

$$G = \frac{n_{A,\alpha}}{n_\alpha} \cdot \frac{n_\alpha}{n} G_{A,\alpha} + \frac{n_{A,\beta}}{n_\beta} \cdot \frac{n_\beta}{n} G_{A,\beta}$$

$$+ \frac{n_{B,\alpha}}{n_\alpha} \cdot \frac{n_\alpha}{n} G_{B,\alpha} + \frac{n_{B,\beta}}{n_\beta} \cdot \frac{n_\beta}{n} G_{B,\beta}$$

$$G = \frac{n_\alpha}{n} \left(\frac{n_{A,\alpha}}{n_\alpha} G_{A,\alpha} + \frac{n_{B,\alpha}}{n_\alpha} G_{B,\alpha} \right) + \frac{n_\beta}{n} \left(\frac{n_{A,\beta}}{n_\beta} G_{A,\beta} + \frac{n_{B,\beta}}{n_\beta} G_{B,\beta} \right)$$