1 Hierarchical Optimistic Optimization

Objective

1.1 original HOO

Idea

Properties

1.2 truncated HOO

Idea

Properties

1.3 local HOO

Idea

Properties

1.4 z-HOO

Idea

Properties

2 Adaptive-treed bandits

Objective In *noisy global optimization*, we wish to maximize a continuous function $\mu : X \mapsto [0,1]$ over a space $X = [0,1]^p$, given only noisy observations of the function values $\mu(x)$.

Idea

Properties

3 Parallel Optimistic Optimization

Idea We want to optimize complex systems such as *black-box* systems where the simple evaluation of the function is noisy and very costly, and the derivatives along each parameters are totaly unknown (think of deep networks ?). Due to the high computational cost of evaluating the function (hours, days...) we only dispose of a finite budget of evaluation n.
Thus we adopt a bandit approach in which the action at each step t is $x_t \in \mathcal{D}_f$ and the reward is a noisy evaluation of our function : $r_t = f(x_t) + \epsilon_t$, with ϵ_t a bounded noise such that $\mathbb{E}[\epsilon_t | x_t] = 0$. After n evaluations, the algorithm outputs its best guess $x(n)$
Regret : $R_n = \sup f(x) - f(x(n))$

hypothesis $\exists x^* / f(x^*) = \sup f(x)$, and $f$does not decrease arround x^* faster than a known rate (local smoothness property).

Properties