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Zadanie 3

$$\begin{array}{ccccc} 1 & 0 & 3 & 2 & 0 \\ 2 & 1 & -3 & -3 & 1 \\ 3 & -2 & -1 & 0 & 1 \\ 0 & 3 & 1 & -1 & 0 \end{array}$$

$$\downarrow \begin{array}{l} (3) - 3 \cdot (1) \\ (4) - 2 \cdot (1) \end{array}$$

$$\begin{array}{ccccc} 1 & 0 & 0 & 0 & 0 \\ 2 & 1 & -9 & -7 & 1 \\ 3 & -2 & -10 & -6 & 1 \\ 0 & 3 & 1 & -1 & 0 \end{array}$$

$$\downarrow \begin{array}{l} (1) - 2 \cdot (2) \\ (3) + 9 \cdot (2) \\ (4) + 7 \cdot (2) \\ (5) - (2) \end{array}$$

$$\begin{array}{ccccc} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 7 & -2 & -28 & -20 & 3 \\ -6 & 3 & 28 & 20 & -3 \end{array}$$

$$\downarrow \begin{array}{l} (5) \cdot \frac{1}{3} \\ (4) \cdot (-\frac{1}{28}) \\ (3) \cdot (-\frac{1}{28}) \end{array}$$

$$\begin{array}{ccccc} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 7 & -2 & 1 & 1 & 1 \\ -6 & 3 & -1 & -1 & -1 \end{array}$$

$$\downarrow \begin{array}{l} (5) - (3) \\ (4) - (3) \end{array}$$

$$\begin{array}{ccccc|cc} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 7 & -2 & 1 & 1 & 1 & 0 & 0 \\ -6 & 3 & -1 & -1 & -1 & 0 & 0 \end{array}$$

$$\begin{array}{cccc} 1 & & & \\ & 1 & & \\ & & 1 & \\ & & & 1 \end{array}$$

$$\downarrow$$

$$\begin{array}{cccc} 1 & -3 & -2 & \\ & 1 & & \\ & & 1 & \\ & & & 1 \end{array}$$

$$\downarrow$$

$$\begin{array}{cccc} 1 & -3 & -2 & \\ -2 & 1 & 9 & 7-1 \\ & & 1 & \\ & & & 1 \end{array}$$

$$\downarrow$$

$$\begin{array}{cccc} 1 & \frac{3}{28} & \frac{1}{10} & \\ -2 & 1 & -\frac{9}{28} & -\frac{3}{20} - \frac{1}{3} \\ & & \frac{1}{28} & \\ & & & -\frac{1}{20} \end{array}$$

$$\downarrow$$

$$\begin{array}{cccc|cc} 1 & \frac{3}{28} & \frac{1}{10} & -\frac{3}{28} & 0 & 0 \\ -2 & 1 & -\frac{9}{28} & -\frac{1}{140} & \frac{1}{84} & \frac{1}{28} \\ & & \frac{1}{28} & -\frac{3}{140} & \frac{1}{3} & \end{array}$$

wykonę eliminację gaussa,
doprowadzam do postaci
schodkowej, te same kroki
dla macierzy jednostkowej

$$\vec{v}_1 = \left(-\frac{1}{140}, -\frac{1}{140}, \frac{5}{140}, -\frac{1}{140}, 0 \right)$$

$$\vec{v}_2 = \left(-\frac{3}{28}, -\frac{1}{84}, \frac{1}{28}, 0, \frac{1}{3} \right)$$

Zatem bazą jądra są wektory \vec{v}_1 oraz \vec{v}_2