

03 #1

2) Вычислим вершину a_{ij}

$$a_{ij} \sim \left| \begin{array}{cc|cc} 1 & 1 & 1 & 1 \\ -2 & -1 & 0 & 1 \\ \hline 1 & 0 & 1 & 1 \\ -1 & 1 & -2 & -1 \end{array} \right|$$

$$a_{ij} = a_{11}'' + a_{12}'' + a_{21}'' + a_{22}'' = 0$$

$\begin{matrix} 1 & 1 & +1 & -1 \end{matrix}$

1) Вычислим вершину

$$a_{ijk} \sim \left| \begin{array}{cc|cc} 1 & -1 & 1 & 1 \\ -2 & 3 & 0 & 1 \\ \hline 1 & -1 & 1 & 1 \\ 0 & 1 & -2 & -1 \end{array} \right|$$

$$a_{ijk} = a_{1k}'' + a_{2k}'' = \left| \begin{array}{cc} 1 & 1 \\ -2 & 0 \end{array} \right| + \left| \begin{array}{cc} -1 & 1 \\ 1 & -1 \end{array} \right| = \left| \begin{array}{cc} 0 & 2 \\ 1 & -1 \end{array} \right|$$

4) задана

вычислим вершину
 B_{ji}^i типа $(1,2)$ тензора
 матрицей;

$$B = \left| \begin{array}{cc|cc} 1 & -2 & 1 & 0 \\ -1 & -1 & 1 & 1 \end{array} \right|$$

$$B_{ji}^i = B_{j1}^1 + B_{j2}^2 = [1, 2] + [1, 1] = [2, 1]$$

3) Вычислим вершину $a_{jk}^i \otimes b_r^j$:

$$a \sim \left| \begin{array}{cc|cc} 1 & -2 & 1 & 0 \\ -1 & 3 & -2 & 1 \end{array} \right|, \quad b \sim \begin{pmatrix} 1 & 1 \\ -1 & 0 \end{pmatrix}$$

$$a_{jk}^i \otimes b_r^j = w_{kr}^i$$

$$w_{11}^1 = a_{11}^1 b_1^1 + a_{21}^1 b_2^1 = 1 \cdot 1 + (-2) \cdot 1 = -1$$

$$w_{21}^1 = a_{12}^1 b_1^1 + a_{22}^1 b_2^1 = 1 \cdot 1 + 0 \cdot 1 = 1$$

$$w_{11}^2 = a_{11}^2 b_1^1 + a_{21}^2 b_2^1 = -1 \cdot 1 + 3 \cdot 1 = 2$$

$$w_{21}^2 = a_{12}^2 b_1^1 + a_{22}^2 b_1^2 = -2 \cdot 1 + 1 \cdot (-1) = -3$$

$$w_{12}^1 = a_{11}^1 b_2^1 + a_{21}^1 b_2^2 = 1 \cdot 1 + (-2) \cdot 0 = 1$$

$$w_{22}^1 = a_{12}^1 b_2^1 + a_{22}^1 b_2^2 = 1 \cdot 1 + 0 \cdot 0 = 1$$

$$w_{11}^2 = a_{11}^2 b_1^1 + a_{21}^2 b_1^2 = -1 \cdot (+1) + 3 \cdot 0 = -1$$

$$w_{22}^2 = a_{12}^2 b_2^1 + a_{22}^2 b_2^2 = -2 \cdot (+1) + 1 \cdot 1 = -1$$

$$\begin{vmatrix} w_{11}^1 & w_{21}^1 & w_{12}^1 & w_{22}^1 \\ w_{11}^2 & w_{21}^2 & w_{12}^2 & w_{22}^2 \end{vmatrix} = \begin{vmatrix} -3 & 1 & 1 & 1 \\ -4 & -3 & -1 & -2 \end{vmatrix}$$