Задание 7_1

5.1.1

$A = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ $B = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$ $C = (1, 0, 2)$

$5 \cdot A = 5\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 5 \\ 10 \\ 15 \end{pmatrix}$ $A + B = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}$

$A \cdot C = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \times (1\ 0\ 2) = \begin{pmatrix} 1 & 0 & 2 \\ 2 & 0 & 4 \\ 3 & 0 & 6 \end{pmatrix}$

5.1.2

$(5E)^{-1}$ $\det(5E) = 5^5$

$M(5E) = \begin{pmatrix} 5^4 & \dots & \\ \dots & 5^4 & \dots \\ \dots & \dots & 5^4 \end{pmatrix} \Rightarrow (5E)^{-1} = \frac{1}{5^5} \begin{pmatrix} 5^4 & \dots & \\ \dots & 5^4 & \dots \\ \dots & \dots & 5^4 \end{pmatrix} = \frac{5^4}{5^5} E = \frac{E}{5}$

5.2

$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 0 & 6 \\ 7 & 8 & 9 \end{pmatrix}$ $\det(A) = 1(0 \cdot 9 - 6 \cdot 8) - 2(4 \cdot 9 - 6 \cdot 7) + 3(4 \cdot 8 - 7 \cdot 0) =$

$= 60$

5.3

$A^{-1} = \frac{1}{|A|} A_+^T$

$\det(A) = 60$ (см 5.2) $\det(A) \neq 0$

$M = \begin{vmatrix} -48 & -6 & 32 \\ -6 & -12 & -6 \\ 12 & -6 & -8 \end{vmatrix}$ $M_+ = \begin{vmatrix} -48 & 6 & 32 \\ 6 & -12 & 6 \\ 12 & 6 & -8 \end{vmatrix}$

$M_+^T = \begin{vmatrix} -48 & 6 & 12 \\ 6 & -12 & 6 \\ 32 & 6 & -8 \end{vmatrix}$

$A^{-1} = \frac{1}{60} \begin{pmatrix} -48 & 6 & 12 \\ 6 & -12 & 6 \\ 32 & 6 & -8 \end{pmatrix}$

5.3.2 $A=\begin{pmatrix}1&1&1&1\\2&2&2&2\\3&3&3&3\\4&4&4&4\end{pmatrix}$ $\operatorname{rang}(A)=1$

5.4 $A=(1,5)$ $B=(2,8)$ $\bar{A}\cdot\bar{B}=x_1x_2+y_1y_2=1\cdot2+5\cdot8=42$

5,5 $\bar{A}=(1\ 5\ 0)$; $\bar{B}(2,8\ 7)$; $\bar{C}(7\ 1{,}5\ 3)$

$$\bar{A}\times[\bar{B}\times\bar{C}]=\begin{vmatrix}1&5&0\\2&8&7\\7&1{,}5&3\end{vmatrix}=1\left(8\cdot3-\frac{3}{2}\cdot7\right)-5(2\cdot3-7\cdot7)=\frac{457}{2}$$