Answer on Question #54964 - Physics / Astronomy | Astrophysics

Question:

Two stars of declinations 56°30`10`` and 56◦ 30` 50`` are used for observation with a zenith tube. After observation of the first star, the instrument is rotated through 180◦ and in order to observe the transit of the second star, the micrometer needs to be turned by 0·4 of a thread in a direction moving the wire away from the zenith. If the plate scale of the telescope is 30 seconds of arc per mm and the pitch of the thread 1 turn per mm, what is the latitude of the observing station?

Solution:

The movement of the micrometer:

$$l = 0.4\,\text{threads} \equiv 0.4\,\text{mm}$$

$$\Delta z = 0.4\,\text{mm} \times 30 arc\sec = 12 arc\sec$$

Using the equation:

$$\frac{z_1 - z_2}{2} = \frac{12 arc\sec}{2} = 6 arc\sec$$

Therefore:

$$\varphi = 56^o 30' 30'' - 6'' = 56^o 30' 24''$$

Answer: φ = 56º30'24"