Assignment to 4.3.2

For internal clearing of services the following data are given:

$$PO := \begin{pmatrix} 1000 \\ 500 \\ 800 \end{pmatrix} \qquad x := \begin{pmatrix} 500 \\ 200 \\ 100 \end{pmatrix} \qquad q := \begin{pmatrix} 70 & 50 & 5 \\ 20 & 40 & 5 \\ 40 & 100 & 20 \end{pmatrix}$$

The vector PO represents the primary overheads of each indirect cost centre (ICC):

$PO_1 = 1000$ Primary overheads of ICC 1

$PO_2 = 500$ Primary overheads of ICC 2

$PO_3 = 800$ Primary overheads of ICC 3

The vector x contains the output of the ICCs, measured by units of quantity (QU):

$x_1 = 500$ Output of ICC 1 [QU]

$x_2 = 200$ Output of ICC 2 [QU]

$x_3 = 100$ Output of ICC 3 [QU]

The lines of matrix q show the deliveries of these outputs to each ICC, and the columns show the supplying ICC:

$q_{1,1} = 70$ Deliveries to ICC 1 by ICC 1 [QU]

$q_{1,2} = 50$ Deliveries to ICC 1 by ICC 2 [QU]

$q_{1,3} = 5$ Deliveries to ICC 1 by ICC 3 [QU]

$q_{2,1} = 20$ Deliveries to ICC 2 by ICC 1 [QU]

$q_{2,2} = 40$ Deliveries to ICC 2 by ICC 2 [QU]

$q_{2,3} = 5$ Deliveries to ICC 2 by ICC 3 [QU]

$q_{3,1} = 40$ Deliveries to ICC 3 by ICC 1 [QU]

$q_{3,2} = 100$ Deliveries to ICC 3 by ICC 2 [QU]

$q_{3,3} = 20$ Deliveries to ICC 3 by ICC 3 [QU]

$ORIGIN \equiv 1$ First digit of the fields

1. Which are the costs per unit for output of each indirect cost centre if no internal clearing of services between ICCs takes place?
2. Which are the costs per unit for output of each indirect cost centre if unidirectional clearing of services between ICCs takes place?
3. Which set of equations must be established in order to determine the costs per unit according to the method of mutual internal clearing of services?