Achmad Fadhlik Sakty Sepura
Achmad Murmafi
Yohanes Radito
Haryanto

massa 1

$F_1 Y_{in} + F_2 X_1 = F_1 Y_1 + F_2 X_{out}$

Subtitusi $X_2 = k Y_2$ dan $X_{out} = k Y_{out}$

$F_1 Y_{in} + F_2 X_1 = F_1 Y_1 + F_2 Y_{out}$

$F_1 Y_{in} + F_2 k Y_1 - F_1 Y_1 - F_2 k Y_{out} = 0$

masukan nilai:

$F_1 = 400$ kg/h
$Y_{in} = 0,1$ F
$F_2 = 800$ kg/h
$X_{in} = 0$
$k = 5$

$400(0,1) + 800(5) Y_1 - (400) Y_1 - (800)(5) Y_{out} = 0$

$40 + 4000 Y_1 - 400 Y_1 - 4000 Y_{out} = 0$

$40 + 3600 Y_1 - 4000 Y_{out} = 0$

(1) .... $3600 Y_1 - 4000 Y_{out} = -40$

massa 2

$F_1 Y_1 + F_2 Y_2 = F_1 Y_2 + F_2 X_1$

Subtitusi: $X_1 = k Y_1$ dan $X_2 = k Y_2$

$F_1 Y_1 + F_2 k Y_2 = F_1 Y_2 + F_2 k Y_1$

$F_1 Y_1 + F_2 k Y_2 - F_1 Y_2 - F_2 k Y_1 = 0$

masukan nilai:

$F_1 = 400$
$Y_{in} = 0,1$
$F_2 = 800$
$X_{in} = 0$
$k = 5$

$400 Y_1 + 800(5) Y_2 - 400 Y_2 - 800(5) Y_1 = 0$

$400 Y_1 + 4000 Y_2 - 400 Y_2 - 4000 Y_1 = 0$

(2)- .... $-3600 Y_1 + 3600 Y_2 = 0$

Massa 3

$F_1 Y_2 + F_2 X_3 = F_1 Y_3 + F_2 X_2$

Subtitusi $X_1 = kY_1$ dan $X_2 = kY_2$

$F_1 Y_2 + F_2 Y_3 = F_1 Y_3 + F_2 k Y_2$

$F_1 Y_2 + F_2 k Y_3 - F_1 Y_3 - F_2 k Y_2 = 0$

Masukan nilai

$F_1 = 400$

$Y_{in} = 0,1$

$F_2 = 800$

$X_{in} = 0$

$k = 5$

$400 Y_2 + 800(5) Y_3 - 400 Y_3 - 800(5) Y_2 = 0$

$400 Y_2 + 4000 Y_3 - 400 Y_3 - 4000 Y_2 = 0$

(3) .... $-3600 Y_2 + 3600 Y_3 = 0$

Massa 4

$F_1 Y_3 + F_2 X_4 = F_1 X_4 + F_2 X_3$

Subtitusi $X_1 = kY_1$ dan $X_2 = kY_3$

$F_1 Y_3 + F_2 k Y_4 = F_1 Y_4 + F_2 k Y_3$

$F_1 Y_3 + F_2 k Y_4 - F_1 Y_4 - F_2 k Y_3 = 0$

Masukan nilai

$F_1 = 400$

$Y_{in} = 0,1$

$F_2 = 800$

$X_{in} = 0$

$k = 5$

$400 Y_3 + 800(5) Y_4 - 400 Y_4 - 800(5) Y_3 = 0$

$400 Y_3 + 4000 Y_4 - 400 Y_4 - 4000 Y_3 = 0$

(4) .... $-3600 Y_3 + 3600 Y_4 = 0$

Massa 5

$F_1 Y_4 + F_2 X_{in} = F_1 Y_{out} + F_2 X_4$

Subtitusi $X_1 = kY_1$ dan $X_2 = kY_2$

$F_1 Y_4 + F_2 X_{in} = F_1 Y_{out} + F_2 k Y_4$

$F_1 Y_4 + F_2 X_{in} - F_1 Y_{out} - F_2 k Y_4 = 0$

Masukan nilai

$F_1 = 400$ $X_{in} = 0$

$Y_{in} = 0,1$ $k = 5$

$F_2 = 800$

$400 Y_4 + 800(0) - 400 Y_{out} - 800(5) Y_4 = 0$

$400 Y_4 - 400 Y_{out} - 4000 Y_4 = 0$

(5) .... $-3600 Y_4 - 400 Y_{out} = 0$

didapat persamaan

$$3600\,Y_1 - 4000\,Y_{out} = -40$$
$$-3600\,Y_1 + 3600\,Y_2 = 0$$
$$-3600\,Y_2 + 3600\,Y_3 = 0$$
$$-3600\,Y_3 + 3600\,Y_4 = 0$$
$$-3600\,Y_4 - 400\,Y_{out} = 0$$

didapat matrix $AC = B$

$$A = \begin{bmatrix} 3600 & 0 & 0 & 0 & -4000 \\ -3600 & 3600 & 0 & 0 & 0 \\ 0 & -3600 & 3600 & 0 & 0 \\ 0 & 0 & -3600 & 3600 & 0 \\ 0 & 0 & 0 & -3600 & -400 \end{bmatrix}$$

$$B = \begin{bmatrix} -40 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

$$C = \begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \\ Y_4 \\ Y_{Out} \end{bmatrix}$$