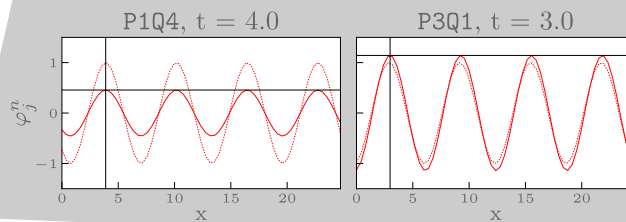


Goal: minimize the runtime/energy under an accuracy constraint

1. Identify options

- P3Q4: 3rd order upwind stencil
4th order integration
- P5Q3: 5rd order upwind stencil
3th order integration
- ...

2. Model accuracy



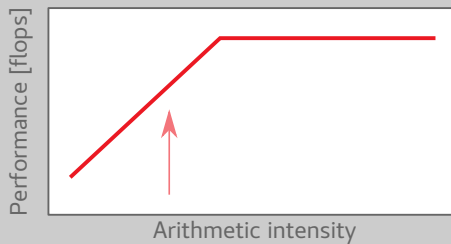
The Von Neumann analysis is automatised to predict the error of the simulation.

4. Optimize

Tune Δx and Δt

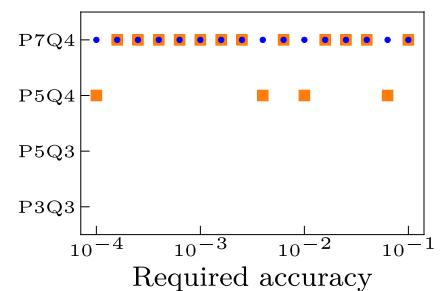
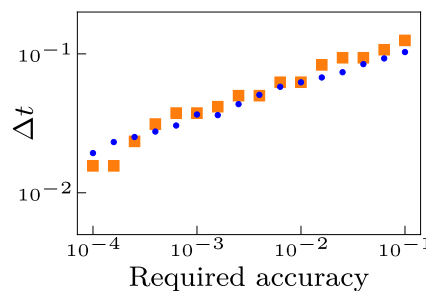
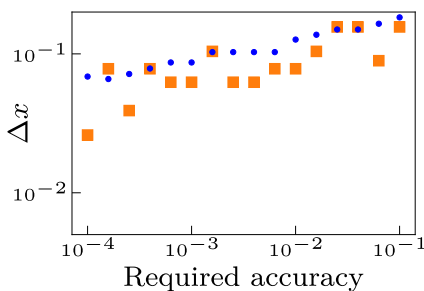


3. Model performance



The Roofline model identifies the bottlenecks and predicts the runtime. Energy consumption is derived from machine information.

Results: The orange squares represent the optimal choice as found experimentally; The blue circles represent the optimal choice as found through modeling



Our optimization strategy identifies the optimal solver without requiring to run expensive tuning experiments.