

$$\tau_{12} := 2.329 \quad \tau_{21} := 1.061 \quad \alpha := 0.3$$

$$G_{12} := \exp(-\alpha \cdot \tau_{12}) = 0.497 \quad G_{21} := \exp(-\alpha \cdot \tau_{21}) = 0.727$$

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

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

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

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

$$x_{1\alpha} := 0.2 \quad x_{1\beta} := 0.9$$

```

X := | err ← 100
      | while err > 10-5
      |   J ← 100 ·  $\left( \begin{array}{cc} \frac{f_1(1.01 \cdot x_{1\alpha}, x_{1\beta}) - f_1(x_{1\alpha}, x_{1\beta})}{x_{1\alpha}} & \frac{f_1(x_{1\alpha}, 1.01x_{1\beta}) - f_1(x_{1\alpha}, x_{1\beta})}{x_{1\beta}} \\ \frac{f_2(1.01 \cdot x_{1\alpha}, x_{1\beta}) - f_2(x_{1\alpha}, x_{1\beta})}{x_{1\alpha}} & \frac{f_2(x_{1\alpha}, 1.01x_{1\beta}) - f_2(x_{1\alpha}, x_{1\beta})}{x_{1\beta}} \end{array} \right)$ 
      |   F ←  $\begin{pmatrix} f_1(x_{1\alpha}, x_{1\beta}) \\ f_2(x_{1\alpha}, x_{1\beta}) \end{pmatrix}$ 
      |   Δ ← -J-1 · F
      |   err ← max(|Δ|)
      |   x1α ← x1α + Δ1
      |   x1β ← x1β + Δ2
      |  $\begin{pmatrix} x_{1\alpha} \\ x_{1\beta} \end{pmatrix}$ 

```

$$x = \begin{pmatrix} 0.234 \\ 0.921 \end{pmatrix}$$