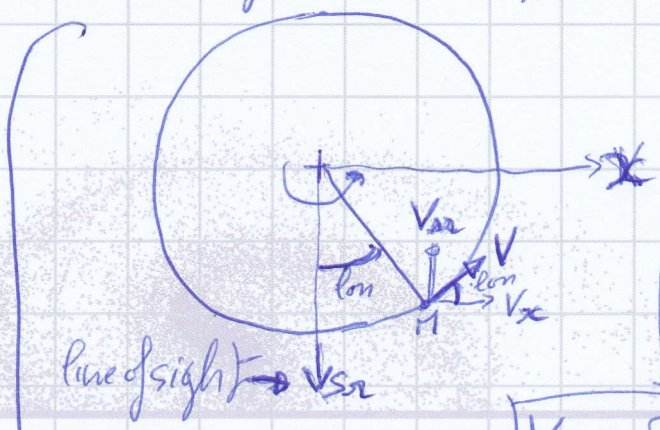
(I)

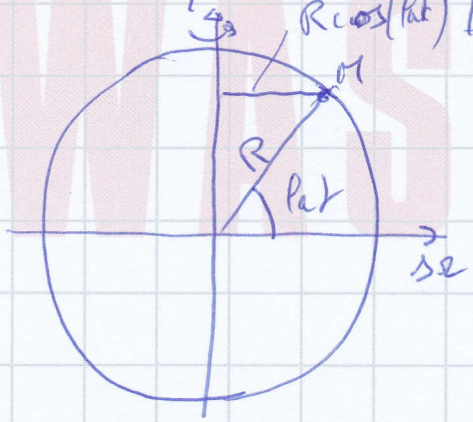
$B\phi$ = inclined angle

Solar derotation formulae

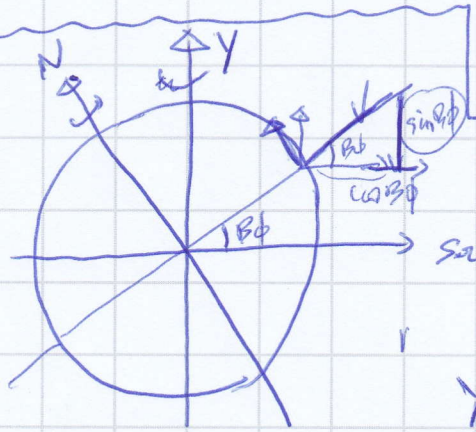
view from the Northpole



$B\phi = 0$



$B\phi \neq \phi$



M { lat = latitude = λ
lon = longitude = φ
V = velocity.
V_{sr} = velocity of solar rotation along the line of sight

Ω = solar rotation
R = solar radius.

$$V = \Omega R \cos(lat)$$

$$\begin{cases} V_x = V \cos(lon) \\ V_{sr} = V \sin(lon) \end{cases}$$

$$\begin{cases} V_x = \Omega R \cos(lat) \cos(lon) \\ V_{sr} = \Omega R \cos(lat) \sin(lon) \end{cases}$$

$$\begin{cases} V_{sr} = \Omega R \cos(lat) \sin(lon) \cos(B\phi) \\ V_x = \text{inchanged} \end{cases}$$

A component parallel to the ~~rotation~~ Y axis is introduced.

$$V_y = V \sin(lon) \sin B\phi$$

$$V_y = \Omega R \cos(lat) \sin(lon) \sin B\phi$$

reference: Howard, R; Harvey, J. Solar Physics 12 (1970) 23-51