S8/Aufg.1

a) $\begin{pmatrix} A_E & B_E & C_E \\ A_T & B_T & C_T \\ A_K & B_K & C_K \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} E \\ T \\ K \end{pmatrix}$ $\cdot \frac{1}{1000}$

20	30	10	5200
16	17	6	3000
2	3	2	760

$II - \left(\frac{16}{20}\right) I = \lambda_{21}$

$III - \left(\frac{2}{20}\right) I = \lambda_{31}$

20	30	10	5200
0	2	1	400
0	0	1	240

$:20$

$:2$

$\left(\frac{0}{2}\right) = \lambda_{32}$

1	1.5	0.5	260
0	1	0.5	200
0	0	1	240

$x_3 = 240$

$x_2 = 200 - \frac{x_3}{2} = 80$

$x_1 = 260 - 1.5x_2 - 0.5x_3 = 20$

$\} \cdot 1000 =$ A = 20'000; B = 80'000; C = 240'000

b) aus a) $\lambda_{21} : 0.5$, $\lambda_{31} : 0.1$, $\lambda_{32} : 0$

$L = \begin{pmatrix} 1 & 0 & 0 \\ 0.5 & 1 & 0 \\ 0.1 & 0 & 1 \end{pmatrix}$ $R = \begin{pmatrix} 20 & 30 & 10 \\ 0 & 2 & 1 \\ 0 & 0 & 1 \end{pmatrix}$

Überprüfen: $L \cdot R = A$

			20	30	10
			0	2	1
			0	0	1
1	0	0	20	30	10
0.5	1	0	10	17	6
0.1	0	1	2	3	2

✓

c) $Ax = b$

$LRx = Pb$

I); $Ly = Pb$ II); $Rx = y$, $P = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$

I) $\begin{pmatrix} 1 & 0 & 0 \\ 0.5 & 1 & 0 \\ 0.1 & 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} y_1 \\ y_2 \\ y_3 \end{pmatrix} = \begin{pmatrix} 5720 \\ 3300 \\ 836 \end{pmatrix} = \begin{pmatrix} y_1 \\ 0.5y_1 + y_2 \\ 0.1y_1 + y_3 \end{pmatrix}$

$y_1 = 5720$
$y_2 = 440$
$y_3 = 264$

II) $\begin{pmatrix} 20 & 30 & 10 \\ 0 & 2 & 1 \\ 0 & 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} y_1 \\ y_2 \\ y_3 \end{pmatrix} = \begin{pmatrix} 20x_1 + 30x_2 + 10x_3 \\ 2x_2 + x_3 \\ x_3 \end{pmatrix}$

$x_1 = 22$
$x_2 = 88$
$x_3 = 264$

$\cdot 1000 =$

$A = 22'000$
$B = 88'000$
$C = 264'000$