## Chapter 3: Astrometry
## Some corrections and changes

1. Equation 3.8 should read

$$\mu = \sqrt{\mu_\delta^2 + (\cos\delta)^2\,\mu_\alpha^2}\,.$$

2. The line before section 3.2.1 should read: Its angular velocity is equivalent to traversing the angle subtended by the diameter of the moon in a little less than 200 years.

3. The set of equations 3.13 can be proved as follows:

   Consider a point $P$ whose coordinates in the two systems are denoted by $(x, y, z)$ and $(x', y', z')$, as illustrated in Figure 3.13. The $x$-axis is same as $x'$-axis, hence we obtain $x' = x$. We next drop a perpendicular from the point $P$ on the $yz$ plane. It meets the plane at point $S$ as shown in the figure below (Figure 1). The projected distance $OS$ on the $y - z$ plane is denoted as $r_p$. Since $\beta$ is the latitude of $P$, it is clear that $OS$ makes an angle $\beta$ with the $y$-axis. From the figure we deduce that the coordinates of $S$ are given by

$$y = r_p \cos\beta\,, \qquad z = r_p \sin\beta\,.$$

   Similarly

$$y' = r_p \cos(\beta + \theta) = r_p(\cos\beta\cos\theta - \sin\beta\sin\theta)\,,$$

$$z' = r_p \sin(\beta + \theta) = r_p(\sin\beta\cos\theta + \cos\beta\sin\theta)\,.$$

   Comparing these two set of equations we obtain the formulas for $y'$ and $z'$ given in Equation 3.8.

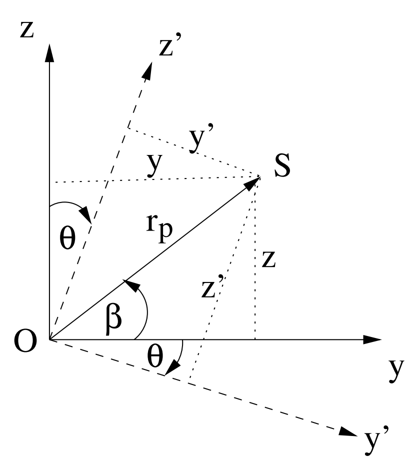


Figure 1: Clockwise rotation about $x$-axis by an angle $\theta$.