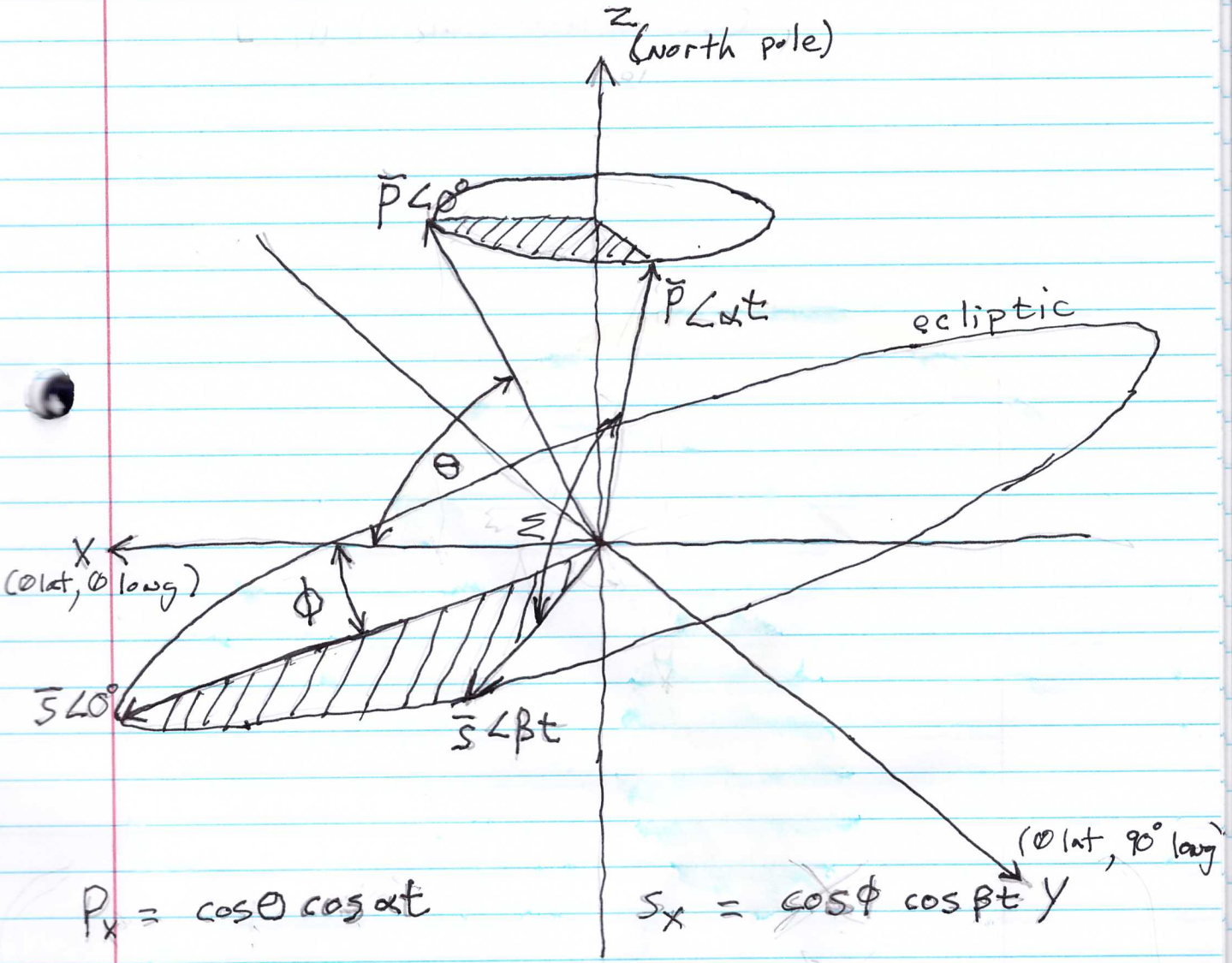
A solution based on the assumption that the planetary rotation axis is vertical, along the z-axis, and that the sun's orbital plane, the plane of the ecliptic, is tilted by an angle ϕ.



$P_x = \cos\theta \cos\alpha t$

$P_y = \cos\theta \sin\alpha t$

$P_z = \sin\theta$

$S_x = \cos\phi \cos\beta t$

$S_y = \sin\beta t$

$S_z = \sin\phi \cos\beta t$

$\cos\Sigma = P_x S_x + P_y S_y + P_z S_z$