$X(t) \to$ Population at time $t$

- If Both parents are Hipsters the offspring will be Hipster
- ELSE $\to$ $r$% of being Hipster

$b \to$ birth rate $\quad$ $d \to$ death rate $\quad$ $b, d$ are constants

$$\frac{dx(t)}{dt} = (b-d)\,x(t) \qquad \frac{dx_i(t)}{dt} = (b-d)\,x_i(t) + rb\left(x(t) - x_i(t)\right)$$

$X_i(t) \to$ Number of Hipsters at time $t$

$$P(t) = \frac{x_i(t)}{x(t)}$$ $\to$ percentage of Hipsters at time $t$

Chain rule : $$\frac{dy}{dx} = \frac{dy}{du}\,\frac{du}{dx}$$

$$\frac{dp(t)}{dt} = \frac{dP}{dx}\cdot\frac{dx}{dt} + \frac{dP}{dX_i}\cdot\frac{dX_i}{dt} =$$

$$= \left(X_i \cdot (-1)\,X^{-2}\right)\cdot(b-d)\,x + \frac{1}{X}\cdot\left[(b-d)\,X_i + rb\,(X - X_i)\right]$$

$$= -\frac{X_i}{X}\cdot(b-d) + \frac{X_i}{X}\cdot(b-d) + \frac{1}{X}\,rb\,(X - X_i)$$

$$= rb\,(1-P)$$

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