$$\gamma_{i}^{\text{FR}}(p,q,\lambda) = \left(\sqrt{p_{i}}\cos\left(\frac{\lambda\rho}{2}\right) + f_{i}\sin\left(\frac{\lambda\rho}{2}\right)\right)^{2}$$

$$f_{i} = \frac{\sqrt{q_{i}} - \sqrt{p_{i}}\cos\left(\frac{\rho}{2}\right)}{\sin\left(\frac{\rho}{2}\right)}$$

$$\rho = 2\arccos\left(\sum_{i}\sqrt{p_{i}q_{i}}\right)$$

$$\gamma_{i}^{\text{FR}}(p,q,\lambda) = \frac{p_{i}^{1-\lambda}q_{i}^{\lambda}}{\sum_{j}p_{j}^{1-\lambda}q_{j}^{\lambda}}$$
Fisher-Rao midpoint
$$\gamma_{i}^{\text{FR}}(p,q,\frac{1}{2}) = \frac{\left(\sqrt{p_{i}}+\sqrt{q_{i}}\right)^{2}}{2\left(1+\sum_{j}\sqrt{p_{j}}\sqrt{q_{j}}\right)}$$

$$\gamma_{i}^{m}(p,q,\lambda) = (1-\lambda)p_{i} + \lambda q_{i}$$

$$Q_{i} = \{p = (p_{1},p_{2},p_{3}) : p_{i} > 0, \sum_{i}p_{i} = 1\}$$

$$(0,0,0)$$