ML notes

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1   Second order accurateness SpicePy

Let there be m time discretizations of size Δt. Assuming second order accuracy:

$$u(i\Delta t) - u_{exact}(i\Delta t) \sim \mathcal{O}\left(\Delta t^2\right) \ ,$$

$$\text{mse} = \frac{1}{m}\sum_{i=1}^{m}\left[u(i\Delta t) - u_{exact}(i\Delta t)\right]^2 \approx \frac{m}{m}\int_0^{T_{\max}} \mathcal{O}\left(\Delta t^4\right) dt \sim \mathcal{O}\left(\Delta t^4\right) \ ,$$

which is what we experimentally observed. The second order accuracy is thus correct.