1 Rewrite the algorithm

Algorithm 1 FJ source code

Inputs: $k_{\min}$, $k_{\max}$, ϵ, initial parameters $\hat{\boldsymbol{\theta}} = \{\hat{\boldsymbol{\theta}}_1, \ldots, \hat{\boldsymbol{\theta}}_{k_{\max}}, \hat{\alpha}_1, \ldots, \hat{\alpha}_{k_{\max}}\}$
Output: Mixture model in $\hat{\boldsymbol{\theta}}_{\text{best}}$

$t \leftarrow 0$, $k_{nz} \leftarrow k_{\max}$, $\mathcal{L}_{\min} \leftarrow +\infty$
$u_m^{(i)} \leftarrow p(\boldsymbol{y}^{(i)}|\hat{\boldsymbol{\theta}}_m)$, for $m = 1, \ldots, k_{\max}$, and $i = 1, \ldots, n$
while $k_{nz} \geq k_{\min}$ **do**
  repeat
    $t \leftarrow t + 1$
    for $m = 1$ to $k_{\max}$ **do**
      $w_m^{(i)} \leftarrow \hat{\alpha}_m u_m^{(i)} \big(\sum_{j=1}^{k_{\max}} \hat{\alpha}_j u_j^{(i)} \big)^{-1}$, for $i = 1, \ldots, n$
      $\hat{\alpha}_m \leftarrow \max \big\{0, \big(\sum_{i=1}^{n} w_m^{(i)} \big) - \frac{N}{2} \big\} / n$
      $\{\hat{\alpha}_1, \ldots, \hat{\alpha}_{k_{\max}}\} \leftarrow \{\hat{\alpha}_1, \ldots, \hat{\alpha}_{k_{\max}}\} \big(\sum_{m=1}^{k_{\max}} \hat{\alpha}_m \big)^{-1}$
      if $\hat{\alpha}_m > 0$ **then**
        $\hat{\boldsymbol{\theta}}_m \leftarrow \arg\max_{\boldsymbol{\theta}_m} \log p(\mathcal{Y}, \mathcal{W}|\boldsymbol{\theta})$
        $u_m^{(i)} \leftarrow p(\boldsymbol{y}^{(i)}|\hat{\boldsymbol{\theta}}_m)$ for $i = 1, \ldots, n$
      else
        $k_{nz} \leftarrow k_{nz} - 1$
      end if
    end for
    $\hat{\boldsymbol{\theta}}(t) \leftarrow \{\hat{\boldsymbol{\theta}}_1, \ldots, \hat{\boldsymbol{\theta}}_{k_{\max}}, \hat{\alpha}_1, \ldots, \hat{\alpha}_{k_{\max}}\}$
    $L(t) \leftarrow \sum_{i=1}^{n} \log \sum_{m=1}^{k} \hat{\alpha}_m u_m^{(i)}$
  until $|L(t) - L(t-1)| < \epsilon |L(t-1)|$
  $\mathcal{L}[\hat{\boldsymbol{\theta}}(t), \mathcal{Y}] \leftarrow \frac{N}{2} \sum_{m:\hat{\alpha}_m > 0} \log \hat{\alpha}_m + \frac{1}{2} k (N+1) \log n - L(t)$
  if $\mathcal{L}[\hat{\boldsymbol{\theta}}(t), \mathcal{Y}] \leq \mathcal{L}_{\min}$ **then**
    $\mathcal{L}_{\min} \leftarrow \mathcal{L}[\hat{\boldsymbol{\theta}}(t), \mathcal{Y}]$
    $\hat{\boldsymbol{\theta}}_{\text{best}} \leftarrow \hat{\boldsymbol{\theta}}(t)$
  end if
  $m^* \leftarrow \arg\min_m \{\hat{\alpha}_m > 0\}$, $\hat{\alpha}_{m^*} \leftarrow 0$, $k_{nz} \leftarrow k_{nz} - 1$
  $\{\hat{\alpha}_1, \ldots, \hat{\alpha}_{k_{\max}}\} \leftarrow \{\hat{\alpha}_1, \ldots, \hat{\alpha}_{k_{\max}}\} \big(\sum_{m=1}^{k_{\max}} \hat{\alpha}_m \big)^{-1}$
end while