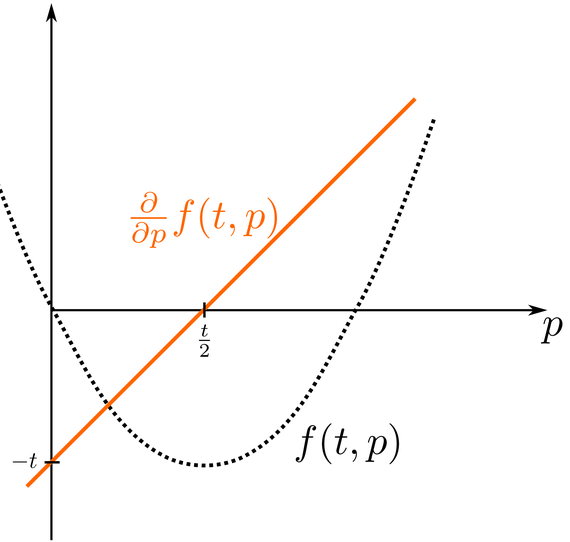
Symbolic Differentiation

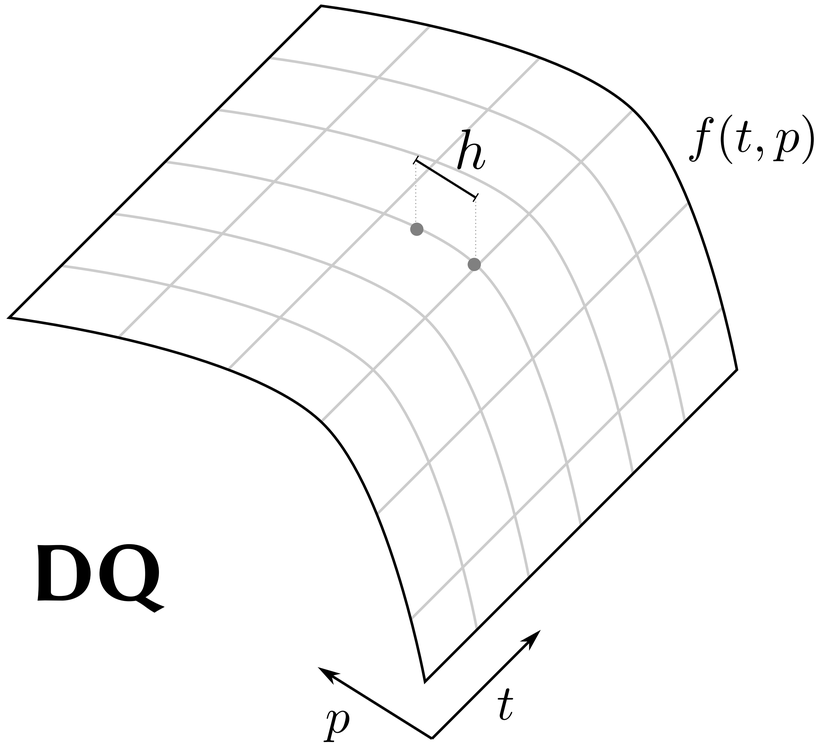
(example)



$$f(t,p) = p^2 - t \cdot p$$

$$\frac{\partial}{\partial p} f(t,p) = 2 \cdot p - t$$

Difference Quotient



DQ

$$\frac{\partial}{\partial p} f(t,p) = \lim_{h \to 0} \frac{f(t,p+h) - f(t,p)}{h}$$

Sensitivity Analysis

Find an ODE
for the derivatives

$$\frac{\mathrm{d}}{\mathrm{d}t} \frac{\partial f(t,p)}{\partial p} = g(\frac{\partial}{\partial p} f(t,p), t)$$

Solve with Runge-Kutta
ODE solver

SAB