

$$\lambda_1 = 9$$

$$\begin{pmatrix} 2 & 2 & -8 \\ 2 & -7 & 10 \\ -8 & 10 & -4 \end{pmatrix} \sim \begin{pmatrix} 1 & 1 & -4 \\ 2 & -7 & 10 \\ -4 & 5 & -2 \end{pmatrix} \sim \begin{pmatrix} 1 & 1 & -4 \\ 0 & -9 & 18 \\ 0 & 9 & -18 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 1 & 1 & -4 \\ 0 & 1 & -2 \end{pmatrix}$$

$$\begin{aligned} x_2 &= 2x_3, & x_3 &= 1, & x_2 &= 2, & x_1 &= 2 \\ & & & & & & & (2, 2, 1) \end{aligned}$$

$$x_1 = 4x_3 - x_2$$

$$\|l_1\| = \sqrt{4+4+1} = 3$$

$$\vec{l}_1 = \frac{1}{3} (2; 2; 1)$$

$$\lambda_2 = -9$$

$$\begin{pmatrix} 20 & 2 & -8 \\ 2 & 11 & 10 \\ -8 & 10 & 14 \end{pmatrix} \sim \begin{pmatrix} 10 & 1 & -4 \\ 2 & 11 & 10 \\ -4 & 5 & 7 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 2 & 11 & 10 \\ 10 & 1 & -4 \\ -4 & 5 & 7 \end{pmatrix} \sim \begin{pmatrix} 2 & 11 & 10 \\ 0 & -54 & -54 \\ 0 & 27 & 27 \end{pmatrix} \sim \begin{pmatrix} 2 & 11 & 10 \\ 0 & 1 & 1 \end{pmatrix}$$

$$x_2 = -x_3, \quad x_3 = -1, \quad x_2 = 1$$

$$x_1 = \frac{-11x_2 - 10x_3}{2} = \frac{-22 + 20}{2} = -1$$

$$\vec{l}_2 = \frac{1}{3} (-1; 1; -2)$$

$$\lambda_3 = 18$$

$$\begin{pmatrix} -7 & 2 & -8 \\ 2 & -16 & 10 \\ -8 & 10 & -13 \end{pmatrix} \sim \begin{pmatrix} 1 & -8 & 5 \\ -7 & 2 & -8 \\ -8 & 10 & -13 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 1 & -8 & 5 \\ 0 & -54 & 27 \\ 0 & -54 & 27 \end{pmatrix} \sim \begin{pmatrix} 1 & -8 & 5 \\ 0 & 2 & -1 \end{pmatrix}$$

$$x_2 = \frac{x_3}{2}, \quad x_3 = 2, \quad x_2 = 1$$

$$\vec{l}_3 = \frac{1}{3} (-2; 1; 2)$$

$$x_3 = 8x_2 - 5x_3 = 8 - 10 = -2$$