Algorithm 1 her-CPRAND

Initialization : Choose $\beta_0 \in (0,1)$, $\eta \geq \gamma \geq \bar{\gamma} > 1$, and 2 sets of initial factor matrices $(A_0^{(1)}, \ldots, A_0^{(N)})$ and $(\hat{A}_0^{(1)}, \ldots, \hat{A}_0^{(N)})$. Set $\bar{\beta}_0 = 1$ and $k = 1$.

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repeat
    for n = 1, ..., N do
        Define sampling operator S ∈ R^{S × ∏_{m≠n} I_m} with S = card(S)
        Z_s ← SKR(S, Â_{k-1}^{(1)}, ..., Â_{k-1}^{(n-1)}, Â_{k-1}^{(n+1)}, ..., Â_{k-1}^{(N)})
        X_s^T ← S X_n^T
        Update : A_k^{(n)} ← argmin_A ||Z_s A^T − X_s^T||_F
        Normalize columns of A_k^{(n)} and update λ
        Extrapolate : Â_k^{(n)} = A_k^{(n)} + β_{k-1}(A_k^{(n)} − A_{k-1}^{(n)})
    end for
    Compute F̂_k = F(A_k^{(N)}; Â_k^{(l≠N)}).
    if F̂_k > F̂_{k-1} for k ≥ 2 then
        Set Â_k^{(i)} = A_k^{(i)} for i = 1, ..., N
        Set β̄_k = β_{k-1}, β_k = β_{k-1}/η
    else
        Set A_k^{(i)} = Â_k^{(i)} for i = 1, ..., N
        Set β̄_k = min{1, β̄_{k-1} γ̄}, β_k = min{β̄_{k-1}, γ β_{k-1}}
    end if
    Set k=k+1
until some criteria is satisfied
return λ, factor matrices {A_k^{(n)}}
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