

$$\sum_{i=1}^m \sum_{j=1}^m \sum_{\ell=1}^{k_j} g_{ij\ell} \log \frac{\beta_{j\ell} \exp(\sum_{s=1}^p x_{is} y_{j\ell s})}{\sum_{\nu=1}^{k_j} \beta_{j\nu} \exp(\sum_{s=1}^p x_{is} y_{j\nu s})}$$