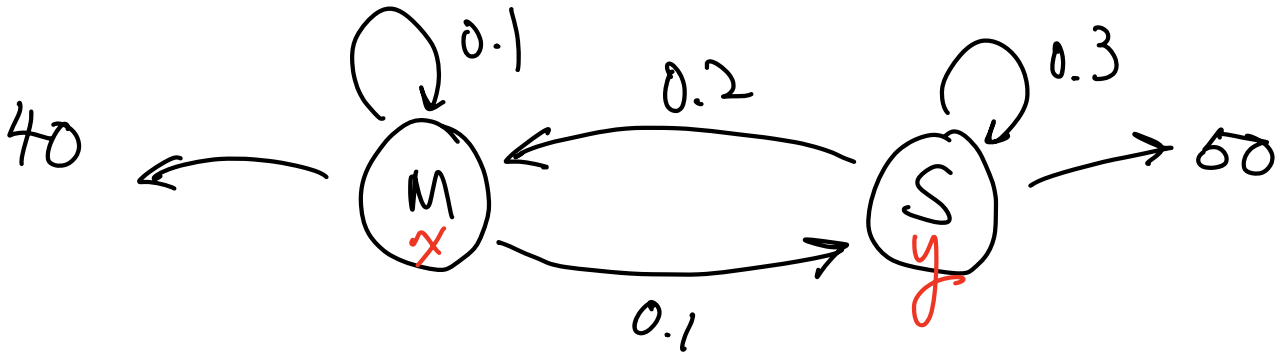


4. Consider a region with two main economies: M (machinery) and S (service). From historical data, it is found out that:

- (a) producing 1 unit of M requires 0.1 unit of M and, 0.2 unit of S;
- (b) producing 1 unit of S requires 0.1 unit of M and, 0.3 unit of S.

Suppose the total outside demands of M and S are 40 and 50 units, respectively. Determine the actual units of M and S produced in order to satisfy the above demands.



$$x = 40 + 0.1x + 0.1y$$

$$y = 50 + 0.2x + 0.3y$$

$$\Leftrightarrow \begin{cases} 0.9x - 0.1y = 40 \\ -0.2x + 0.7y = 50 \end{cases} \Leftrightarrow$$

$$\begin{cases} 9x - y = 400 \\ -2x + 7y = 500 \end{cases}$$

$$(7 \times 9 - 2)x = 7 \times 400 + 500 \Rightarrow x = \frac{3300}{61} \approx 54.10 \quad M$$

$$y = 9x - 400 = \frac{9(3300)}{61} - 400 = \frac{29700 - 24400}{61}$$

$$= \frac{5300}{61} \approx 86.89 \quad S$$