

Serie 7

① a)

	A	B	C	
E	<u>20'000</u>	30'000	10'000	5'200'000
$\frac{1}{2}$ T	10'000	17'000	6'000	3'000'000
$\frac{1}{10}$ K	2'000	3'000	2'000	760'000
	20	30	10	5200
	0	2	1	400
	0	0	1	240

$$1000 \cdot x_3 = 240'000$$

$$x_3 = \underline{\underline{240 = C}}$$

$$2'000 \cdot x_2 + 240'000 = 400'000$$

$$2'000 \cdot x_2 = 160'000$$

$$x_2 = \underline{\underline{80 = B}}$$

$$20'000 x_1 + 2'400'000 + 2'400'000 = 5'200'000$$

$$20'000 \cdot x_1 = 400'000$$

$$x_1 = \underline{\underline{20 = A}}$$

b)

$$\underbrace{\begin{pmatrix} 1 & & & \\ & \frac{1}{2} & 1 & \\ & & \frac{1}{10} & 1 \end{pmatrix}}_L \cdot \underbrace{\begin{pmatrix} 20 & 30 & 10 & 5200 \\ & 2 & 1 & 400 \\ & & 1 & 240 \end{pmatrix}}_R$$

c)

$$L \cdot y = b$$

$$\begin{array}{ccc|c} 1 & 0 & 0 & 5720 \\ \frac{1}{2} & 1 & 0 & 3300 \\ \frac{1}{10} & 0 & 1 & 836 \end{array}$$

$$x_1 = 5720$$

$$2860 + x_2 = 3300$$

$$x_2 = 440$$

$$572 + x_3 = 836$$

$$x_3 = 264$$

$$y = \begin{pmatrix} 5720 \\ 440 \\ 264 \end{pmatrix}$$

$$R \cdot x = y$$

$$\begin{array}{ccc|c} 20 & 30 & 10 & 5720 \\ & 2 & 1 & 440 \\ & & 1 & 264 \end{array}$$

$$x_3 = 264$$

$$x_2 = 88$$

$$x_1 = 22$$

$$x = \begin{pmatrix} 264 \\ 88 \\ 22 \end{pmatrix}$$

2

a) $A = \begin{pmatrix} 0.8 & 2.2 & 3.6 \\ 2.0 & 3.0 & 4.0 \\ 1.2 & 2.0 & 5.8 \end{pmatrix} \quad b = \begin{pmatrix} 2.4 \\ 1.0 \\ 4.0 \end{pmatrix}$

$P \quad L \quad A$

$$\begin{pmatrix} 1 & & \\ & 1 & \\ & & 1 \end{pmatrix} \begin{pmatrix} 1 & & \\ & 1 & \\ & & 1 \end{pmatrix} \begin{pmatrix} 0.8 & 2.2 & 3.6 \\ 2.0 & 3.0 & 4.0 \\ 1.2 & 2.0 & 5.8 \end{pmatrix}$$

$$\begin{pmatrix} & 1 & \\ 1 & & \\ & & 1 \end{pmatrix} \begin{pmatrix} 1 & & \\ & 1 & \\ & & 1 \end{pmatrix} \begin{pmatrix} 2.0 & 3.0 & 4.0 \\ 0.8 & 2.2 & 3.6 \\ 1.2 & 2.0 & 5.8 \end{pmatrix} \begin{matrix} \\ \frac{0.8}{2.0} \\ \frac{1.2}{2.0} \end{matrix}$$

$$\begin{pmatrix} & & 1 \\ 0.4 & 1 & \\ 0.6 & & 1 \end{pmatrix} \begin{pmatrix} 1 & & \\ & 1 & \\ & & 1 \end{pmatrix} \begin{pmatrix} 2.0 & 3.0 & 4.0 \\ 0 & 1 & 2 \\ 0 & 0.2 & 3.4 \end{pmatrix} \begin{matrix} \\ \\ \frac{0.2}{1} \end{matrix}$$

$$\underbrace{\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}}_P \underbrace{\begin{pmatrix} 1 & 0 & 0 \\ 0.4 & 1 & 0 \\ 0.6 & 0.2 & 1 \end{pmatrix}}_L \underbrace{\begin{pmatrix} 2.0 & 3.0 & 4.0 \\ 0 & 1 & 2 \\ 0 & 0 & 3 \end{pmatrix}}_R$$

b) $b = \begin{pmatrix} 2.4 \\ 1.0 \\ 4.0 \end{pmatrix} \quad Pb = \begin{pmatrix} 1.0 \\ 2.4 \\ 4.0 \end{pmatrix}$

$Lx = Pb$

$Rx = y$

$$\begin{array}{ccc|c} 1 & 0 & 0 & 1.0 \\ 0.4 & 1 & 0 & 2.4 \\ 0.6 & 0.2 & 1 & 4.0 \end{array} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} = y$$

$$\begin{array}{ccc|c} 2.0 & 3.0 & 4.0 & 1 \\ 0 & 1 & 2 & 2 \\ 0 & 0 & 3 & 3 \end{array} = \begin{pmatrix} -1.5 \\ 0 \\ 1 \end{pmatrix} = x$$

Aufgabe 3

$$1997 = 0$$

$$p(x) = a_0 + a_1x + a_2x^2 + a_3x^3$$

$$p_1(0, 150) = a_0 + 0 \cdot a_1 + 0 \cdot a_2 + 0 \cdot a_3 = 150$$

$$a_0 = 150$$

$$p_2(2, 104) = 150 + 2a_1 + 4a_2 + 8a_3 = 104$$

$$p_3(3, 172) = 150 + 9a_1 + 81a_2 + 729a_3 = 172$$

$$p_4(13, 152) = 150 + 13a_1 + 169a_2 + 2197a_3 = 152$$

$$\Rightarrow \begin{array}{ccc|cc} 2 & 4 & 8 & -46 & -37.15 \\ 9 & 81 & 729 & 22 & 7.84 \\ 13 & 169 & 2197 & 2 & -0.38 \end{array}$$