$T := 306.4 \qquad \tau_{12} := 3.060 \qquad \tau_{21} := 1.714 \qquad \alpha := 0.2$

$G_{12} := \exp(-\alpha \cdot \tau_{12}) = 0.542 \qquad G_{21} := \exp(-\alpha \cdot \tau_{21}) = 0.71$

$$\gamma_1(x_1) := \exp\left[(1 - x_1)^2 \cdot \left[\tau_{21} \cdot \left[\frac{G_{21}}{x_1 + (1 - x_1) \cdot G_{21}}\right]^2 + \frac{\tau_{12} \cdot G_{12}}{(1 - x_1 + G_{12} \cdot x_1)^2}\right]\right]$$

$$\gamma_2(x_1) := \exp\left[{x_1}^2 \cdot \left[\tau_{12} \cdot \left(\frac{G_{12}}{1 - x_1 + x_1 \cdot G_{12}}\right)^2 + \frac{\tau_{21} \cdot G_{21}}{\left[x_1 + (1 - x_1) \cdot G_{21}\right]^2}\right]\right]$$

$$f_1(x_{1\alpha}, x_{1\beta}) := \ln(\gamma_1(x_{1\alpha})) - \ln(\gamma_1(x_{1\beta})) - \ln\left(\frac{x_{1\beta}}{x_{1\alpha}}\right)$$

$$f_2(x_{1\alpha}, x_{1\beta}) := \ln(\gamma_2(x_{1\alpha})) - \ln(\gamma_2(x_{1\beta})) - \ln\left(\frac{1 - x_{1\beta}}{1 - x_{1\alpha}}\right)$$

$x_{1\alpha} := 0.05 \qquad x_{1\beta} := 0.98$

$X :=$ err $\leftarrow 100$

while err $> 10^{-5}$

$J \leftarrow 100 \cdot \begin{pmatrix} \frac{f_1(1.01 \cdot x_{1\alpha}, x_{1\beta}) - f_1(x_{1\alpha}, x_{1\beta})}{x_{1\alpha}} & \frac{f_1(x_{1\alpha}, 1.01 x_{1\beta}) - f_1(x_{1\alpha}, x_{1\beta})}{x_{1\beta}} \\ \frac{f_2(1.01 \cdot x_{1\alpha}, x_{1\beta}) - f_2(x_{1\alpha}, x_{1\beta})}{x_{1\alpha}} & \frac{f_2(x_{1\alpha}, 1.01 x_{1\beta}) - f_2(x_{1\alpha}, x_{1\beta})}{x_{1\beta}} \end{pmatrix}$

$F \leftarrow \begin{pmatrix} f_1(x_{1\alpha}, x_{1\beta}) \\ f_2(x_{1\alpha}, x_{1\beta}) \end{pmatrix}$

$\Delta \leftarrow -J^{-1} \cdot F$

err $\leftarrow \max(|\Delta|)$

$x_{1\alpha} \leftarrow x_{1\alpha} + \Delta_1$

$x_{1\beta} \leftarrow x_{1\beta} + \Delta_2$

$\begin{pmatrix} x_{1\alpha} \\ x_{1\beta} \end{pmatrix}$

$$X = \begin{pmatrix} 0.045 \\ 0.984 \end{pmatrix}$$