

16/ENGG/037

ENG 380

Electrical Engineering

Assignment 3

$$x_1 = 2, x_2 = b, x_3 = c, x_4 = d, x_5 = e, x_6 = f$$

$$a + b - 2c + d + 3e - f = 4$$

$$2a - b + c + 2d + e - 3f = 20$$

$$a + 3b - 3c - d + 2e + f = -15$$

$$5a + 2b - c - d + 2e + f = -3$$

$$-2a - b + 2c + 3d + e + 3f = 16$$

$$4a + 3b + c - 6d - 3e - 2f = -27$$

eqn 1, is the pivot equation

$$2(a + b - 2c + d + 3e - f = 4) = 2a + 2b - 4c + 2d + 6e - 2f = 8$$

$$1(a + b - 2c + d + 3e - f = 4) = a + b - 2c + d + 3e - f = 4$$

$$5(a + b - 2c + d + 3e - f = 4) = 5a + 5b - 10c + 5d + 15e - 5f = 20$$

$$-3(a + b - 2c + d + 3e - f = 4) = -3a - 3b + 6c - 3d - 9e + 3f = -12$$

$$4(a + b - 2c + d + 3e - f = 4) = 4a + 4b - 8c + 4d + 12e - 4f = 16$$

Gathering equations

$$2a + 2b - 4c + 2d + 6e - 2f = 8$$

$$-2a - b + c + 2d + e - 3f = 20$$

$$0 - 3b + 3c + 0 + 5e - f = 12$$

$$a + 5b - 3c - d + 2e + f = -15$$

$$-a + b - 2c + d + 2e - f = 4$$

$$0 + 2b - c - 2d - e + 2f = -19$$

$$5a + 2b - c + d + 2e + f = -3$$

$$-5a + 5b - 10c + 5d + 15e - 5f = 20$$

$$0 - 3b + 3c - 6d - 3e + 6f = -23$$

$$-2a - b + 2c + 3d + e + 3f = 16$$

$$-3a - 3b + 6c - 3d - 9e + 3f = -12$$

$$0 + 2b - 4c + 6d + 10e - 6f = 28$$

$$4a + 3b + c - 6d - 3e - 2f = -27$$

$$-4a + 4b - 8c + 4d + 12e - 4f = 16$$

$$a - b + 9c - 10d - 15e + 2f = -43$$

eqn 1 is now the pivot

$$2/3 [-3b + 5c + 50 - f = 12] = \frac{2b}{3} - \frac{10c}{3} + \frac{100}{3} - \frac{2f}{3} = -8$$

$$-7/3 [-3b + 5c - 50 - f = 12] = -3b + 5c - 50 - f = 12$$

$$+2/3 (-3b + 5c - 50 - f = 12) = \frac{2b}{3} - \frac{10c}{3} + \frac{100}{3} - \frac{2f}{3} = -8$$

$$-1/3 (-3b + 5c - 50 - f = 12) = -b + \frac{5c}{3} - \frac{50}{3} - \frac{1}{3}f = -4$$

Subtracting eqn

$$2b - c - 20 - 0 + 2f = -10$$

$$-2b - \frac{10c}{3} + 0 + \frac{100}{3} + 2f = -8$$

$$+7/3c - 20 - \frac{130}{3} + \frac{14}{3}f = -11$$

$$-3b + 5c - 0 - 130 + 6f = -23$$

$$-3b + 5c - 50 - f = 12$$

$$4c - 60 - 80 + 7f = -35$$

$$2b - 4c + 60 + 100 - 0f = 28$$

$$-2b - \frac{10}{3}c + \frac{100}{3} + \frac{2f}{3} = -8$$

$$-7/3c + 60 + \frac{20}{3} - \frac{2}{3}f = 36 \quad \text{--- (5)}$$

$$-b + 5c - 100 - 150 + 2f = -43$$

$$-b + \frac{5}{3}c + 0d - \frac{50}{3} - \frac{1}{3}f = 4$$

$$0 + \frac{22}{3}c - 10d - \frac{40}{3}e + \frac{7}{3}f = -47 \quad \text{--- (6)}$$

eqn 3" is now the pivot eqn

$$+12/7 [+7/3c - 20 - \frac{13}{3}e + \frac{4}{3}f = -11] = +4c - 24/7d - \frac{52}{7}e + \frac{16}{7}f = \frac{-132}{7}$$

$$-2/7 [+7/3c - 20 - \frac{13}{3}e + \frac{4}{3}f = -11] = -\frac{2}{3}c + 4/7d + \frac{26}{21}e - \frac{8}{21}f = \frac{22}{7}$$

$$+22/7 [+7/3c - 20 - \frac{13}{3}e + \frac{4}{3}f = -11] = \frac{22}{3}c - 44/7d - \frac{284}{21}e + \frac{88}{21}f = \frac{-242}{7}$$

Subtracting

$$4c - 60 - 80 + 7f = -35$$

$$-4c - \frac{24}{7}d - \frac{52}{7}e + \frac{16}{7}f = \frac{-132}{7}$$

$$0 - 2.5714d - 0.5714e + 4.7142f = -10.1429 \quad \text{--- (4)}$$

$$-2/3C + 0d + 20/3e - 2/3f = 36$$

$$- \left[\frac{936}{3} + \frac{1400}{3} + \frac{260}{3}e - \frac{8}{3}f = \frac{22}{3} \right]$$

$$0 + 5.42857d + 5.42857e - 0.28571f = 32.85714 \quad (6)$$

$$\frac{22}{3}C - 14d - \frac{40}{3}e + \frac{7}{3}f = -49$$

$$- \left(\frac{22}{3}C - 44/9d - \frac{286}{21}e + \frac{88}{21}f = -\frac{242}{7} \right)$$

$$0 - 5.71429d + 0.285714e - 1.85714f = -12.4286 \quad (7)$$

eqn 4 is row 5 in final

$$-2.1111 \left[-2.5714d - 0.5714e + 4.7142f = -16.1429 \right]$$

$$= 5.42857d + 1.2663e - 9.9522f = 34.0793$$

$$1.44446 \left(-2.5714d - 0.5714e + 4.7142f = -16.1429 \right)$$

$$-3.71429d - 0.82536e + 6.86947f = 23.31777$$

Subtracting

$$5.42857d + 5.42857e - 0.28571f = 32.85714$$

$$- (5.42857d + 1.2663e - 9.9522f = 34.0793)$$

$$0 + 0.2222e + 9.66639f = -1.2222$$

$$-2.71429d + 0.285714e - 1.85714f = -12.4286$$

$$- (-3.71429d - 0.82536e + 6.86947f = 23.31777)$$

$$-0.4 + 1.1111e - 5.6667f = 10.8889$$

eqn 5 is row 4 equation

$$-0.2667 \left(4.2222e + 9.66639f = -1.2222 \right)$$

$$\rightarrow 1.1111e + 2.5442f = 0.32168$$

$$1.1111e - 5.6667f = 10.8889$$

$$-1.1111e + 2.5442f = 0.32168$$

$$0e - 11.2109f = 11.2106$$

$$f = \frac{11.2106}{11.2109} = 0.9999732 \approx -1$$

$$11.2109$$

$$f = -1$$

$$1.1111e - 5.6667(-1) = 10.8889$$

$$e = \frac{10.8889 - 5.6667}{1.1111} = 2$$

$$1.1111$$

$$-3.714298 + 0.285714(2) = 1.85714(-1) = -12.4286$$

$$d = -12.4286 - 0.571428 - 1.5714$$

$$-3.71429$$

$$\underline{\underline{24}}$$

$$4c - 6d - 8e + 7f = -35$$

$$4c - 24 - 16 - 7 = -35$$

$$c = \frac{-35 + 47}{4} = \frac{12}{4} = 3$$

$$2b - c - 2d - e + 2f = -19$$

$$2b - 3 - 8 - 2 - 2 = -19$$

$$b = \frac{-19 + 15}{2} = \frac{-4}{2} = \underline{\underline{-2}}$$

$$a + b + 2c + d + 3e - f = 4$$

$$2 - 2 - 6 + 4 + 6 + 1 = 4$$

$$a = 4 - 3 = 1$$

$$a=1, b=-2, c=3, d=24, e=2, f=-1$$

Therefore

$$T_1 = 1$$

$$T_2 = 2$$

$$T_3 = 3$$

$$T_4 = 4$$

$$T_5 = 2$$

$$T_6 = -1$$