To find a matrix

$$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & 1 \end{pmatrix}$$

such that

$$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & 1 \end{pmatrix} \begin{pmatrix} x \\ y \\ 1 \end{pmatrix} = \begin{pmatrix} x^* z^* \\ y^* z^* \\ z^* \end{pmatrix} \rightarrow \begin{pmatrix} x^* \\ y^* \end{pmatrix}$$

we can solve the following equation for a, b, c, d, e, f, g, h given four sets of x_i, y_i, x_i^*, y_i^* values.

$$\begin{pmatrix} x_1 & y_1 & 1 & 0 & 0 & 0 & 0 & 0 & -x_1^* & 0 & 0 & 0 \\ 0 & 0 & 0 & x_1 & y_1 & 1 & 0 & 0 & -y_1^* & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & x_1 & y_1 & -1 & 0 & 0 & 0 \\ x_2 & y_2 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & -x_2^* & 0 & 0 \\ 0 & 0 & 0 & x_2 & y_2 & 1 & 0 & 0 & 0 & -y_2^* & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & x_2 & y_2 & 0 & -1 & 0 & 0 \\ x_3 & y_3 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -x_3^* & 0 \\ 0 & 0 & 0 & x_3 & y_3 & 1 & 0 & 0 & 0 & 0 & -y_3^* & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & x_3 & y_3 & 0 & 0 & -1 & 0 \\ x_4 & y_4 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -x_4^* \\ 0 & 0 & 0 & x_4 & y_4 & 1 & 0 & 0 & 0 & 0 & 0 & -y_4^* \\ 0 & 0 & 0 & 0 & 0 & 0 & x_4 & y_4 & 0 & 0 & 0 & -1 \end{pmatrix} \begin{pmatrix} a \\ b \\ c \\ d \\ e \\ f \\ g \\ h \\ z_1^* \\ z_2^* \\ z_3^* \\ z_4^* \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ -1 \\ 0 \\ 0 \\ -1 \\ 0 \\ 0 \\ -1 \\ 0 \\ 0 \\ -1 \end{pmatrix}$$