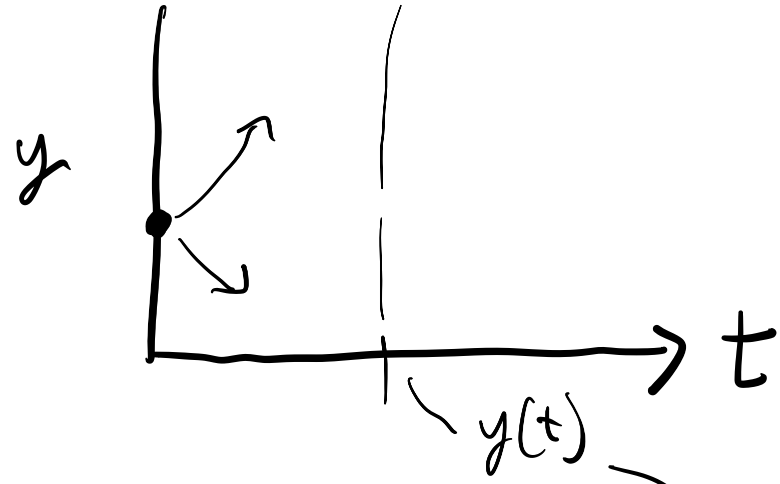
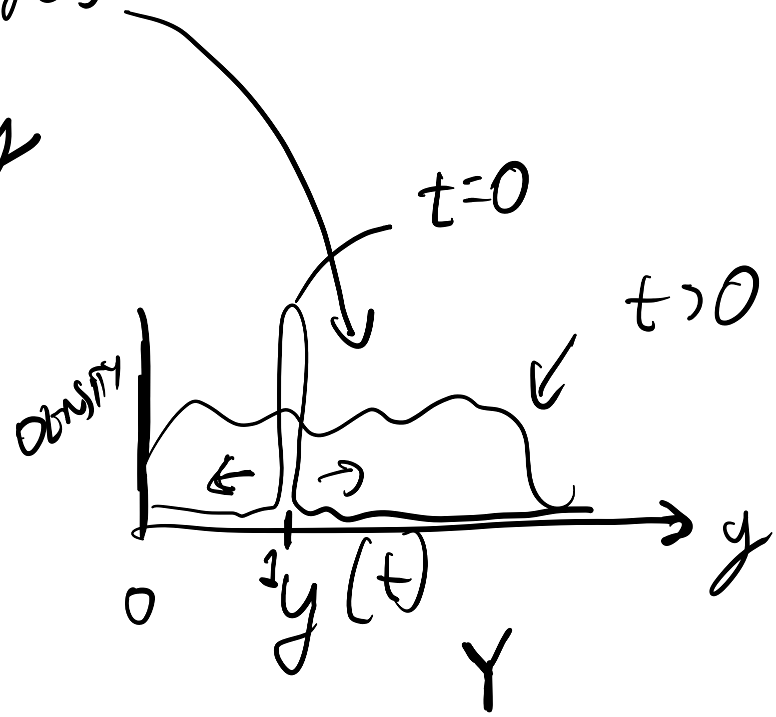


$$\frac{dy}{dt} = (R-1)\,y$$



GIVEN

$$X \sim p_x(x)$$

$$Y = g(X)$$

THEN FIND $p_Y(y)$

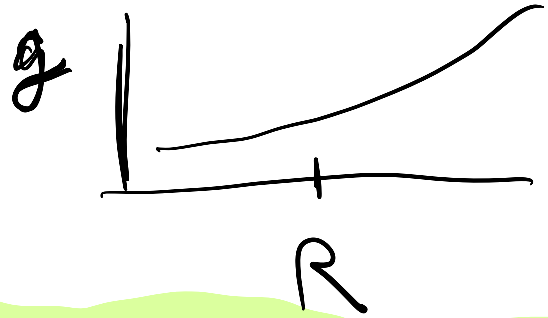
TODAY

$R \sim p_R(r)$

$Y = g(R)$

$Y = e^{(R-1)t}$

$g(R) = e^{(R-1)t}$



$g^{-1}(y)$

$y = e^{(R-1)t}$

$\ln y = (R-1)t$

$R = \frac{1}{t}\ln y + 1$

$g^{-1}(y) = \frac{1}{t}\ln y + 1$

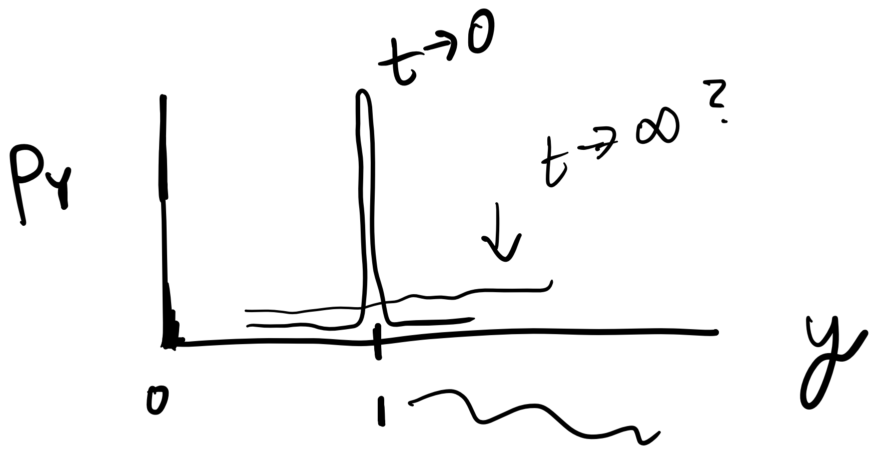
$\frac{dg}{dR} = e^{-t} e^{Rt}$

$= t e^{(R-1)t}$

$\left(\frac{dg}{dR}\right)^{-1} = t e^{\frac{1}{(R-1)}t}$ ✓

$\left.\left(\frac{dg}{dR}\right)^{-1}\right|_y = \frac{1}{yt}$

$$p_Y(y) = p_R\left(\frac{1}{t}\ln y + 1\right) \cdot \frac{1}{yt}$$



All $t > 0$

$$\mathbb{P}(Y > 1) = 0.5$$

$$= \int_1^\infty p_Y(y;t)\,dy = 0.5$$

$$\mathbb{P}(Y < 1) = 0.5$$

$$= \int_0^1 p_Y(y;t)\,dy = 0.5$$