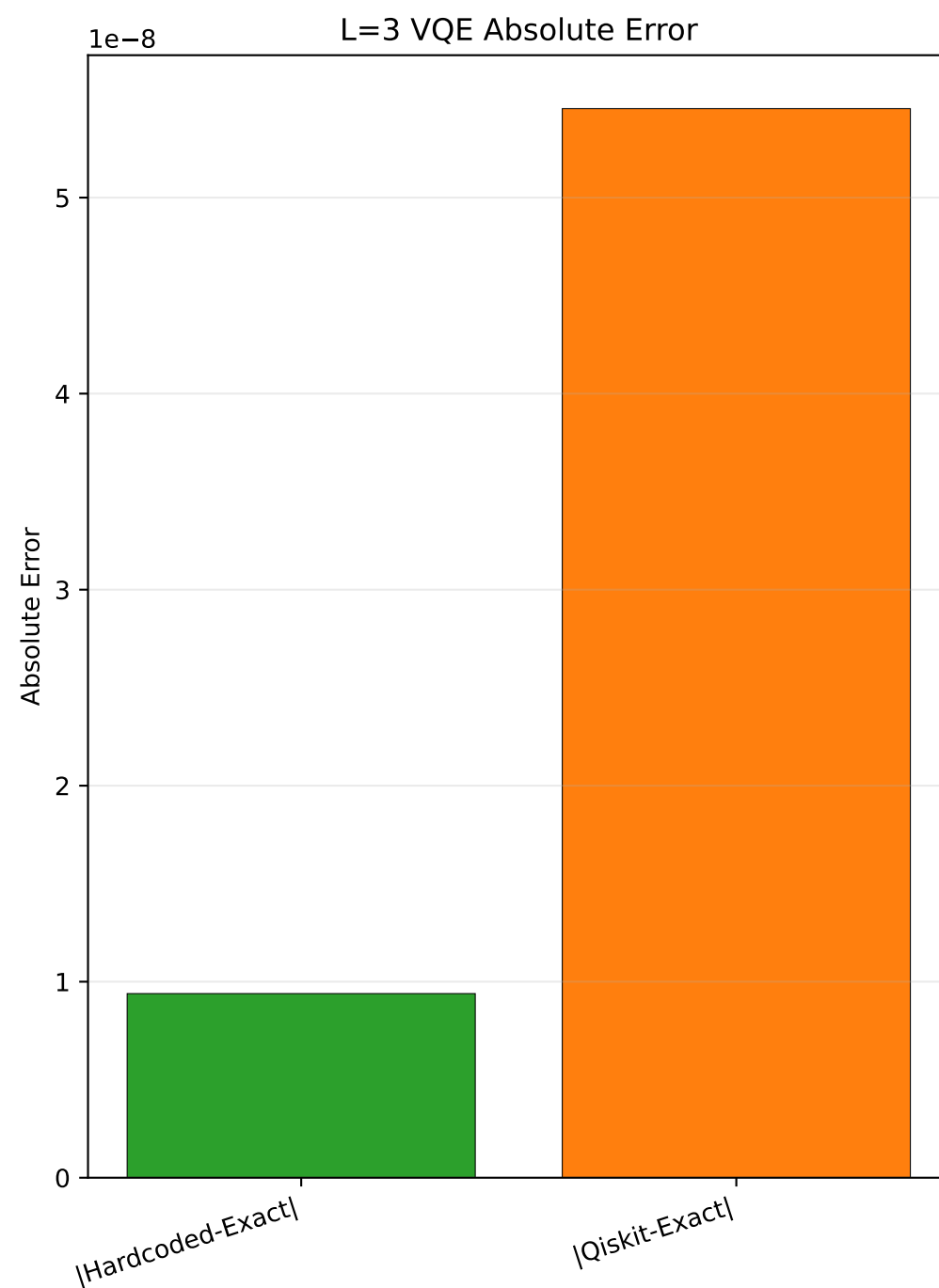
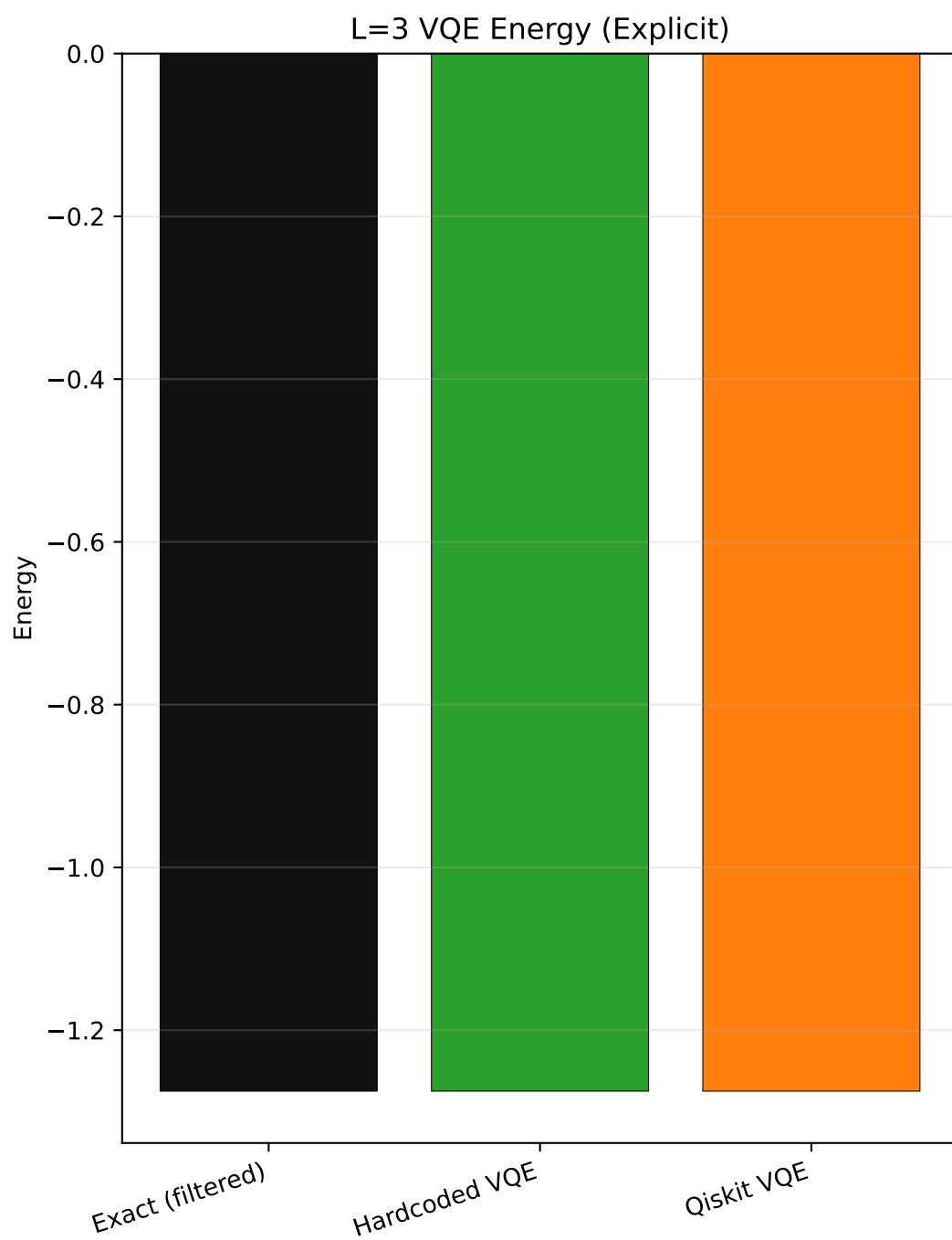
L=3 t=1.0 u=4.0 dv=0.0 boundary=periodic ordering=blocked initial_state source=vqe t_final=20.0 num_times=401 suzuki_order=2 trotter_steps=128

thresholds:
 doublon_trotter_max_abs_delta: 1.00e-03
 energy_trotter_max_abs_delta: 1.00e-03
 fidelity_max_abs_delta: 1.00e-04
 ground_state_energy_abs_delta: 1.00e-08
 n_dn_site0_trotter_max_abs_delta: 5.00e-03
 n_up_site0_trotter_max_abs_delta: 5.00e-03

max $|\Delta|$:
 gs_energy: 0.00e+00
 doublon_trotter: 6.39e-05
 energy_trotter: 4.75e-05
 fidelity: 1.35e-03
 n_dn_site0_trotter: 2.41e-03
 n_up_site0_trotter: 3.15e-03
 result: FAIL



VQE is a separate quantity from the Trotter $t=0$ value; do not infer VQE energy from trajectory plots.



Bundle Delta Diagnostics L=3

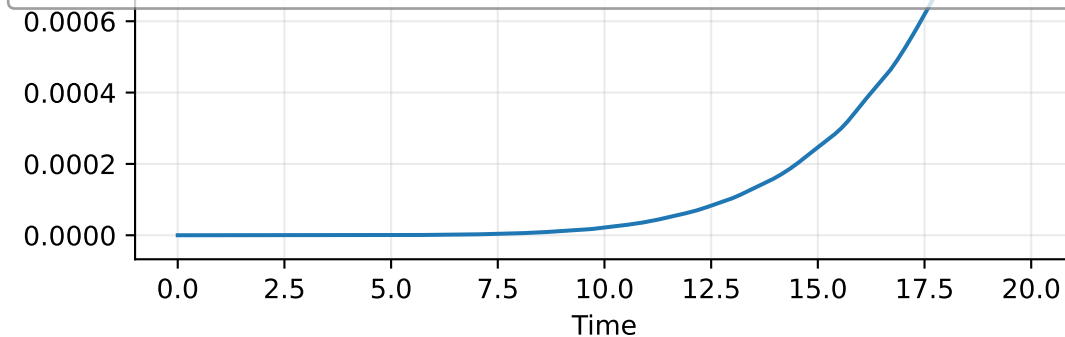
$\Delta X(t) = |X_{hc}(t) - X_{qk}(t)|$, where $X_{pipeline}(t)$ is that pipeline's stored trajectory value.

L=3 t=1.0 u=4.0 dv=0.0 boundary=periodic ordering=blocked initial_state_source=vqe t_final=20.0 num_times=401 suzuki_order=2 trotter_steps=128

thresholds:
doublon_trotter_max_abs_delta: 1.00e-03
energy_trotter_max_abs_delta: 1.00e-03
fidelity_max_abs_delta: 1.00e-04
ground_state_energy_abs_delta: 1.00e-08
n_dn_site0_trotter_max_abs_delta: 5.00e-03
n_up_site0_trotter_max_abs_delta: 5.00e-03

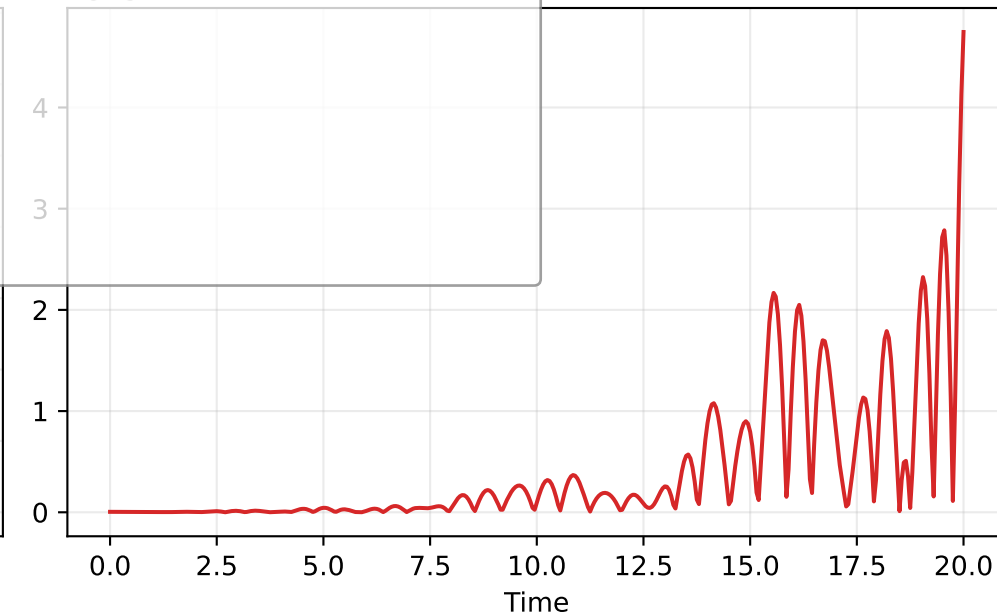
max $|\Delta|$:
gs_energy: 0.00e+00
doublon_trotter: 6.39e-05
energy_trotter: 4.75e-05
fidelity: 1.35e-03
n_dn_site0_trotter: 2.41e-03
n_up_site0_trotter: 3.15e-03
result: FAIL

$|\Delta F(t)|$

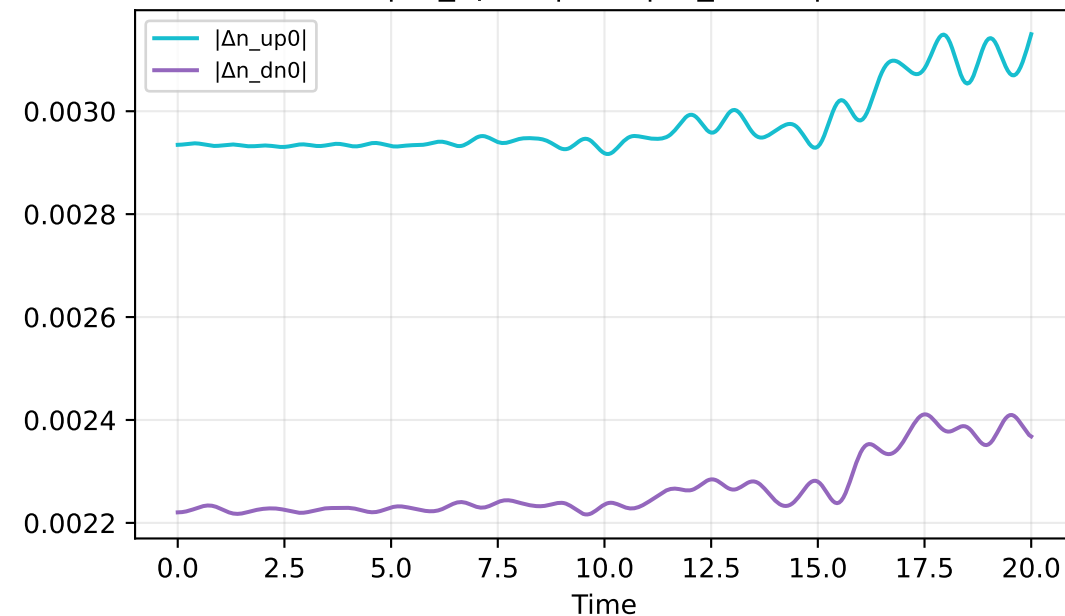


$1e-5$

$|\Delta E_{trot}(t)|$

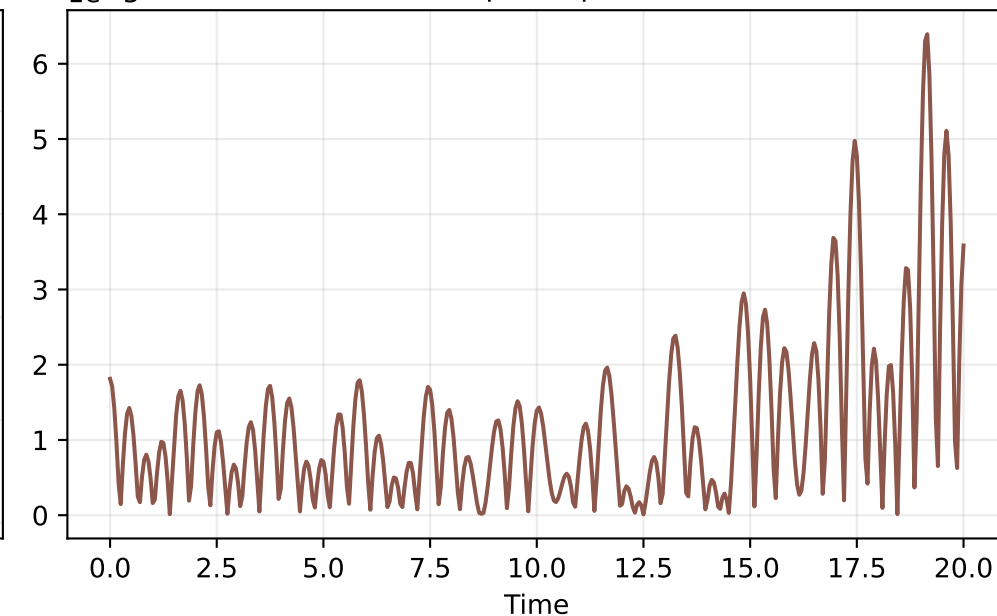


$|\Delta n_{up0}(t)|$ and $|\Delta n_{dn0}(t)|$



$1e-5$

$|\Delta D(t)|$



Bundle metrics page L=3

Trotterization comparison uses each path's configured initial state.

For VQE-init runs, both exact(t) and trotter(t) start from the VQE ansatz state.

Delta metric definitions:

$$\Delta F(t) = |F_{hc}(t) - F_{qk}(t)|$$

$$\Delta E_{trot}(t) = |E_{trot_hc}(t) - E_{trot_qk}(t)|$$

$$\Delta n_{up0}(t) = |n_{up0_hc}(t) - n_{up0_qk}(t)|$$

$$\Delta n_{dn0}(t) = |n_{dn0_hc}(t) - n_{dn0_qk}(t)|$$

$$\Delta D(t) = |D_{hc}(t) - D_{qk}(t)|$$

$F_{pipeline}(t)$ is the pipeline's stored trajectory fidelity value (as computed internally vs that pipeline's exact evolution).

ground_state_energy_abs_delta = 0.0

fidelity max/mean/final = 0.0013464071626839713 / 0.00019665025721909328 / 0.0013464071626839713

energy_trotter max/mean/final = 4.7458908048580994e-05 / 3.99668035453194e-06 / 4.7458908048580994e-05

n_up_site0_trotter max/mean/final = 0.0031496651890847716 / 0.002975898354829075 / 0.0031496651890847716

n_dn_site0_trotter max/mean/final = 0.0024109550934178353 / 0.00226718670337712 / 0.002368035185029038

doublon_trotter max/mean/final = 6.39293585977807e-05 / 1.1616930205037722e-05 / 3.5848731140875056e-05

checks:

```
{'doublon_trotter_max_abs_delta': True,
 'energy_trotter_max_abs_delta': True,
 'fidelity_max_abs_delta': False,
 'ground_state_energy_abs_delta': True,
 'n_dn_site0_trotter_max_abs_delta': True,
 'n_up_site0_trotter_max_abs_delta': True}
```

PASS = False