Section 2.4 (Approximate integration of the lifted likelihood)

Algorithm for finding the integration boundaries

Algorithm 1 Find integration boundaries $[a, b]$

$\Delta x \leftarrow \frac{b_0 - a_0}{m-1}$
$y \leftarrow (a_0, a_0 + \Delta x, a_0 + 2 \cdot \Delta x, \ldots, a_0 + m \cdot \Delta x)$
$f \leftarrow \log l_i(x^{i \to y}) = (\log l_i(x^{i \to y_1}), \ldots, \log l_i(x^{i \to y_m}))$
EXPAND $\leftarrow$ TRUE
while EXPAND **do**
  if $y_1 - \Delta x > a_{\min}$ AND $f_1 \geq \max(f) -$ drop **then**
    $y^{\text{new}} \leftarrow (y_1 - m \cdot \Delta x, y_1 - (m-1) \cdot \Delta x, \ldots, y_1 - \Delta x)$
    $y^{\text{new}} \leftarrow y^{\text{new}}[y^{\text{new}} > a_{\min}]$
    $f \leftarrow (\log l_i(x^{i \to y^{\text{new}}}), f)$
    $y \leftarrow (y^{\text{new}}, y)$
  else if $y_m + \Delta x < b_{\max}$ AND $f_m \geq \max(f) -$ drop **then**
    $y^{\text{new}} \leftarrow (y_m + \Delta x, y_m + 2 \cdot \Delta x, \ldots, y_m + m \cdots \Delta x)$
    $y^{\text{new}} \leftarrow y^{\text{new}}[y^{\text{new}} < b_{\max}]$
    $f \leftarrow (f, \log l_i(x^{i \to y^{\text{new}}}))$
    $y \leftarrow (y, y^{\text{new}})$
  else
    EXPAND $\leftarrow$ FALSE
  end if
  $m \leftarrow$ length(y)
end while
$a \leftarrow y_1, b \leftarrow y_m$