

Start

Specify initial value \mathbf{x}_{MPP}

Deterministic design optimization

$$\begin{aligned} & \underset{\mathbf{s}}{\text{minimize}} \quad \mathcal{C}(\mathbf{s}) \\ & \text{subject to} \quad \mathcal{G}_i(\mathbf{s}, \mathbf{x}_{\text{MPP}}) - \bar{\xi}_i \leq 0; \forall i \in \{1, \dots, I\} \\ & \quad \quad \quad \mathcal{H}_j(\mathbf{s}) \leq 0; \forall j \in \{1, \dots, J\}, \\ & \quad \quad \quad \mathbf{s} \in [\mathbf{s}_L, \mathbf{x}_U]. \end{aligned}$$

\mathbf{s}

Generate initial training data points using LSH
 $\mathcal{D} = (\mathbf{X}, \mathcal{G})$

Construct GPR model
 $\hat{\mathcal{G}}(\mathbf{x}) \sim \mathcal{N}(\mu_{\hat{\mathcal{G}}}(\mathbf{x}), \sigma_{\hat{\mathcal{G}}}^2(\mathbf{x}))$

Number of added points exhausted?

no

Add new training point to \mathcal{D}

Optimize EFF to find a new training point

yes

Estimate \mathcal{P}_f using CE method (Algorithm 1)

Optimal design

Perform iCE to update \mathbf{x}_{MPP}

$\mathcal{P}_f \leq \mathcal{P}_a?$

no

yes

