

- φ^* colatitude = $79^\circ 52'$
 p polar distance ($=90^\circ - \delta$)
 δ declination = $7^\circ 23'$
 z zenith distance ($=90^\circ - h$)
 h altitude = $17^\circ 57'$
 t hour angle

$$\text{hav } t = \frac{\text{hav } z - \text{hav}(\varphi^* - p)}{\text{hav}(\varphi^* + p) - \text{hav}(\varphi^* - p)} = \left\{ \text{hav } x = \frac{1}{2}(1 - \cos x) \right\} =$$

$$= \frac{\cos(\varphi^* - p) - \cos z}{\cos(\varphi^* + p) - \cos(\varphi^* - p)} = \left\{ \begin{array}{l} \cos(\varphi^* - p) = \sin(\varphi^* + \delta) \\ \cos(\varphi^* + p) = -\sin(\varphi^* - \delta) \\ \cos z = \sin h \end{array} \right\} =$$

$$= \frac{\sin(\varphi^* + \delta) - \sin h}{\sin(\varphi^* + \delta) + \sin(\varphi^* - \delta)} = \frac{\sin(87^\circ 15') - \sin(17^\circ 57')}{\sin(87^\circ 15') + \sin(72^\circ 29')} =$$

$$= \frac{3000 \cdot \sin(87^\circ 15') - 3000 \cdot \sin(17^\circ 57')}{3000 \cdot \sin(87^\circ 15') + 3000 \cdot \sin(72^\circ 29')} = \frac{2996 - 925}{2996 + 2861} = \frac{2996' - 925'}{2996' + 2861'} =$$

$$= \frac{49^\circ 56' - 15^\circ 25'}{49^\circ 56' + 47^\circ 41'} = \frac{34^\circ 31'}{97^\circ 37'} = \frac{2071'}{5857'} = \frac{2071}{5857}$$

"Arcs"

| Arc | Log |
|---------|--------|
| 0° 0' | 0.0000 |
| 12° 57' | 0.2231 |
| 49° 56' | 0.9800 |
| 72° 29' | 0.9500 |
| 87° 15' | 0.9642 |
| 90° 0' | 0.9999 |