$$\rightsquigarrow \left(\begin{array}{ccc|c} 1/2 & 1/2 & 1/2 & 3 \\ 1/2 & -1/2 & -1/2 & 1 \\ 1/2 & 1/2 & -1/2 & -5 \\ 1/2 & -1/2 & 1/2 & 9 \end{array}\right) \rightsquigarrow \left(\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 1 & -1 & -1 & 2 \\ 1 & 1 & -1 & -10 \\ 1 & -1 & 1 & 18 \end{array}\right) \quad (2)$$

$$\rightsquigarrow \left(\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 2 & 0 & 0 & 8 \\ 0 & 0 & 2 & 16 \\ 0 & 2 & 0 & -12 \end{array}\right) \Rightarrow \lambda_1 = 4, \lambda_2 = -6, \lambda_3 = 8$$

(übersprünge an 1. Zeile)

$$\Rightarrow v = 4 \cdot b_1 + (-6) b_2 + 8 b_3 \quad (1)$$

$\Sigma_{A4} = 8$

A5

i) $M_T^{B_1, B_2}\begin{pmatrix} 2 \\ -1 \\ -1 \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \end{pmatrix} = -\frac{1}{2}\left(\begin{pmatrix} 1 \\ 1 \end{pmatrix} + \begin{pmatrix} 1 \\ -1 \end{pmatrix}\right)$ (1)

$M_T^{B_1, B_2}\begin{pmatrix} 1 \\ 0 \\ 8 \end{pmatrix} = \begin{pmatrix} 9 \\ 1 \end{pmatrix} = 5 \cdot \begin{pmatrix} 1 \\ 1 \end{pmatrix} + 4\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ (1)

$M_T^{B_1, B_2}\begin{pmatrix} -1 \\ 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 7 \\ -5 \end{pmatrix} = 1 \cdot \begin{pmatrix} 1 \\ 1 \end{pmatrix} + 6\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ (1)

$\Rightarrow M_T^{B_1', B_2'} = \begin{pmatrix} -1/2 & 5 & 1 \\ -1/2 & 4 & 6 \end{pmatrix}$ (1)

ii) $M_T^{B_1', B_2'} \cdot v = \begin{pmatrix} -1/2 & 5 & 1 \\ -1/2 & 4 & 6 \end{pmatrix}\begin{pmatrix} 4 \\ 1 \\ 3 \end{pmatrix} = \begin{pmatrix} 6 \\ 20 \end{pmatrix}$ (2)

$\Sigma_{A5} = 6$