CONDITION FACTOR

$$K = \frac{W_{obs}}{L^3}$$

(isometric growth) condition factor or Fulton c.f.

$$K' = \frac{W_{obs}}{L^b}$$

(allometric growth) condition factor where b is the allometric coefficient of the length-weight relationship.

$$K'' = \frac{W_{obs}}{W_{calc}}$$

where $W_{calc} = a \times L^b$

$$W = a \times L^3 \leftarrow$$ isometric growth

$$W = a \times L^b \leftarrow$$ $b \neq 3$ allometric growth

$$K = \frac{W}{L^3} \quad \text{or} \quad K' = \frac{W}{L^b}$$

RELATIVE GROWTH

1) x and y two linear variables (eg. height of the body (y) against the length of the body (x))

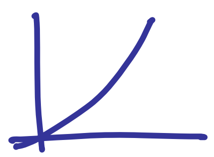
2) or x and y where x is a linear variable (eg total length of the body and y is the total weight)

Allometric growth models

Assumption: $$\frac{1}{y}\frac{dy}{dt} = b \times \frac{1}{x}\frac{dx}{dt}$$ relative growth rate

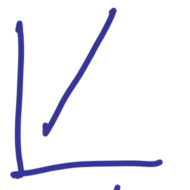
$$\downarrow$$

$$y = a \cdot x^{b}$$



$$\log_{10} y = \log_{10} a + b \times \log_{10} x$$

$$Y = a + b \times X$$



In case 1 (linear variables)

$b = 1 \implies$ isometric growth

$b \neq 1 \implies$ allometric growth

- $b > 1$ positive allometric growth
- $b < 1$ negative allometric growth

in case 2 (Weight - length)

$b = 3$ isometric growth

$b \neq 3$ allometric growth
- $b > 3$ positive allometric growth
- $b < 3$ negative allometric growth

Relative growth studies

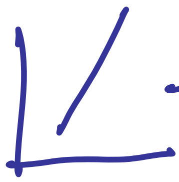
Data

y	x
⋮	⋮

→

$\log_{10} y$	$\log_{10} x$
⋮	⋮

→ plot



→ Regression analysis

↓

estimate parameters

a, b (r^2)

Hypothesis testing of slope, b

$H_0 : b = b_0$

$H_1 : b \neq b_0$

$\alpha = 0{,}05$

$$t_b = \frac{b - b_0}{s_b}$$

$b_0 = 1$ or $b = 3$

$d.f = n - 2$

P value?

if $P < 0{,}05 \Rightarrow$ rej H_0

if not you can not reject H_0