Weekly work summary

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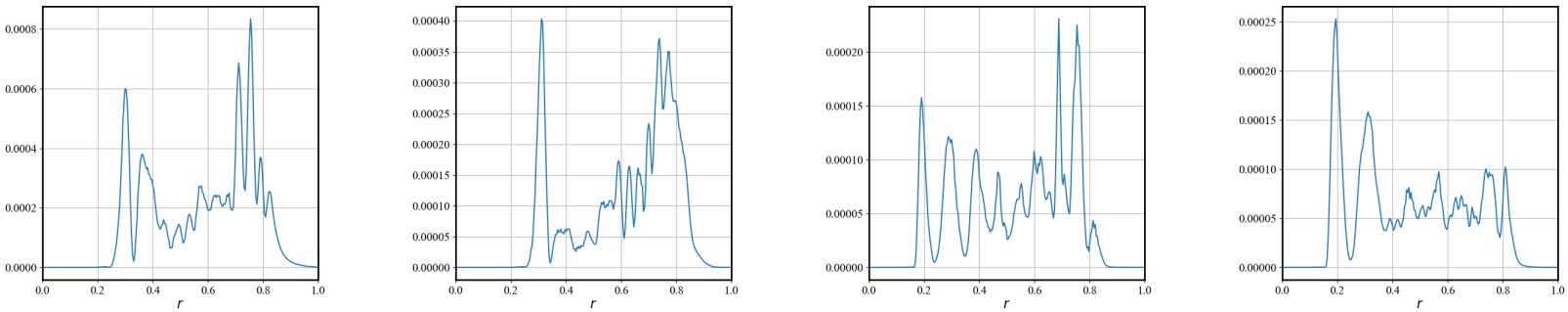
content

- revisiting to former simulation result
- spectral simulation base on electromagnetic 5-field landau fluid
  - conservation test
  - initial perturbation

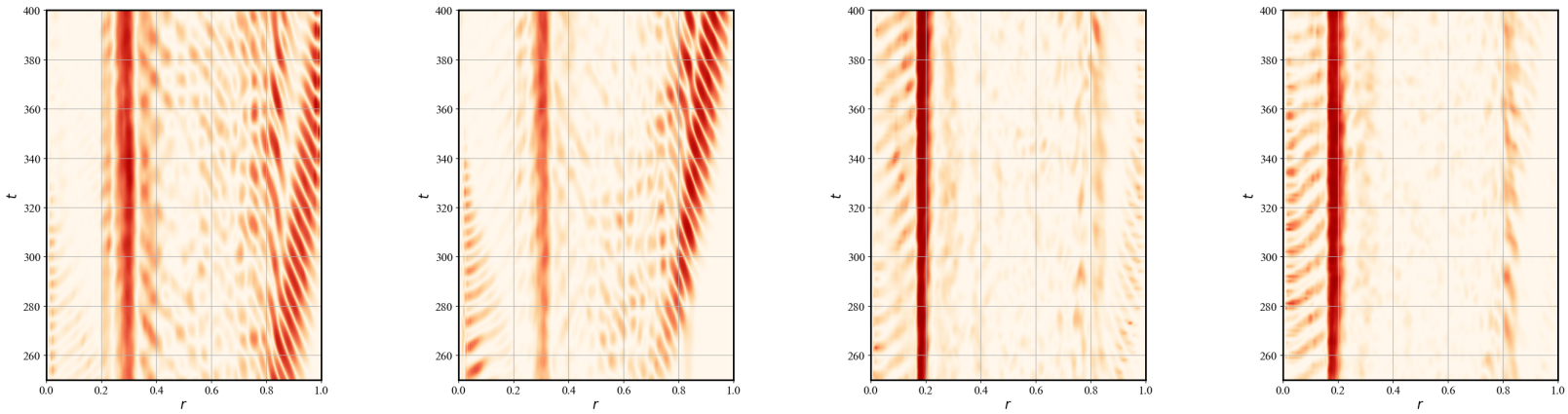
revisiting to former simulation result



(a) $\beta = 0.1\%$ (b) $\beta = 0.3\%$ (c) $\beta = 1.0\%$ (d) $\beta = 1.2\%$

Figure: Time averaged zonal flow profile

revisiting to former simulation result

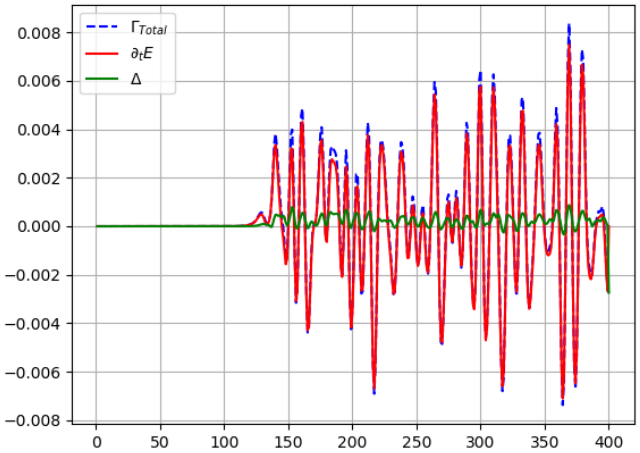


(a) $\beta = 0.1\%$ (b) $\beta = 0.3\%$ (c) $\beta = 1.0\%$ (d) $\beta = 1.2\%$

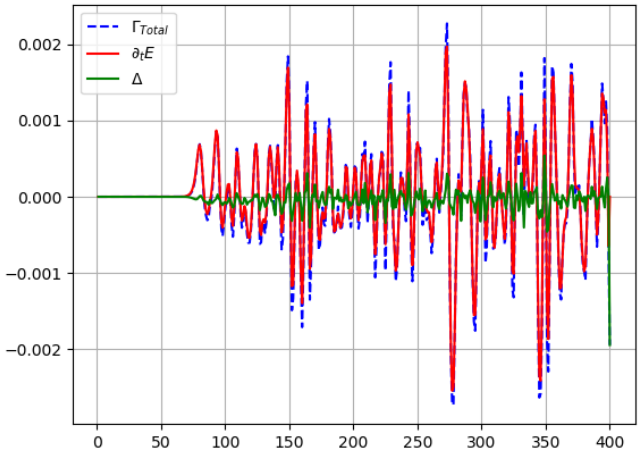
Figure: The ratio E_{zf}/E_{total} as a function of radius and time

Maybe a low q profile should be selected to check the results.

consevation test



(a) $\beta = 0.1\%$



(b) $\beta = 1.0\%$

Figure: derivative of zonal flow energy

question: accuration

consevation test

for LW2:

$$\frac{f_x^t - f_x^{t-\Delta t}}{\Delta t} - \mu(\nabla_\perp^2 f)_x^t = \frac{1}{2}(C_{x-1/2}^{t-\Delta t/2} + C_{x+1/2}^{t-\Delta t/2}) \tag{1}$$

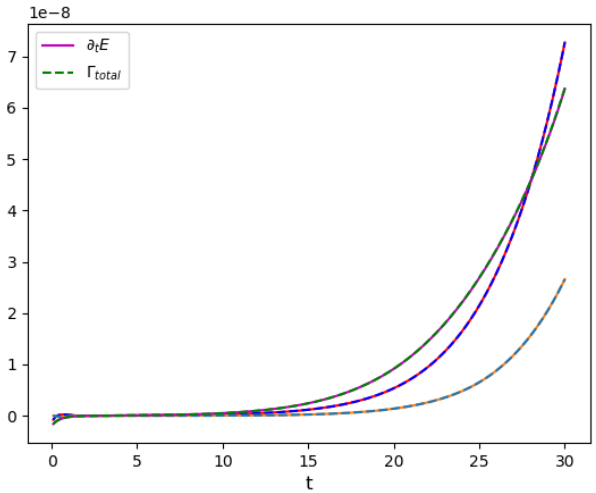
$$\frac{E_x^t - E_x^{t-\Delta t}}{\Delta t} = \mathcal{E}\{\frac{1}{2}(C_{x-1/2}^{t-\Delta t/2} + C_{x+1/2}^{t-\Delta t/2}) + \mu(\nabla_\perp^2 f)_x^t\} \tag{2}$$

problem: deviation triggered by volumn integration

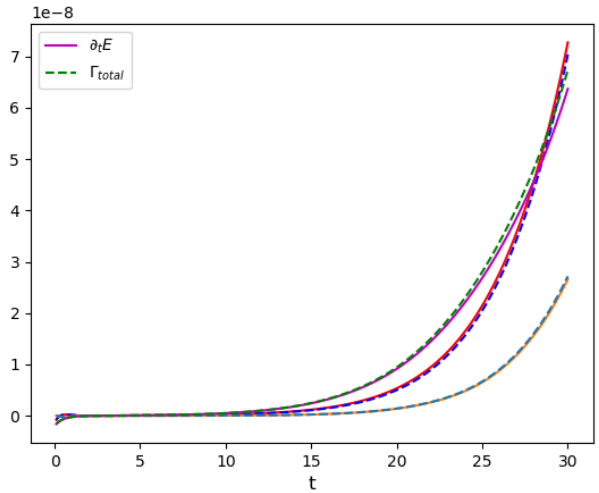
another idea:

E as a coupling equation to field equation set

consevation test



(a) $f \sim f(t - \Delta t/2)$



(b) $f \sim f(t)$

Figure: derivative of energy with LW2

consevation test

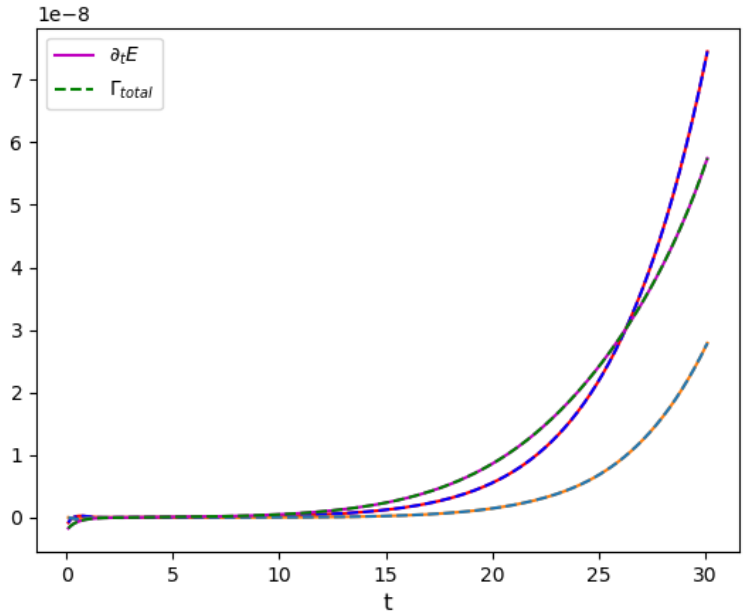


Figure: derivative of energy with AB2

initial perturbation

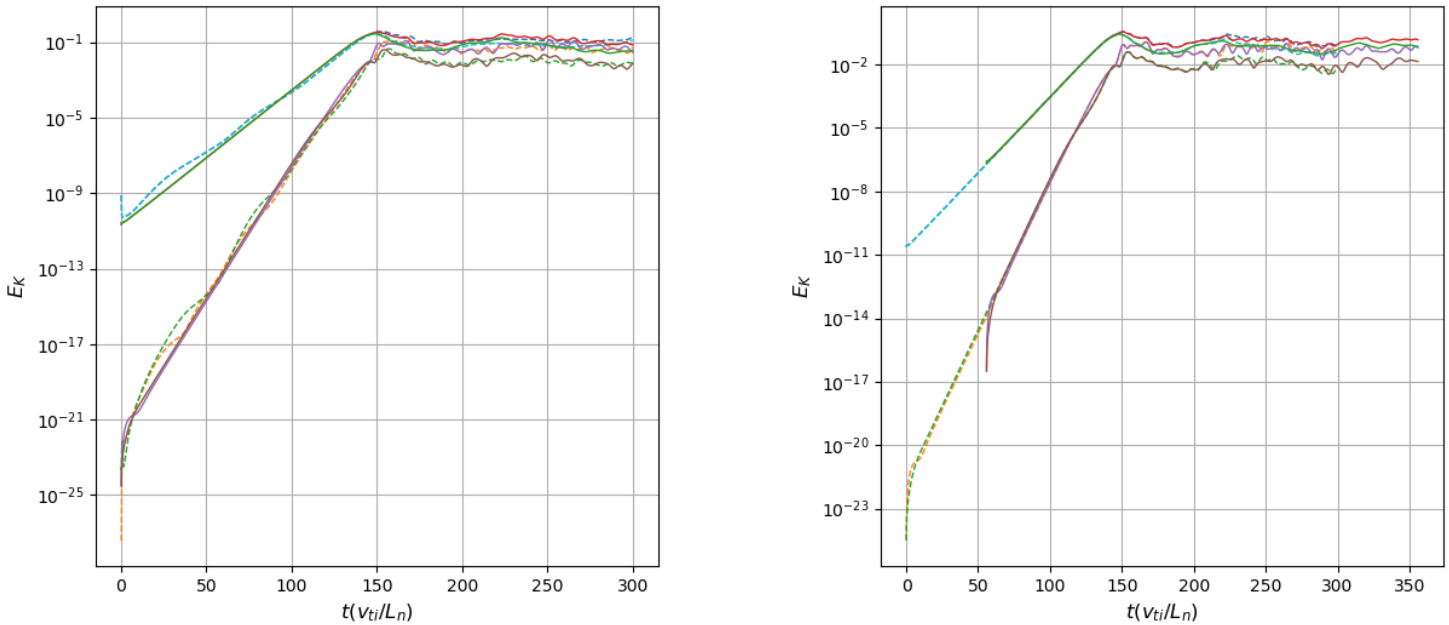


Figure: evolution of kinetic energy with different initial perturbation