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$$d_{alg}(x_i', Hx_i)^2 = \|\epsilon_i\|^2 = \left\| \begin{bmatrix} 0^t & -w_i' x_i^t & y_i' x_i^t \\ w_i' x_i^t & 0^t & -x_i' x_i^t \end{bmatrix} h \right\|^2 \quad \text{—⑥}$$

As a result, given a set of correspondences the quantity $\epsilon = Ah$ is the algebraic error vector for the complete set

$$\sum_i d_{alg}(x_i', Hx_i)^2 = \sum_i \|\epsilon_i\|^2 = \|Ah\|^2 = \|\epsilon\|^2 \quad \text{—⑦}$$

From ⑥ & ⑦

$$\Rightarrow \|Ah\|^2 = \left\| \begin{bmatrix} 0^t & -w_i' x_i^t & y_i' x_i^t \\ w_i' x_i^t & 0^t & -x_i' x_i^t \end{bmatrix} h \right\|^2 \quad \text{—⑧}$$

Now we have eqⁿ ④ by applying constraint $h_{33} = 1 = h_9$
eqⁿ ④ becomes

$$H = \begin{bmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & 1 \end{bmatrix}$$

Here it is clearly seen that since scaling gets multiplied during the scale factor always with the zero^t in eqⁿ ⑧ matrix, we have the scaling transformation invariant.

On the other hand if we consider translation, we have h_{13} & h_{23} participating in the translation transformation; so it will remain variant (non-invariant).