

Nonlinear models

TMB and stock assessment

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Outline

Recruitment

- Beverton-Holt
- Ricker

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Growth

- von Bertalanffy

Beverton-Holt recruitment

$$(1) \quad \hat{R} = R_{\max} \frac{S}{S + S_{50}}$$

$$(2) \quad \hat{R} = \frac{S}{a + bS}$$

$$(3) \quad \hat{R} = \frac{aS}{1 + bS}$$

$$(4) \quad \hat{R} = \frac{aS}{1 + S/b}$$

Ricker recruitment

$$(1) \quad \hat{R} = R_{\max} \times \frac{S}{S_{\max}} \times \exp\left(1 - \frac{S}{S_{\max}}\right)$$

$$(2) \quad \hat{R} = aSe^{-bS}$$

von Bertalanffy growth

$$\hat{L}_a = L_{\infty} \left(1 - e^{-K(a-t_0)} \right)$$