

$$H.W 6.2 \quad f_1 = x^2 + y - x - 0.75 = 0 \\ f_2 = x^2 - y^2 - 5xy = 0$$

$$f_1 = x^2 + y - x - 0.75 = 0$$

$$f_2 = x^2 - y^2 - 5xy = 0$$

$$\frac{\partial f_1}{\partial x} = 2x - 1, \frac{\partial f_1}{\partial y} = 1, \frac{\partial f_2}{\partial x} = 2x - 5y, \frac{\partial f_2}{\partial y} = -2y - 5x$$

$$(P.F.0 \cdot \frac{\partial f_1}{\partial x} - P.F.0 \cdot \frac{\partial f_2}{\partial y}) = (S.2x - S.2x) = (0)$$

$$(P.F.0 \cdot \begin{bmatrix} 2x - 5y & 1 \\ 2x - 5y & -2y - 5x \end{bmatrix}) = (S.1) = (0)$$

$$\begin{bmatrix} x_1 \\ y_1 \end{bmatrix} = \begin{bmatrix} x_0 \\ y_0 \end{bmatrix} \left(-F \begin{bmatrix} J \end{bmatrix}^{-1} \cdot f(x_0) \right)$$

$$n=0, x=1.2, y=1$$

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1.2 \\ 1 \end{bmatrix} - \begin{bmatrix} 1.4 & 1 \\ -2.6 & -8 \end{bmatrix}^{-1} \times \begin{bmatrix} 0.49 \\ -5.56 \end{bmatrix}$$

$$f(x_0) = x^2 + y - x - 0.75 = 1.2^2 + 1 - 1.2 - 0.75 \\ = 0.49$$

$$f(y_0) = x^2 - y^2 - 5xy = 1.2^2 - 1^2 - 5 \cdot 1.2 \cdot 1 \\ = -5.56$$

$$\begin{bmatrix} x_1 \\ y_1 \end{bmatrix} = \begin{bmatrix} 1.3907 \\ 0.243 \end{bmatrix}$$

$$n=1, x = 1.3907, y = 0.243$$

$$\begin{bmatrix} x_1 \\ x_2 \\ y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} x_1 \\ y_1 \\ x_2 \\ y_2 \end{bmatrix} - \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 1.3907 \\ 0.243 \end{bmatrix}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} 1.3907 \\ 0.243 \\ 1.7814 \\ 1.5663 \end{bmatrix} - \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 0.0364 \\ 0.1851 \end{bmatrix}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} 1.3599 \\ 0.2614 \end{bmatrix}$$

$$c_{ax} = \left| \frac{1.3599 - 1.3907}{1.3599} \right| \times 100 = 2.26\%$$

$$c_{ay} = \left| \frac{0.2614 - 0.243}{0.2614} \right| \times 100 = 7.03\%$$

$$n_2 = 2, x = 1.3599, y = 0.2614$$

$$\begin{bmatrix} x_1 \\ x_2 \\ y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} 1.3599 \\ 0.2614 \\ 1.7814 \\ 1.5663 \end{bmatrix} - \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} 1.3592 \\ 0.2618 \end{bmatrix}$$

$$c_{ax} = \left| \frac{1.3592 - 1.3599}{1.3592} \right| \times 100 = 0.051\%$$

$$c_{ay} = \left| \frac{0.2618 - 0.2614}{0.2618} \right| \times 100 = 0.8527\%$$

HWB - 1

$$\begin{aligned}10c_1 + 2c_2 - c_3 &= 27 \\c_1 + c_2 + 5c_3 &= -21 \\-3c_1 - 6c_2 + 2c_3 &= -60\end{aligned}$$

$$\left[\begin{array}{ccc|c} 10 & 2 & -1 & 27 \\ 1 & 1 & 5 & -21 \\ -3 & -6 & 2 & -60 \end{array} \right]$$

$$|a_{11}| > |a_{12}| + |a_{13}| \quad \therefore F = 10 > 3.$$

$$|a_{22}| = 1 \not> 1 \quad 1+5 \not> 1 \quad 1 \not> 6$$

So we rearrange the system as

$$\begin{aligned}10c_1 + 2c_2 - c_3 &= 27 \\-3c_1 - 6c_2 + 2c_3 &= -60 \\c_1 + c_2 + 5c_3 &= -21\end{aligned}$$

$$|a_{22}| = |-6| = 6 \text{ and } |a_{21}| + |a_{23}|$$

$$|a_{33}| = 5, |a_{31}| + |a_{32}| = 1+1 = 2 < 5$$

$$|a_{33}| > |a_{31}| + |a_{32}|$$

$$c_1^{(k+1)} = \frac{1}{10} (27 - 2c_2^K - c_3^K)$$

$$c_2^{(k+1)} = \frac{-1}{6} (-60 + 3c_1^{(k+1)} - 2c_3^K)$$

$$= \frac{1}{6} (60 - 3c_1^{(k+1)} + 2c_3^K)$$

$$c_3^{(k+1)} = \frac{1}{5} (-21 - c_1^{(k+1)} - c_2^{(k+1)})$$

$$\text{Let } c_2 = c_3 = 0 \quad \text{, then } c_2^{(1)} = c_3^{(1)} = 0$$

$$c_1^{(2)} = \frac{1}{10} (27 - 0 + 0) = \frac{27}{10} = 2.7$$

$$c_2^{(2)} = \frac{1}{6} [60 - 3c_1^{(2)} + 2c_3^{(1)}]$$

$$\text{or } = \frac{1}{6} [60 - 3 \times 2.7 + 0] = 8.65$$

$$\begin{array}{|c|c|c|c|} \hline & 8 & 3 & 1 \\ \hline 60 & 22.8 & F.5 & \\ \hline \end{array}$$

$$c_3^{(2)} = \frac{1}{5} [-21 - 2.7] = -8.65$$

$$\therefore Z = 2, \Delta F = 6.47, E82.0 = 12$$

$k = 2$

$$c_1^{(3)} = \frac{1}{10} (27 - 2c_2^{(2)} + c_3^{(2)})$$

$$= \frac{1}{10} (27 - (2 \times 8.65) - 6.47)$$

$$= \frac{1}{10} [27 - 17.3 - 6.47] = 0.323$$

$$c_2^{(3)} = \frac{1}{6} [60 - 3c_1^{(3)} + 2c_3^{(2)}]$$

$$= \frac{1}{6} [60 - 3 \times 0.323 + 2(-6.47)] = 7.6818$$

$$\begin{aligned}
 c_3^{(3)} &= \frac{1}{5} \left[-21 - c_1^{(3)} - c_2^{(3)} \right] = 5 \\
 &= \frac{1}{5} \left[-21 - 0 \cdot 323 - 7 \cdot 6818 \right] \\
 F \cdot S &= F5 \cdot \left[(0 + 0 - F8) \right] \\
 &= -5 \cdot 801 \\
 &= \left[0.8 + 1.28 - 0.2 \right] \cdot 5
 \end{aligned}$$

k	c_1	c_2	c_3	$c_a(c_1)$	$c_a(c_2)/c_{a3}$
1	$x + F \cdot S \cdot 80$	0	0	x	x
2	2.7	8.65	-6.47	x	x
3	0.323	7.6818	-5.801	2.377	0.968
4	0.5835	7.7746	-5.872	0.2605	0.0907
	0.5579	7.7743	-5.864	0.0256	0.01008

$$c_1 = 0.5835, c_2 = 7.7746, c_3 = -5.872$$

$$(F \cdot S + F8 - F8) \cdot 5 = 0$$

$$(FF \cdot 2 - (5 \cdot 0.8 \cdot 8) - F8) \cdot 5 = 0$$

$$FF \cdot 0 = [FF \cdot 2 - 8 \cdot F1 - F8] \cdot 5 = 0$$