**Cross Entropy**

**Init**

\[ D(\theta) \]

**Sample**

- Sample \( N \) times from \( D(\theta) \)

\[ \theta_i \sim \theta_i \sim \sum_{i=1}^N \]

**Evaluate**

- Evaluate each \( \theta_i \), \( J(\theta_i) \)

**Update**

- Find the top \( k \)\% samples
  
  \[ \text{FIT } D'(\theta) \text{ to top } k\% \text{ samples} \]

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**CEM for Control**

\[ \theta = [u_1, u_2, \ldots, u_T] \]

\[ D(\theta) \]

\[ X_{tr} = f(x_t, u_t) \]

\[ J(\theta) = \sum_{t=1}^T C(x_t, u_t) \]

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**Diagram**

- Graphical representation of the cross entropy and control variables over different time steps.
\[ X_{t+1} = f(X_t, U_t) \]

\[ J(\theta) = \sum_{t=1}^{T} C(X_t, U_t) \]

\[ M \sum_{(X_t \in O_{bs})} + \|U_t\|^2 + (X_T - X_0)^2 \]