

CROSS ENTROPY.

INIT $D(\theta)$

SAMPLE

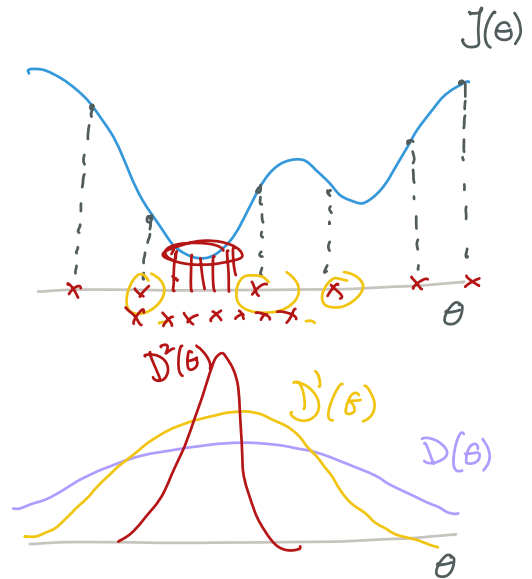
- SAMPLE N times from $D(\theta)$
- $$\{\theta_i\}_{i=1}^N$$

EVALUATE

- EVALUATE EACH θ_i , $J(\theta_i)$

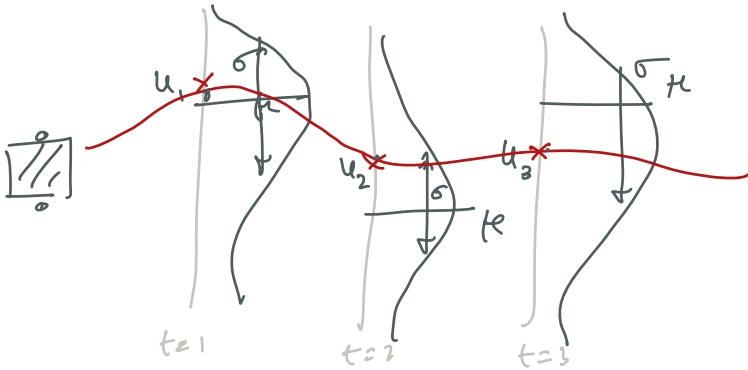
UPDATE

- FIND THE TOP $K\%$ SAMPLES (10%)
- FIT $D'(\theta)$ TO TOP $K\%$ SAMPLES



CEM FOR CONTROL

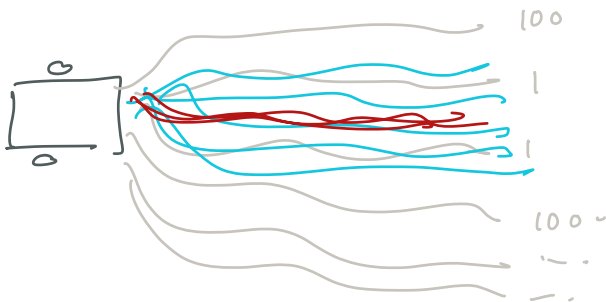
$$\theta = [u_1, u_2, \dots, u_T]$$

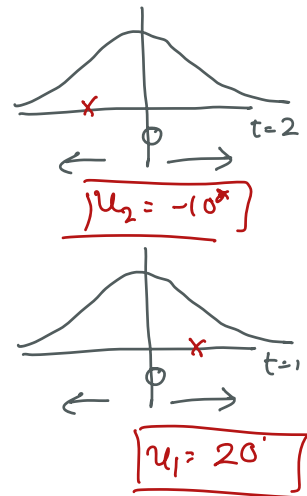
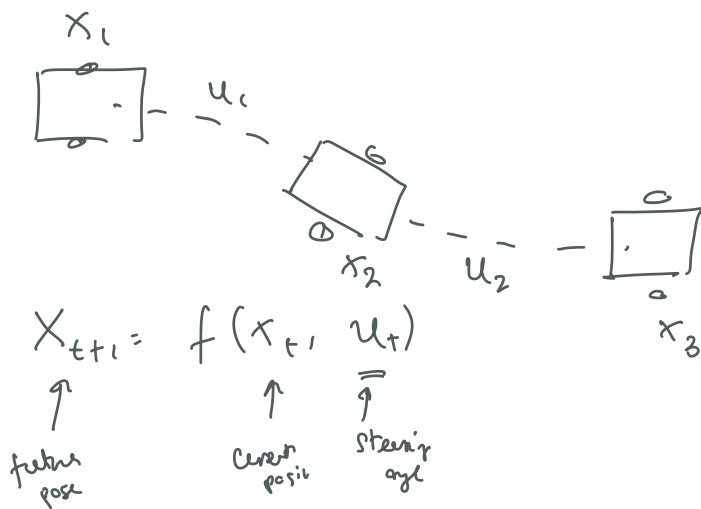


$D(\theta)$

$$x_{t+1} = f(x_t, u_t)$$

$$J(\theta) = \sum_{t=1}^T c(x_t, u_t)$$





$$\begin{aligned}
 J(\theta) &= \begin{matrix} \rightarrow & [u_1 & u_2 & \dots & u_T] \\ & \downarrow & & & \\ & [x_1 & \dots & \dots & x_T] \end{matrix} \\
 &= \sum_{t=1}^T C(x_t, u_t)
 \end{aligned}$$

$$\begin{aligned}
 &M(x_t \in O_{ps}) + \|u_t\|^2 \\
 &+ \|x_T - x_{G1}\|^2
 \end{aligned}$$