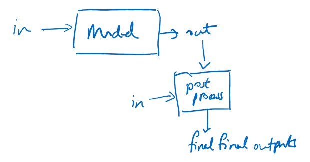
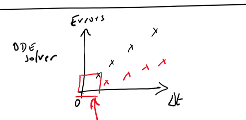
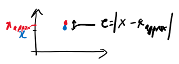
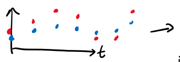
COMP MATH L4



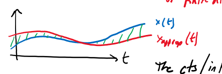


Hard to drive errors all the way to zero.

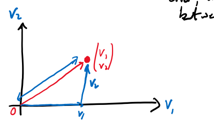


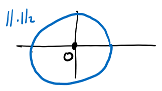


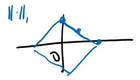
→ "size" of the error $x - x_{approx}$ is a discrete norm question or finite dim.

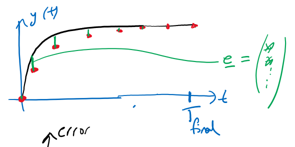


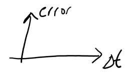
The cts/infinite-dim question is what is the size of the error, or difference between two fns



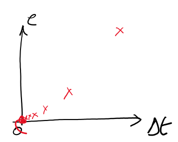








ODE solver $\frac{dy}{dt} = f(t, y)$



NOT IMPORTANT → 1. logging the Δt axis means halving Δt means an equal sized jump to the left.

2.

$$e \sim \frac{\Delta t^2}{2!} f'' + \frac{\Delta t^3}{3!} f''' + \dots$$

$$= \underbrace{\tfrac{1}{2} f''}_{\alpha_2} \Delta t^2 + \underbrace{\tfrac{1}{6} f'''}_{\alpha_3} \Delta t^3 + \dots$$

$$= \text{poly in } \Delta t$$

$$= \alpha_2 \Delta t^2 + \alpha_3 \Delta t^3 + \dots$$

For small enough Δt.

$$e \approx \alpha_2 \Delta t^2.$$
