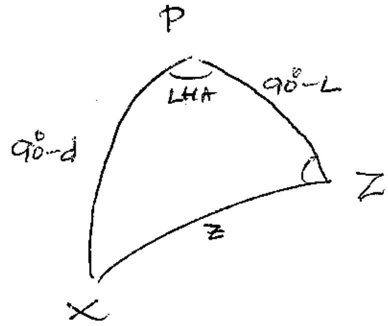

$$\cos(90^\circ - d) = \cos(90^\circ - L)\cos z + \sin(90^\circ - L)\sin z \cos Z \qquad (1)$$

$\Downarrow$

$$\cos Z = \frac{\sin d - \sin L \cos z}{\cos L \sin z} \qquad (2)$$

$$\begin{cases} \cos z = \cos(90^\circ - L)\cos(90^\circ - d) + \sin(90^\circ - L)\sin(90^\circ - d)\cos LHA = \\ \quad = \sin L \sin d + \cos L \cos d \cos LHA & (3) \\ \sin z = \sin LHA \dfrac{\sin(90^\circ - d)}{\sin Z} = \dfrac{\cos d \sin LHA}{\sin Z} & (4) \end{cases}$$

Insert (3) and (4) in (2)

$$\cos Z = \frac{\sin d - \sin L(\sin L \sin d + \cos L \cos d \cos LHA)}{\cos L \dfrac{\cos d \sin LHA}{\sin Z}} \qquad (5)$$

Rearrange (5)

$$\frac{\sin Z}{\cos Z} = \frac{\cos L \cos d \sin LHA}{\sin d - \sin^2 L \sin d - \sin L \cos L \cos d \cos LHA} = \left\{ \begin{matrix} \text{divide by} \\ \cos L \end{matrix} \right\} =$$

$$= \frac{\cos d \sin LHA}{\dfrac{\sin d}{\cos L} - (1 - \cos^2 L)\dfrac{\sin d}{\cos L} - \sin L \cos d \cos LHA} =$$

$$= \boxed{\frac{\cos d \sin LHA}{\cos L \sin d - \sin L \cos d \cos LHA} = \tan Z}$$