For $k = 1, 2, \ldots,$

Ia. if the minimization of the Lagrangian functional $\mathcal{L}^k$ constrained by $M_{1,1} = M_{2,2} = \cdots = M_{k-1,k-1} = 1$ results in all $K-k+1$ members of the set $\{M_{k',k}\}_{k'=k}^{K}$ satisfying $M_{k',k} \geq 1$, $k' = k, \ldots, K$, then

Ib. simply rounding downwards to the nearest integer produces integer sample numbers $M^*_{k',k} \to \lfloor M^*_{k',k} \rfloor$, $k' = k, \ldots, K$, so that the final set $\{M_{k',k'} = 1\}_{k'=1}^{k-1} \cup \{\lfloor M^*_{k',k} \rfloor\}_{k'=k}^{K}$ of sample numbers are optimal under the constraint $M_{1,1} = \cdots = M_{k',k'} = 1$ and *preserve the computational budget*. We then set $\widehat{K} = k-1$ and exit to step IV.

Otherwise,

IIa. if $M^*_{k,k} < 1$, then it is rounded upwards $M^*_{k,k} \to 1$, and the function $\mathcal{L}^{k+1}$ is minimized to obtain the remaining $K-k$ components of $M^*_{k',k}$, $k' = k+1, \ldots, K$.

This yields

IIb. a new set $\{M^*_{1,1} = 1, M^*_{2,2} = 1, \ldots, M^*_{k,k} = 1\} \cup \{M^*_{k',k}\}_{k'=k+1}^{K}\}$ which may or may not contain entries less than 1. If it does not, the model evaluation vector becomes $\mathbf{M}^* = \{M_{k',k'} = 1\}_{k'=1}^{k} \cup \{\lfloor M^*_{k',k} \rfloor\}_{k'=k+1}^{K}$. We then set $\hat{K} = k$ and exit to step IV.

Otherwise,

III. we increment $k \to k+1$ and return to step Ia.

IV. The process terminates, and the final set of sample numbers is given by $\{M^*_{1,1} = 1, M^*_{2,2} = 1, \ldots, M^*_{\widehat{K},\widehat{K}} = 1\} \cup \{M^*_{k',\widehat{K}+1}\}_{k'=\widehat{K}+1}^{K}$.