

Compositional Analysis of Catch Curve Data

Model

$$S_a = e^{-Z(a-k)}; \quad a = k, \dots, B \quad (1)$$

$$\beta_a(\beta_k, \alpha) = \begin{cases} 1 - (1 - \beta_k) \left(\frac{b_0 - a}{b_0 - k} \right)^\alpha; & a = k, \dots, b_0 - 1 \\ 1; & a = b_0, \dots, B \end{cases} \quad (2)$$

$$R_a(\rho_1, \dots, \rho_m, \tau) = 1 + \sum_{h=1}^m \rho_h \exp \left[-\frac{1}{2} \left(\frac{a - b_h}{\tau} \right)^2 \right]; \quad a = k, \dots, B \quad (3)$$

$$p_a = \frac{S_a \beta_a R_a}{\sum_{a=k}^B S_a \beta_a R_a}; \quad a = k, \dots, B \quad (4)$$

$$p_A = \sum_{a=A}^B p_a \quad (5)$$

Amalgamation into groups

$$p_i = \sum_{a=a_{i-1}+1}^{a_i} p_a; \quad i = 1, \dots, g \quad (6)$$

Parameters

Z = total mortality

α, β_k = selectivity parameters

ρ_h = recruitment anomaly ($h = 1, \dots, m$)

τ = anomaly ‘width’