

# 方向場作圖求解常微分方程

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$$\dot{P}(t) = P(t)(\beta - \delta P) \quad (1)$$

Three cases of initial conditions:

Case 1: unreasonable

$$P(0) < 0$$

Case 2: grow to be saturated

$$0 < P(0) < \frac{\beta}{\delta}$$

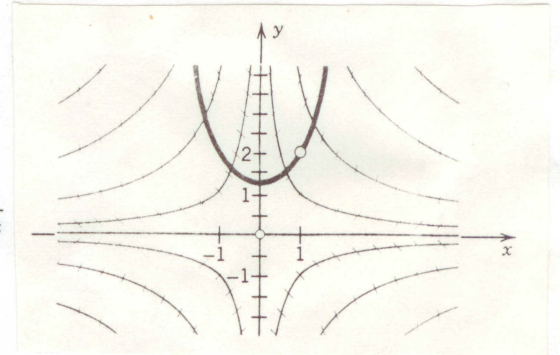
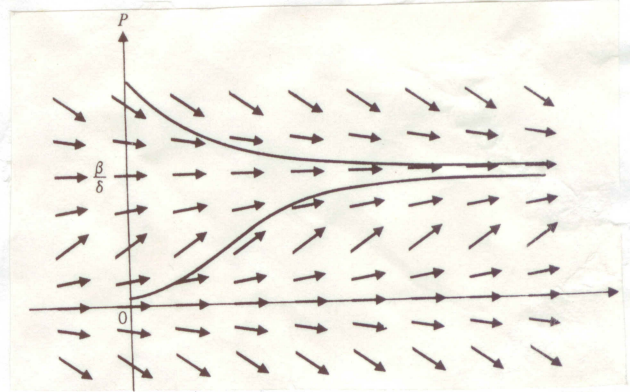
Case 3: decay to be saturated

$$P(0) > \frac{\beta}{\delta}$$

general solution is :

$$P(t) = \frac{\beta}{\delta + [\frac{\beta}{P(0)} - \delta]e^{-\beta t}}$$

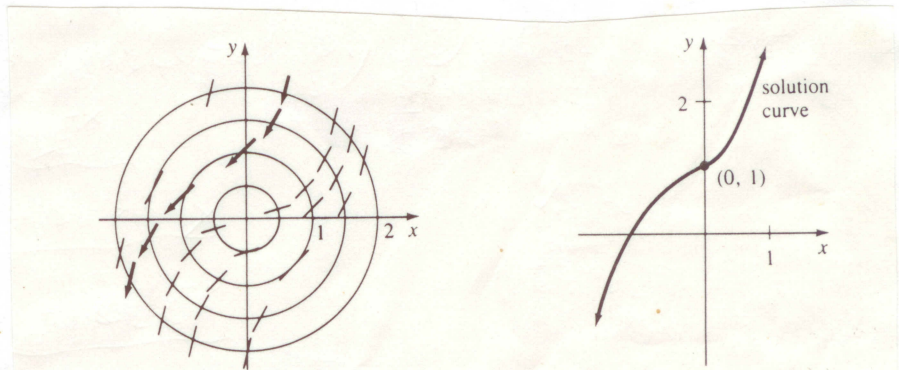
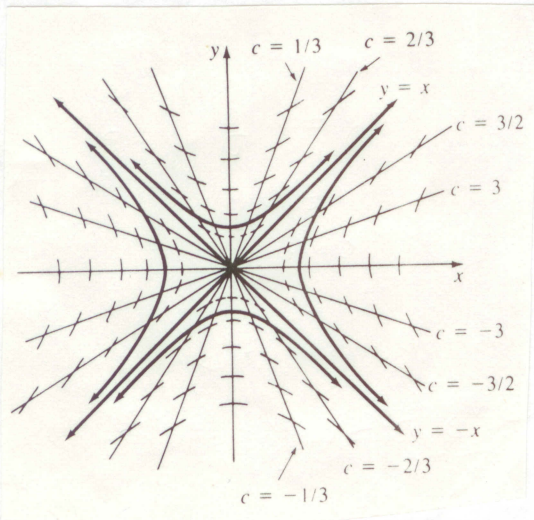
Asymptotic population =  $\frac{\beta}{\delta}$ .



$$dy/dx = xy, y(1) = 2 \quad (2)$$

$$dy/dx = x/y, y(1) = 0 \quad (3)$$

$$dy/dx = x^2 + y^2, y(0) = 1 \quad (4)$$



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【存檔 : c:/ctex/course/field1.te】 【建檔: Sep./24/'96】