

PROPERTY

GOMPERTZ

LOGISTIC

Equation

$$y = ke^{-e^{a-bx}}$$

$$y = \frac{k}{1 + e^{a-bx}}$$

Number of constants

3

3

Asymptotes

$$\begin{cases} y = 0 \\ y = k \end{cases}$$

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Inflection

$$\begin{cases} x = \frac{a}{b} \\ y = \frac{k}{e} \end{cases}$$

$$\begin{cases} x = \frac{a}{b} \\ y = \frac{k}{2} \end{cases}$$

Straight line form of equation

$$\log \log \frac{k}{y} = a - bx$$

$$\log \frac{k - y}{y} = a - bx$$

Symmetry

Assymetrical

Symmetrical about inflection

Growth rate

$$\frac{dy}{dx} = bye^{a-bx} = by \log \frac{k}{y}$$

$$\frac{dy}{dx} = \frac{b}{k} y(k - y)$$

Maximum growth rate

$$\frac{bk}{e}$$

$$\frac{bk}{4}$$

Relative growth rate as function of time

$$\frac{1}{y} \frac{dy}{dx} = be^{a-bx}$$

$$\frac{1}{y} \frac{dy}{dx} = \frac{b}{1 + e^{-a+bx}}$$

Relative growth rate as function of size

$$\frac{1}{y} \frac{dy}{dx} = b (\log k - \log y)$$

$$\frac{1}{y} \frac{dy}{dx} = \frac{b}{k} (k - y)$$