THE ROYAL SOCIETY OF CANADA

Synodic radial Compt. at limb = $v. \frac{R}{r}$

Sidereal " " " $= v. \frac{R}{r} + s$

Sidereal velocity of rotation $V = \frac{\xi}{\xi'-} \left(v, \frac{R}{r} + s\right) \sec \eta$

Where $\hat{\varepsilon}$ and $\hat{\varepsilon}'$ — are the angular velocities at the limb and at the mean latitude \dagger of the observed points φ_1 and φ_2 obtained from the second method

 ξ (Adams) = 11°.04 + 3°.5 cos² φ .

12. Second Method-Corrections at observed points.

(a) Determine the heliographic latitudes φ_1 and φ_2 of the observed points by the Greenwich method

 $\sin \varphi = \cos \rho \sin D + \sin \rho \cos D \cos \chi$

 $\left(\sin \rho \text{ and } \cos \rho \text{ obtained from De LaRue's tables argument } \frac{R}{r}\right)$

also the differences of longitude λ_1 and λ_2

 $\sin \lambda = \sin \chi \sin \rho \sec \varphi$.

(b) Determine the angles η_1 , η_2 at the two observed points

$$\cos \eta = \cos D \cos \left(\frac{\pi}{2} - \lambda\right)$$

(c) Divide the total sidereal radial velocity into the two following parts proportional to the angular velocities at the latitudes φ_1, φ_2 (obtained closely enough from Adams' formula $\hat{\xi} = 11^{\circ}.04 + 3^{\circ}.5 \cos^2 \varphi$)

$$2\left(v + \frac{r}{R} s\right) \frac{\xi_1}{\xi_1 + \xi_2} \quad , \quad 2\left(v + \frac{r}{R} s\right) \frac{\xi_2}{\xi_1 + \xi_2}$$

(d) Sidereal Velocities of Rotation :----

$$\begin{aligned} \mathbf{V}_1 &= 2 \left(\mathbf{v} + \frac{\mathbf{r}}{\mathbf{R}} \mathbf{s} \right) \frac{\boldsymbol{\xi}_1}{\boldsymbol{\xi}_1 + \boldsymbol{\xi}_2} \sec \eta_1 \\ \mathbf{V}_2 &= 2 \left(\mathbf{v} + \frac{\mathbf{r}}{\mathbf{R}} \mathbf{s} \right) \frac{\boldsymbol{\xi}_2}{\boldsymbol{\xi}_1 + \boldsymbol{\xi}_2} \sec \eta_2 \end{aligned}$$

For c and d may preferably be substituted the following practically identical but simpler method.

† Instead of taking the mean latitude $\frac{\varphi_1 + \varphi_2}{2}$ it is more correct to take the angle φ^1 such that $11^\circ.04 + 3.5 \cos^2 \varphi^1 = \frac{1}{2} (11^\circ.04 + 3.5 \cos^2 \varphi_1 + 11^\circ.04 + 3.5 \cos^2 \varphi_2)$. This was not necessary in Series I and III but in Series II this difference in one case reaches 23' which changes the correction slightly.

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(d') formula

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