

III.4 Runge-Kutta methods

So far: Euler methods with error $\mathcal{O}(h)$

→ want 100 x smaller error

↳ ? x smaller step size h

100

100

? x more (computational) work

Can we do better? YES! ▽

Try: $y_{j+1} = y_j + h \cdot f\left(t_j + \frac{h}{2}, \tilde{y}_{j+\frac{1}{2}}\right)$

↑
Approx. of sol. at $t_j + h/2$?

Let's go back to the slope field:

