

FCAI

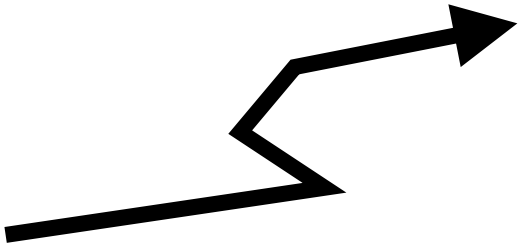
fcai.fi

Shooting Methods

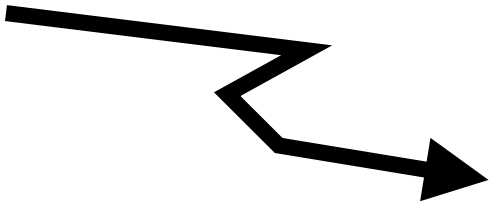
Cross-Entropy Method

2

6







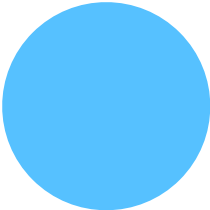
$$a_{t:t+H}^*$$

Iteration 3



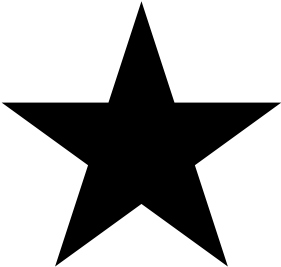






More **sample** efficient

Fastenerconvergence



Initialise action sequence sampling distribution $\{a_t \sim \mathcal{N}(\mu_t, \sigma_t^2)\}_{t=0}^H$

For each iteration

Sample N action sequences $\{a_{0:H}^i\}_{i=1}^N$ from sampling distribution

Evaluate objective $J(a_{0:H}^i) = \sum_{t=0}^H \gamma^t r(s_t, a_t^i)$ for each sample

Select top K performing samples, i.e. highest value $J(a_{0:H}^i)$

Update parameters $\{\mu_t, \sigma_t^2\}_{t=0}^H$ of action dist. using top K samples

Shooting Methods

Cross-Entropy Method

More sample efficient
Faster convergence

Iteration 3

Initialise action sequence sampling distribution $\{a_t \sim \mathcal{N}(\mu_t, \sigma_t^2)\}_{t=0}^H$

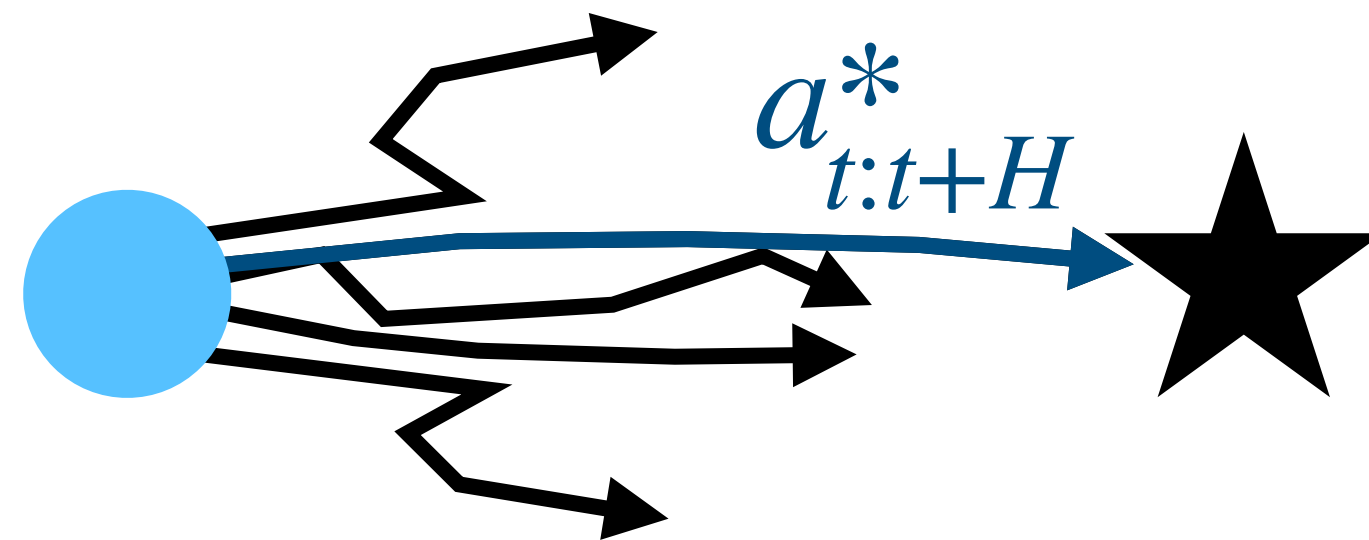
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Evaluate objective $J(a_{0:H}^i) = \sum_{t=0}^H \gamma^t r(s_t, a_t^i)$ for each sample

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Collocation methods

Illustration

$$J(a_{0:H}, s_{0:H}) = \sum_{t=0}^H \gamma^t r(s_t, a_t) \quad \text{s.t.} \quad \|s_{t+1} - f(s_t, a_t)\| = 0$$

