

Input: Initial path X_0 , initial index k_0 , initial displacement direction s_0 , displacement magnitude Δk ,

$\{X^o, k^o, s^o\} \leftarrow \{X_0, k_0, s_0\}$

for trial < n_trials **do**

Draw uniform $\hat{k}^o \in \{k^o, k^o + s^o \Delta k\}$: **return** \hat{k}^o

if InBounds($\hat{k}^o, L(X^o)$) **then**

$x^{\text{SP}} \leftarrow X^o$ at \hat{k}^o

$X^{\text{fwd}} \leftarrow \text{IntegrateToState}(x^{\text{SP}})$

$X^{\text{rv}} \leftarrow \text{IntegrateToState}(\bar{x}^{\text{SP}})$

$X^n \leftarrow \text{ConcatenatePath}(\bar{X}^{\text{rv}}, X^{\text{fwd}})$

$\hat{k}^n \leftarrow \text{Index of } x^{\text{SP}} \text{ on } X^n$

Draw uniform $s^n \in \{-1, 1\}$: **return** s^n

Draw uniform $k^n \in \{\hat{k}^n, \hat{k}^n + s^n \Delta k\}$:
return k^n

$p_{\text{acc}}(X^o \rightarrow X^n) \leftarrow H_{\text{AB}}(X^n) \min\left[1, \frac{L(X^o)}{L(X^n)}\right]$

if rand() < $p_{\text{acc}}(X^o \rightarrow X^n)$ **and**

InBounds($k^n, L(X^n)$) **then**

| $\{X^o, k^o, s^o\} \leftarrow \{X^n, k^n, s^n\}$

end

end

Add $\{X^o, k^o, s^o\}$ to the ensemble

trial \leftarrow trial+1

end