Parallel Tempering Pseudocode

Let S be an arbitrary state space with an associated cost function $\omega\colon S \to \mathbb{R}$ and a set of transitions $E \subseteq S \times S$. Let $V = \{\omega(s)\colon s \in S\}$. Then $G = (V, E)$ is a network of weighted states and transitions.

Let T be a finite subset of real numbers (representing the ”energy” of a replica).

Let L be a natural number (representing the number of independent transitions prior to a ”neighbor swap”).

Let R be an ordering of $\{1, \ldots, |T| - 1\}$ (representing an ordering of the replicas).

Let $\delta_1 = \delta_2 = \cdots = v$, where v is a uniform randomly selected element of V.
loop an arbitrary number of times
    for all $i \in \{1, \ldots, |T|\}$ **do**
        loop L times
            Let δ' be a uniform randomly chosen neighbor of δ_i.
            Let $p = \min\{1, \exp\left[(1/T_i)(\omega(\delta_i) - \omega(\delta'))\right]\}$
            Let $\delta_i = \delta'$ with probability p.
        end loop
    end for

    for all $i \in R$ **do**
        Let $p = \min\{1, \exp\left[(1/T_i - 1/T_{i+1}(\omega(\delta_i) - \omega(\delta_{i+1}))\right]\}$
        Swap δ_i, δ_{i+1} with probability p.
    end for
end loop