

$$\begin{aligned}
\mathbf{a}_{y_i}^\top \mathbf{p} &= [0, 0, 0, 0, -X_i, -Y_i, -Z_i, -1, y_i X_i, y_i Y_i, y_i Z_i, y_i] \begin{bmatrix} p_{11} \\ p_{12} \\ p_{13} \\ p_{14} \\ p_{21} \\ p_{22} \\ p_{23} \\ p_{24} \\ p_{31} \\ p_{32} \\ p_{33} \\ p_{34} \end{bmatrix} \\
&= \begin{bmatrix} \mathbf{0}, & -\mathbf{X}_i^\top, & y_i \mathbf{X}_i^\top \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{B} \\ \mathbf{C} \end{bmatrix} \\
&= -\mathbf{X}_i^\top \mathbf{B} + y_i \mathbf{X}_i^\top \mathbf{C}
\end{aligned}$$