$$\underline{a} = (I - S_a)\, K_a' \,(\underline{A} - \underline{b}_a)$$

$$f(\underline{\theta}^{acc}) = \|g\|^2 - \|a\|^2$$

$$\frac{\partial f(\underline{\theta}^{acc})}{\partial \underline{a}} = \frac{-\underline{a}^T \underline{a}}{\partial \underline{a}} = -2\underline{a} \in \mathbb{R}^{3\times 1}$$

$\underline{\theta}^{acc}$:

$$S_a = \begin{pmatrix} 0 & 0 & 0 \\ s_{ayx} & 0 & 0 \\ s_{azx} & s_{azy} & 0 \end{pmatrix}$$

$$K_a' = \begin{pmatrix} \frac{1}{k_{ax}} & & \\ & \frac{1}{k_{ay}} & \\ & & \frac{1}{k_{az}} \end{pmatrix}$$

$$b_a = (b_{ax},\ b_{ay},\ b_{az})^T$$

$\in \mathbb{R}^{3\times 1}$

$$\underline{a} = \begin{pmatrix} 1 & 0 & 0 \\ -s_{ayx} & 1 & 0 \\ -s_{azx} & -s_{azy} & 1 \end{pmatrix} \begin{pmatrix} \frac{1}{k_{ax}} & & \\ & \frac{1}{k_{ay}} & \\ & & \frac{1}{k_{az}} \end{pmatrix} \begin{pmatrix} A_x - b_{ax} \\ A_y - b_{ay} \\ A_z - b_{az} \end{pmatrix}$$

$$= \begin{pmatrix} \frac{1}{k_{ax}}(A_x - b_{ax}) \\ -\frac{s_{ayx}}{k_{ax}}(A_x - b_{ax}) + \frac{1}{k_{ay}}(A_y - b_{ay}) \\ -\frac{s_{azx}}{k_{ax}}(A_x - b_{ax}) - \frac{s_{azy}}{k_{ay}}(A_y - b_{ay}) + \frac{1}{k_{az}}(A_z - b_{az}) \end{pmatrix}$$

① $$\frac{\partial \underline{a}}{\partial s_{ayx}} = \begin{pmatrix} 0 \\ -\frac{(A_x - b_{ax})}{k_{ax}} \\ 0 \end{pmatrix} \Rightarrow \frac{\partial y}{\partial s_{ayx}} = \left(\frac{\partial y}{\partial \underline{a}}\right)^T \cdot \left(\frac{\partial \underline{a}}{\partial s_{ayx}}\right)$$

② $$\frac{\partial \underline{a}}{\partial s_{azx}} = \begin{pmatrix} 0 \\ 0 \\ -\frac{(A_x - b_{ax})}{k_{ax}} \end{pmatrix} \Rightarrow \frac{\partial y}{\partial s_{azx}} = \left(\frac{\partial y}{\partial \underline{a}}\right)^T \cdot \left(\frac{\partial \underline{a}}{\partial s_{azx}}\right)$$

③ $$\frac{\partial \underline{a}}{\partial s_{azy}} = \begin{pmatrix} 0 \\ 0 \\ -\frac{(A_y - b_{ay})}{k_{ay}} \end{pmatrix} \Rightarrow \frac{\partial y}{\partial s_{azy}} = \left(\frac{\partial y}{\partial \underline{a}}\right)^T \cdot \left(\frac{\partial \underline{a}}{\partial s_{azy}}\right)$$

④ $$\frac{\partial a}{\partial k_{ax}'} = \begin{pmatrix} A_x - b_{ax} \\ -S_{ayx}(A_x - b_{ax}) \\ -S_{azx}(A_x - b_{ax}) \end{pmatrix}$$

$$k_{ax}' = \frac{1}{k_{ax}}$$

$$\frac{\partial k_{ax}'}{\partial k_{ax}} = -\frac{1}{(k_{ax})^2}$$

$$\Longrightarrow \frac{\partial a}{\partial k_{ax}} = \begin{pmatrix} A_x - b_{ax} \\ -S_{ayx}(A_x - b_{ax}) \\ -S_{azx}(A_x - b_{ax}) \end{pmatrix} \cdot \left(-\frac{1}{(k_{ax})^2}\right)$$

⑤ $$\frac{\partial a}{\partial k_{ay}'} = \begin{pmatrix} 0 \\ (A_y - b_{ay}) \\ -S_{azy}(A_y - b_{ay}) \end{pmatrix}$$ |2] ④

⑥ $$\frac{\partial a}{\partial k_{az}'} = \begin{pmatrix} 0 \\ 0 \\ A_z - b_{az} \end{pmatrix}$$ |2] ④

⑦ $$\frac{\partial a}{\partial b_{ax}} = \begin{pmatrix} -\frac{1}{k_{ax}} \\ \frac{S_{ayx}}{k_{ax}} \\ \frac{S_{azx}}{k_{ax}} \end{pmatrix}$$

⑧ $$\frac{\partial a}{\partial b_{ay}} = \begin{pmatrix} 0 \\ \frac{1}{k_{ay}} \\ \frac{S_{azy}}{k_{ay}} \end{pmatrix}$$

⑨ $$\frac{\partial a}{\partial b_{az}} \begin{pmatrix} 0 \\ 0 \\ \frac{1}{k_{az}} \end{pmatrix}$$