

$$\hat{J}(\underline{\xi}) = \hat{J}(\xi_1, \xi_2, \xi_3) = \begin{pmatrix} \frac{\partial x_1}{\partial \xi_1} & \frac{\partial x_1}{\partial \xi_2} & \frac{\partial x_1}{\partial \xi_3} \\ \frac{\partial x_2}{\partial \xi_1} & \frac{\partial x_2}{\partial \xi_2} & \frac{\partial x_2}{\partial \xi_3} \\ \frac{\partial x_3}{\partial \xi_1} & \frac{\partial x_3}{\partial \xi_2} & \frac{\partial x_3}{\partial \xi_3} \end{pmatrix}$$

$A^{-1} = \frac{1}{|A|} \cdot A^T$, где $|A|$ – определитель матрицы A , A^T – транспонированная матрица алгебраических дополнений соответствующих элементов матрицы A .

$$\hat{J}(\xi_1, \xi_2, \xi_3)_*^T = A^T$$

$$|\hat{J}(\xi_1, \xi_2, \xi_3)| = \frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} + \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} + \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} - \frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3}$$

$$\begin{pmatrix} \begin{vmatrix} \frac{\partial x_2}{\partial \xi_2} & \frac{\partial x_2}{\partial \xi_3} \\ \frac{\partial x_3}{\partial \xi_2} & \frac{\partial x_3}{\partial \xi_3} \end{vmatrix} & \begin{vmatrix} \frac{\partial x_2}{\partial \xi_1} & \frac{\partial x_2}{\partial \xi_3} \\ \frac{\partial x_3}{\partial \xi_1} & \frac{\partial x_3}{\partial \xi_3} \end{vmatrix} & \begin{vmatrix} \frac{\partial x_2}{\partial \xi_1} & \frac{\partial x_2}{\partial \xi_2} \\ \frac{\partial x_3}{\partial \xi_1} & \frac{\partial x_3}{\partial \xi_2} \end{vmatrix} \\ \begin{vmatrix} \frac{\partial x_1}{\partial \xi_2} & \frac{\partial x_1}{\partial \xi_3} \\ \frac{\partial x_3}{\partial \xi_2} & \frac{\partial x_3}{\partial \xi_3} \end{vmatrix} & \begin{vmatrix} \frac{\partial x_1}{\partial \xi_1} & \frac{\partial x_1}{\partial \xi_3} \\ \frac{\partial x_3}{\partial \xi_1} & \frac{\partial x_3}{\partial \xi_3} \end{vmatrix} & \begin{vmatrix} \frac{\partial x_1}{\partial \xi_1} & \frac{\partial x_1}{\partial \xi_2} \\ \frac{\partial x_3}{\partial \xi_1} & \frac{\partial x_3}{\partial \xi_2} \end{vmatrix} \\ \begin{vmatrix} \frac{\partial x_1}{\partial \xi_2} & \frac{\partial x_1}{\partial \xi_3} \\ \frac{\partial x_2}{\partial \xi_2} & \frac{\partial x_2}{\partial \xi_3} \end{vmatrix} & \begin{vmatrix} \frac{\partial x_1}{\partial \xi_1} & \frac{\partial x_1}{\partial \xi_3} \\ \frac{\partial x_2}{\partial \xi_1} & \frac{\partial x_2}{\partial \xi_3} \end{vmatrix} & \begin{vmatrix} \frac{\partial x_1}{\partial \xi_1} & \frac{\partial x_1}{\partial \xi_2} \\ \frac{\partial x_2}{\partial \xi_1} & \frac{\partial x_2}{\partial \xi_2} \end{vmatrix} \end{pmatrix}$$

$$= \begin{pmatrix} \left(\frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} \right) & \left(\frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} \right) & \left(\frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} \right) \\ \left(\frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} \right) \\ \left(\frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_2} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_1} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_1} \right) \end{pmatrix}$$

— матрица миноров соответствующих элементов матрицы $\hat{J}(\xi_1, \xi_2, \xi_3)$.

$$\begin{pmatrix} \left(\frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} \right) & - \left(\frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} \right) & \left(\frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} \right) \\ - \left(\frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} \right) & - \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} \right) \\ \left(\frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_2} \right) & - \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_1} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_1} \right) \end{pmatrix}$$

— матрица алгебраических дополнений соответствующих элементов матрицы $\hat{J}(\xi_1, \xi_2, \xi_3)$

$$\begin{pmatrix} \left(\frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} \right) & - \left(\frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_2} \right) & \left(\frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_2} \right) \\ - \left(\frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_2}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_3}{\partial \xi_1} \right) & - \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_3} - \frac{\partial x_1}{\partial \xi_3} * \frac{\partial x_2}{\partial \xi_2} \right) \\ \left(\frac{\partial x_2}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_2}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} \right) & - \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_3}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_3}{\partial \xi_1} \right) & \left(\frac{\partial x_1}{\partial \xi_1} * \frac{\partial x_2}{\partial \xi_2} - \frac{\partial x_1}{\partial \xi_2} * \frac{\partial x_2}{\partial \xi_1} \right) \end{pmatrix}$$

транспонированная матрица алгебраических дополнений соответствующих элементов

матрицы $\hat{J}(\xi_1, \xi_2, \xi_3)$

$$\hat{J}(\xi_1, \xi_2, \xi_3)^{-1} = \frac{1}{|\hat{J}(\xi_1, \xi_2, \xi_3)|} * \hat{J}(\xi_1, \xi_2, \xi_3)_*^T$$