Data: $\{T_i, \delta_i, g_i, X_i\}_{i=1}^n$; Number of iterations M; Updating rate υ

Result: β.

begin

  Initialize $\beta_j = 0\ (j = 1, \ldots, p)$.

  for $m = 1, \ldots, M$ **do**

    for $j = 1, \ldots, p$ **do**

      Compute the first partial derivative with respect to j:

$$L_1(j) = \sum_{i=1}^{n} \sum_{g=1}^{G} I_{[g_i=g]} \delta_i \{X_{ij} - S_{1g}(i,j)/S_{0g}(i,i)\}.$$

    end

    Find $j^* = \text{argmax}_j\ |L_1(j)|$.

    Calculate the second partial derivative with respect to j^*:

$$L_2(j^*) = \sum_{i=1}^{n} \sum_{g=1}^{G} I_{[g_i=g]} \delta_i \left[\frac{S_{2g}(i,i)}{S_{0g}(i,i)} - \left\{ \frac{S_{1g}(i,j^*)}{S_{0g}(i,i)} \right\}^2 \right]$$

    Update $\beta_{j^*} = \beta_{j^*} + \upsilon L_2(j^*)^{-1} L_1(j^*)$

  end

end