DIF Magnitude Recovery

- Regularization

$$P_j(\boldsymbol{\theta}_i) = \frac{1}{1 + e^{-[\boldsymbol{a}_j^T \boldsymbol{\theta}_i + d_j + (\boldsymbol{Y}_i \boldsymbol{\gamma}_j)\boldsymbol{\theta}_i + \boldsymbol{Y}_i \boldsymbol{\beta}_j]}}$$

- LRT

$$P_j(\boldsymbol{\theta}_i) = \frac{1}{1 + e^{-[\boldsymbol{a}_{jy}^T \boldsymbol{\theta}_i + d_{jy}]}}$$

$y = 1$ for reference group. For $y > 1$, $\boldsymbol{\gamma}_{jy} = \boldsymbol{a}_{jy} - \boldsymbol{a}_{j1}$ and $\boldsymbol{\beta}_{jy} = \boldsymbol{d}_{jy} - \boldsymbol{d}_{j1}$.