Covariance matrix of single (Δ) diff. obs.

- Between pair of receivers

$$l_s = \begin{bmatrix} \Phi_{ij}^b \\ \Phi_{ij}^k \end{bmatrix} = \begin{bmatrix} -1 & 1 & \cdot & \cdot \\ \cdot & \cdot & -1 & 1 \end{bmatrix} \begin{bmatrix} \Phi_i^b \\ \Phi_j^b \\ \Phi_i^k \\ \Phi_j^k \end{bmatrix} = D_s \cdot l$$

$$\Sigma_{l_s} = D_s \Sigma_l D_s^T = \sigma_\Phi^2 D_s D_s^T = \sigma_\Phi^2 \begin{bmatrix} 2 & \cdot \\ \cdot & 2 \end{bmatrix} = 2\sigma_\Phi^2 I$$

- Uncorrelated within one epoch
- Correlated between baselines (if # baselines > 1)

Covariance matrix of double diff. obs.

- Between 2receivers & 2satellites

$$l_d = \begin{bmatrix} \Phi_{ij}^{bk} \\ \Phi_{ij}^{bl} \end{bmatrix} = \begin{bmatrix} 1 & -1 & -1 & 1 & \cdot & \cdot \\ 1 & -1 & \cdot & \cdot & -1 & 1 \end{bmatrix} \begin{bmatrix} \Phi_i^b \\ \Phi_j^b \\ \Phi_i^k \\ \Phi_j^k \\ \Phi_i^l \\ \Phi_j^l \end{bmatrix} = D_d \cdot l$$

$$\Sigma_{l_d} = D_d \Sigma_l D_d^T = \sigma_\Phi^2 D_d D_d^T = \sigma_\Phi^2 \begin{bmatrix} 4 & 2 \\ 2 & 4 \end{bmatrix}$$

  - Correlated within single baseline in one epoch (due to the same base SV)!