Von Bertalanffy's Individual Growth Model

The "individual growth model" published by von Bertalanffy in 1934 is widely used in biological models. Although it has a number of variations, we focus here on its simplest form:

$$L_t = L_\infty \left[1 - e^{-K(t-t_0)} \right],$$

a formula that describes the length L_t of an individual at age t. The model involves three parameters:

L_∞ = horizontal asymptote of the curve, corresponding to the ultimate length,
K = growth rate toward the asymptotic length,
t_0 = theoretical age at which an individual has length 0.

Motivation for this model comes from the differential equation

$$\frac{dL_t}{dt} = K\left(L_\infty - L_t\right),$$

which states that the growth rate is proportional to the difference between the asymptotic length L_∞ and the current length L_t.

Schnute (1981) published a variation of this growth model that is also illustrated in *PBS Modelling*. See the example "SGM" in the GUI generated by `runExamples()`.

References

Quinn II, T.J. and Deriso, R.B. (1999) *Quantitative Fish Dynamics*. Oxford University Press, New York NY, 542 pp.

Schnute, J. (1981) A versatile growth model with statistically stable parameters. *Canadian Journal of Fisheries and Aquatic Sciences* **38**, 1128-1140.

von Bertalanffy, L. (1934) Untersuchungen über die Gesetzlichkeit des Wachstums. I. Allgemeine Grundlagen der Theorie; mathematische und physiologische Gesetzlichkeiten des Wachstums bei Wassertieren. *Arch. Entwicklungsmech.* **131**, 613-652.

Wikipedia: http://en.wikipedia.org/wiki/Von_Bertalanffy