$$\ell_{ij}^2 = \vec{d}_{ij}^{\,T} \cdot \vec{d}_{ij}$$

$$\delta q \Leftrightarrow (\delta q_i \;\; \delta q_j) \Leftrightarrow (\delta r_i \;\; \delta \varphi_i \;\; \delta r_j \;\; \delta \varphi_j)$$

$\delta \ell$ $\qquad$ $\delta \vec{d}_{ij}$

$2\ell\,\delta\ell$ $\qquad$ $2\vec{d}_{ij}^{\,T} \cdot \delta \vec{d}_{ij}$

$$2\ell\,\delta\ell = 2\vec{d}_{ij}^{\,T} \cdot \delta \vec{d}_{ij}$$

$$\Downarrow$$

$$\ell\,\delta\ell = \vec{d}_{ij}^{\,T} \cdot \delta \vec{d}_{ij}$$

$$\Downarrow$$

$$\delta\ell = \frac{\vec{d}_{ij}^{\,T}}{\ell} \cdot \delta \vec{d}_{ij}$$

$$\Downarrow$$

$$\delta\ell = \frac{\vec{d}_{ij}^{\,T}}{\ell} \cdot \left(\delta r_j + \delta\varphi_j B_j \bar{s}_j^P - \delta r_i - \delta\varphi_i B_i \bar{s}_i^P \right)$$