Tugas 6.1

$y^2 + u^2 = 2cu$

$2y\,dy + 2u\,du = 2c\,du \longleftrightarrow \dfrac{dy}{du} = \dfrac{c-u}{y}$

$c = \dfrac{y^2 + u^2}{2u}$

$\dfrac{dy}{du} = -\dfrac{1}{f(u,y)} = -\dfrac{2uy}{y^2 - u^2}$

$\dfrac{dy}{du} = \dfrac{2uy}{u^2 - y^2}$

Jika $y = v \cdot u$ maka $\dfrac{dy}{du} = u\dfrac{dv}{du} + v$

Sehingga :

$u\dfrac{dv}{du} + v = \dfrac{2u \cdot (vu)}{u^2 - v^2 u^2} = \dfrac{2v}{1 - v^2}$

$\dfrac{dv}{du} = \dfrac{1}{u}\left(\dfrac{2v}{1-v^2} - v\right)$

$\dfrac{dv}{du} = \dfrac{1}{u}\left(\dfrac{2v - v + v^3}{1 - v^2}\right)$

$\dfrac{dv}{du} = \dfrac{1}{u}\left(\dfrac{v + v^3}{1 - v^2}\right)$

untuk penyelesaian konstantanya:

$\dfrac{1}{u}\left(\dfrac{v + v^3}{1 - v^2}\right) = 0, \; v + v^3 = 0 \rightarrow v = 0$

Jadi, $y = v \cdot u = \underline{0}$

Tugas 6.5.

$y'' + 5y' + 6y = 0$

$y'' + 5y' + 6y$ is.

$l^2 + 5r + 6$

Untuk persamaan kodrat. $b^2 - 4c = 5^2 - 4(6)$

$= 25 - 24$

$= 1$

~~persamaan Diperegrat~~

persamaan Difensial $b^2 - 4 - l > 0$

$y(t) = l_1 e^{r_1 t} + C_2 e^{r_2 t}$

$p^2 + 5r + 6 = 0$

$l_1 = \dfrac{-b}{2} + \dfrac{\sqrt{b^2 - 4c}}{2}$

$\dfrac{-51}{2 \cdot} + \underline{\quad}$

$= -2.5 + 0.5$

$= -2$

$k_2 = \dfrac{-b}{2} - \dfrac{\sqrt{b^2 - AC}}{2}$

$= \dfrac{-5}{2} - \dfrac{\sqrt{1}}{2}$

$= 2.5 - 0.5$

$= -3.$

$$y(t) = C_1 e^{-2t} + C_2 e^{-3t}$$
$$1 = C_1 e^{0} + C_2 e^{0}$$
$$C_1 + C_2 = 1$$
$$y(t) = C_1 e^{-2t} + C_2 e^{-3t}$$
$$0 = C_1 e^{-2} + C_2 e^{-3}$$
$$e^{-2} C_1 + e^{-3} C_2 = 0$$

$$C_1 = \frac{1}{1-e} \qquad\qquad C_2 = \frac{-6}{1-e}$$

$$y(t) = \frac{1}{1-e} e^{-2t} + \frac{-e}{1-e} e^{-3t}$$

$$y(t) = \frac{1}{1-e} e^{-2t} + \frac{-e}{1-e} e^{-3t}$$