Algorithm 1: Stochastic Optimization of NL Process with multiple constraints

Input : $\vec{B}, \vec{\sigma}, \overrightarrow{min}, \overrightarrow{max}, \mathcal{D}$

ConfigParams: $\delta_{cost}, \delta_{restart}$, noSimulations, $\overrightarrow{PB}$, CB, $\vec{\alpha}$, $\vec{\beta}$, totalIterations, storeSize, maxSimBudget, budgetDelta, budgetThreshold

Output : bestCandidate, $\hat{O}.m$

1 $acceptedCandSet_1$, $acceptedCandSet_2$, $\hat{O}.m \leftarrow$ `InflateDeflate` ($\vec{B}, \vec{\sigma}, \overrightarrow{min}, \overrightarrow{max}, \mathcal{D}$, $\delta_{cost}, \delta_{restart}$, noSimulations, $\overrightarrow{PB}$, CB, $\vec{\alpha}$, $\vec{\beta}$, totalIterations, storeSize, maxSimBudget) `// Algorithm 2`

2 bestCandidate, $\hat{O}.m \leftarrow$ `RefineCandidates` ($acceptedCandSet_1$, $acceptedCandSet_2$, $\vec{B}$, $\vec{\sigma}$, $\hat{O}.m$, $\mathcal{D}$, noSimulations, $\overrightarrow{PB}$, CB, maxSimBudget, budgetDelta, budgetThreshold) `// Algorithm 7`

3 **return** bestCandidate, $\hat{O}.m$

Algorithm 2: InflateDeflate

Input : $\vec{B}, \vec{\sigma}, \overrightarrow{min}, \overrightarrow{max}, \mathcal{D}$

ConfigParams: $\delta_{cost}, \delta_{restart}$, noSimulations, $\overrightarrow{PB}$, CB, $\vec{\alpha}$, $\vec{\beta}$, totalIterations, storeSize, maxSimBudget

Output : $acceptedCandSet_1$, $acceptedCandSet_2$, $\hat{O}.m$

1 $\overrightarrow{CIB} \leftarrow \vec{B}$

2 $\hat{O}.m \leftarrow \infty$ `// Best expected objective cost till now`

3 noCandidates $\leftarrow 1$

4 noIterations $\leftarrow 1$

5 **repeat**

6 `// Algorithm 3`

7 ($acceptedCandSet_1$, $acceptedCandSet_2$, noCandidates, $\hat{O}.m, \overrightarrow{LIB}, \overrightarrow{CIB}$) $\leftarrow$ `PerformInflations` ($\vec{B}, \overrightarrow{CIB}, \vec{\sigma}, \overrightarrow{min}, \overrightarrow{max}, \mathcal{D}$, $acceptedCandSet_1$, $acceptedCandSet_2$, noCandidates, $\hat{O}.m, \delta_{cost}, \delta_{restart}$, noSimulations, maxSimBudget, $\overrightarrow{PB}$, CB, $\vec{\alpha}$)

`// Algorithm 5`

8 ($acceptedCandSet_1$, $acceptedCandSet_2$, noCandidates, $\hat{O}.m, \overrightarrow{CIB}$) $\leftarrow$ `PerformDeflations`($\vec{B}, \overrightarrow{LIB}, \overrightarrow{CIB}, \vec{\sigma}, \overrightarrow{min}, \overrightarrow{max}$, $\mathcal{D}$,$acceptedCandSet_1$, $acceptedCandSet_2$, noCandidates, $\hat{O}.m, \delta_{cost}, \delta_{restart}$, noSimulations, maxSimBudget, $\overrightarrow{PB}$, CB, $\vec{\beta}$)

9 noIterations $\leftarrow$ noIterations + 1

10 **until** noIterations > totalIterations or noCandidates > storeSize or $\hat{O}.m_{noIterations} - \hat{O}.m_{noIterations-\delta} = 0$

11 **return** $acceptedCandSet_1$, $acceptedCandSet_2$, $\hat{O}.m$