0.6 → T_1

0.4 → T_2

0.9 →

0.1 →

T_3

0.5 →

0.5

$$\begin{pmatrix} 0.6 & 0.9 & 0.5 \\ 0.4 & 0 & 0 \\ 0 & 0.1 & 0.5 \end{pmatrix}$$

7)

$$M = \begin{pmatrix} 0.3 & 0.4 & 0.8 \\ 0.4 & 0.5 & 0 \\ 0.3 & 0.1 & 0.2 \end{pmatrix}$$

a)

$$M = \begin{pmatrix} 0.3 & 0.4 & 0.8 \\ 0.4 & 0.5 & 0 \\ 0.3 & 0.1 & 0.2 \end{pmatrix}$$

b) $\vec{x}_0 = \begin{pmatrix} 100 \\ 100 \\ 100 \end{pmatrix}_{3\times3 \cdot 3\times1}$

$\vec{x}_1 = M \cdot \vec{x}_0$

$$= \begin{pmatrix} 0.3 & 0.4 & 0.8 \\ 0.4 & 0.5 & 0 \\ 0.3 & 0.1 & 0.2 \end{pmatrix} \begin{pmatrix} 100 \\ 100 \\ 100 \end{pmatrix}$$

$$= \begin{pmatrix} 0.3 \cdot 100 + 0.4 \cdot 100 + 0.8 \cdot 100 \\ \cdots \\ \cdots \end{pmatrix}$$

$$= \begin{pmatrix} 150 \\ 90 \\ 60 \end{pmatrix}$$

c) $M \cdot M$

$$\begin{pmatrix} 0.3 & 0.4 & 0.8 \\ 0.4 & 0.5 & 0 \\ 0.3 & 0.1 & 0.2 \end{pmatrix} \cdot \begin{pmatrix} 0.3 & 0.4 & 0.8 \\ 0.4 & 0.5 & 0 \\ 0.3 & 0.1 & 0.2 \end{pmatrix}$$

$0.3 \cdot 0.3 + 0.4 \cdot 0.4 + 0.8 \cdot 0.3$
$= 0.49$

$0.3 \cdot 0.4 + 0.4 \cdot 0.5 + 0.8 \cdot 0$
$= 0.4$
$\vdots$

$$M^2 = \begin{pmatrix} 0.49 & 0.4 & 0.4 \\ 0.32 & 0.41 & 0.32 \\ 0.19 & 0.19 & 0.28 \end{pmatrix}$$

$\vec{x}_2 = M\vec{x}_1 = M \cdot (M \cdot \vec{x}_0)$
$\qquad\qquad = M^2 \cdot \vec{x}_0$

$$\vec{x}_2 = \begin{pmatrix} 0.49 & 0.4 & 0.4 \\ 0.32 & 0.41 & 0.32 \\ 0.19 & 0.19 & 0.28 \end{pmatrix} \begin{pmatrix} 100 \\ 100 \\ 100 \end{pmatrix}$$

$$= \begin{pmatrix} 0.49 \cdot 100 + 0.4 \cdot 100 + 0.4 \cdot 100 \\ \vdots \end{pmatrix}$$

$$\vec{x}_2 = \begin{pmatrix} 129 \\ 105 \\ 66 \end{pmatrix}$$

d) $\vec{x} = M\vec{x}; \quad \vec{x} = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$

$\qquad\qquad\qquad x_1 + x_2 + x_3 = 91$

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 0.3 & 0.4 & 0.8 \\ 0.4 & 0.5 & 0 \\ 0.3 & 0.1 & 0.2 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$$

I: $x_1 = 0.3x_1 + 0.4x_2 + 0.8x_3$
II: $x_2 = 0.4x_1 + 0.5x_2$
III: $x_3 = 0.3x_1 + 0.1x_2 + 0.2x_3$

Gjør om II

$x_2 = 0.4x_1 + 0.5x_2$

$\dfrac{0.5x_2}{0.5} = \dfrac{0.4x_1}{0.5}$ $(x_2 - 0.5x_2 = 0.5x_2)$

II: $x_2 = 0.8x_1$

Sett inn i I & III

I $x_1 = 0.3x_1 + 0.4 \cdot (0.8x_1) + 0.8x_3$
III $x_3 = 0.3x_1 + 0.1 \cdot (0.8x_1) + 0.2x_3$

I: $-x_1 + 0.3x_1 + 0.32x_1 + 0.8x_3 = 0$
III: $0.3x_1 + 0.08x_1 + 0.2x_3 - x_3 = 0$

I: $-0.38x_1 + 0.8x_3 = 0$
III: $0.38x_1 - 0.8x_3 = 0$
$\qquad$ I $= -$ III

I: $0.8x_3 = 0.38x_1$

$\qquad x_3 = 0.475x_1$
$\qquad x_2 = 0.8x_1$

$$\vec{x} = \begin{pmatrix} x_1 \\ 0.8 \cdot x_1 \\ 0.475 \cdot x_1 \end{pmatrix}$$

NB! $x_1 + x_2 + x_3 = 91$ (Betingelse)

$x_1 + 0.8x_1 + 0.475x_1 = 91$

$\dfrac{2.275x_1}{2.275} = \dfrac{91}{2.275}$

$\vec{x} = \begin{pmatrix} 40 \\ 32 \\ 19 \end{pmatrix} \qquad x_1 = 40$