If Y follows a Weibull distribution, the loglikelihood to be maximized is:

$$
\begin{aligned}
l(\boldsymbol{\theta}, \boldsymbol{\omega}) = \sum_{i=1}^{n} \Bigg[& \epsilon_i \delta_{1_i} \ln \Bigg(\sum_{j=1}^{m} \frac{\alpha_{ij}}{\sigma} \exp \Bigg(\frac{\ln(u_i + z_{r_i} - s_j) - \mu - \beta \ln(s_j)}{\sigma} \\
& \qquad - e^{\frac{\ln(u_i + z_{r_i} - s_j) - \mu - \beta \ln(s_j)}{\sigma}} \Bigg) \omega_j \Bigg) \\
& + \epsilon_i \delta_{2_i} \ln \Bigg(\sum_{j=1}^{m} \alpha_{ij} \exp \Bigg(- e^{\frac{\ln(u_i + z_{r_i} - s_j) - \mu - \beta \ln(s_j)}{\sigma}} \Bigg) \omega_j \Bigg) \\
& + \epsilon_i (1 - \delta_{1_i})(1 - \delta_{2_i}) \ln \Bigg(\sum_{j=1}^{m} \alpha_{ij} \Bigg[1 - \exp \Bigg(- e^{\frac{\ln(u_i + z_{r_i} - s_j) - \mu - \beta \ln(s_j)}{\sigma}} \Bigg) \Bigg] \omega_j \Bigg) \\
& + (1 - \epsilon_i) \ln \Bigg(\sum_{j=1}^{m} \alpha_{ij} \omega_j \Bigg) \Bigg],
\end{aligned}
$$

where $n = 361$ and $m = 204$ (months).

Maximization is restricted by the known constraints on $\boldsymbol{\omega}$ and $\sigma > 0$.