

$y_t - 4y_{t-1} = -6$

$\bar{y} = 2$

CF: $y_t - 4y_{t-1} = 0$

Let the trial solution be $y_t = \beta x^t$
 $y_{t-1} = \beta x^{t-1}$

$\therefore \beta x^t - 4\beta x^{t-1} = 0$
 $\beta x^{t-1} (x - 4) = 0$

$x - 4 = 0$
 $x = 4$

$\therefore y_t = \beta 4^t$

\therefore The required solution is

$y_t = PI + CF$
 $y_t = 2 + \beta 4^t$

$\checkmark \hat{C}, \hat{I}, \hat{Y}$

$c(t) = g \cdot y(t)$

\checkmark income changes at a rate proportional to excess demand

$I(t) = b \cdot y(t)$

$(C + I) = Y$

$$\frac{dy}{dt} \propto (e + 1 - \gamma)$$

$$\frac{dy}{dt} = a (c + z - \gamma)$$

$$\frac{dy}{dt} = a (g y(t) + b y(t) - \gamma(t))$$

$$\frac{dy}{dt} = a (g + b - 1) y(t)$$

$$\frac{dy}{dt} - a (g + b - 1) y(t) = 0$$

$\int a (g + b - 1) dt$ is 1st order, homogeneous differential equation with constant coefficient.

$$y(t) = Ae^{-a(g+b-1)t}$$

$$y(t) = \lambda e^{-a(g+b-1)t}$$

$$y(0) - \gamma_e = \lambda e^{-a(g+b-1) \cdot 0}$$

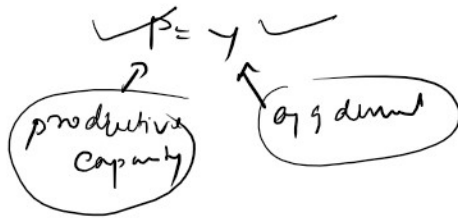
$$\lambda = y(0) - \gamma_e$$

$$\text{at } t=0 \quad y(t) = y(0) - \gamma_e$$

$$\therefore y(t) = [y(0) - \gamma_e] e^{-a(g+b-1)t}$$

$$t \rightarrow \infty \quad y(t) = y(0) - \gamma_e$$

Domar's Model:



- (1) initial supply = demand as $(g + b < 1)$
- (2) $\frac{dP}{dt} = \frac{dY}{dt}$

Rate of change in supply = rate of change in demand.

$\Delta P \rightarrow$ supply/productivity

$P = \frac{\Delta}{\beta K}$ → Supply/productivity
 is derived from production function.

$$\frac{dP}{dt} = \beta \frac{dK}{dt}$$

Capital stock

change in capital over time is known as Investment.

$$\frac{dP}{dt} = \beta I$$

$$\frac{dK}{dt} = I$$

In equilibrium we require

$$S = I$$

where $\Rightarrow S = \frac{s}{1-s} Y$
 mps income.

\therefore In equilibrium $\frac{dP}{dt} = \beta \cdot S = \beta \cdot \frac{s}{1-s} Y$

\therefore or $\frac{dY}{dt} = \beta \cdot \frac{s}{1-s} Y$

or, $\left(\frac{dY}{dt} - \frac{\beta s}{1-s} Y \right) = 0$
 const

$$Y(t) = A \cdot e^{-\int \beta s \cdot dt}$$

$$= A e^{-\beta \cdot s \cdot t + C}$$

$$= A e^{-\beta \cdot s \cdot t} \cdot e^C$$

At initial condition $t=0 \therefore Y(t) = Y_0$

At initial condition $t=0$ $\therefore Y(t) = Y_0$

$$Y(0) = \lambda e^{-\beta \cdot 0}$$

$$\lambda = Y_0$$

$$\therefore \boxed{Y(t) = Y_0 e^{-\beta t}}$$

is solution.