①

$$a = \left(\begin{array}{cc|cc} 1 & 1 & 1 & 1 \\ 0 & 1 & -2 & -1 \\ \hline 1 & 1 & 1 & -2 \\ 0 & 1 & 1 & -1 \end{array}\right) \begin{matrix} \leftarrow i\text{-стр.} \\ \leftarrow j\text{-ст.} \end{matrix} \qquad a^{ij}_{lk}, \quad a^{ij}_{jk} - ?$$

k

$$a^{i}_{k} = a^{i1}_{1k} + a^{i2}_{2k}.$$

$$a^{1}_{1} = a^{11}_{11} + a^{12}_{21}; \quad a^{1}_{2} = a^{11}_{12} + a^{12}_{22};$$

$$a^{2}_{1} = a^{21}_{11} + a^{22}_{21}; \quad a^{2}_{2} = a^{21}_{12} + a^{22}_{22}.$$

$$a^{1}_{1} = 1 + 1 = 2; \quad a^{1}_{2} = 1 + (-2) = -1$$

$$a^{2}_{1} = 0 + 1 = 1; \quad a^{2}_{2} = -2 + (-1) = -3$$

$$a^{i}_{k} = \begin{pmatrix} 2 & -1 \\ 1 & -3 \end{pmatrix}$$

②

$$a = \left(\begin{array}{cc|cc} 1 & -1 & 1 & -1 \\ -2 & 3 & 0 & 1 \\ \hline 1 & -2 & 1 & -2 \\ 0 & 1 & 0 & 1 \end{array}\right) \begin{matrix} \\ \\ \leftarrow k \end{matrix} \qquad a^{ij}_{kl}, \quad a^{ij}_{ij} - ?$$

$\angle$

$$a^{i}_{j} = a^{i1}_{j1} + a^{i2}_{j2};$$

$$a = a^{1}_{1} + a^{2}_{2} = a^{11}_{11} + a^{12}_{12} + a^{21}_{21} + a^{22}_{22} =$$

$$= 1 + (-1) + 0 + 1 = 1$$

③

$$a^{i}_{jk} \sim \left(\begin{array}{cc|cc} 1 & 0 & 1 & 1 \\ 0 & 1 & -1 & 0 \end{array}\right), \quad b^{j}_{r} \sim \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$$

$$c^{ij}_{jkr} = \left(\begin{array}{c|c} \cdot & \cdot \\ \hline \cdot & \cdot \end{array}\right) = a^{i}_{jk} \otimes b^{j}_{r}.$$

$$c^{ij}_{jkr} = \left(\begin{array}{cc|cc} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ \hline 1 & 0 & 1 & 0 \\ -1 & 0 & 0 & 0 \end{array}\right) \left(\begin{array}{cc|cc} -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & 1 \\ \hline -1 & 1 & -1 & 1 \\ 1 & -1 & 0 & 0 \end{array}\right)$$

(c^{ij}_{mkr})

$$c^{i}_{kr} = c^{i1}_{1kr} + c^{i2}_{2kr}.$$

$$c^{1}_{11} = c^{11}_{111} + c^{12}_{211} = 1 \qquad c^{2}_{11} = c^{21}_{111} + c^{22}_{211} = 0$$

$$c^{1}_{12} = c^{11}_{112} + c^{12}_{212} = -1 \qquad c^{2}_{12} = c^{21}_{112} + c^{22}_{212} = 1$$

$$c^{1}_{21} = c^{11}_{121} + c^{12}_{221} = 1 \qquad c^{2}_{21} = c^{21}_{121} + c^{22}_{221} = -1$$

$$c^{1}_{22} = c^{11}_{122} + c^{12}_{222} = 0 \qquad c^{2}_{22} = c^{21}_{122} + c^{22}_{222} = 1$$

④

$$B^{i}_{ji} = \left(\begin{array}{cc|cc} 1 & 0 & 1 & -2 \\ -2 & 1 & -2 & 5 \end{array}\right)$$

$$B^{i}_{j} = B^{i1}_{j1} + B^{i2}_{j2}$$

$$B^{1}_{1} = B^{11}_{11} + B^{12}_{12}; \quad B^{1}_{2} = B^{11}_{21} + B^{12}_{222}$$

$$B^{i} = (1 + (-2); 0 + 5) = (-1\ 5)$$

$$\left(\begin{array}{cc|cc} a^{1}_{11} & a^{1}_{21} & a^{1}_{12} & a^{1}_{22} \\ a^{2}_{11} & a^{2}_{21} & a^{2}_{12} & a^{2}_{22} \end{array}\right) \begin{pmatrix} b^{1}_{1} & b^{1}_{2} \\ b^{2}_{1} & b^{2}_{2} \end{pmatrix}$$

$$\left(\begin{array}{cc|cc} a^{11}_{111} & a^{12}_{111} & a^{11}_{211} & a^{12}_{211} \\ a^{21}_{111} & a^{22}_{111} & a^{21}_{211} & a^{22}_{211} \\ \hline a^{11}_{121} & a^{12}_{121} & a^{11}_{221} & a^{12}_{221} \\ a^{21}_{121} & a^{22}_{121} & a^{21}_{221} & a^{22}_{221} \end{array}\right) \left(\begin{array}{cc|cc} a^{11}_{112} & a^{12}_{112} & a^{11}_{212} & a^{12}_{212} \\ a^{21}_{112} & a^{22}_{112} & a^{21}_{212} & a^{22}_{212} \\ \hline a^{11}_{122} & a^{12}_{122} & a^{11}_{222} & a^{12}_{222} \\ a^{21}_{122} & a^{22}_{122} & a^{21}_{222} & a^{22}_{222} \end{array}\right)$$