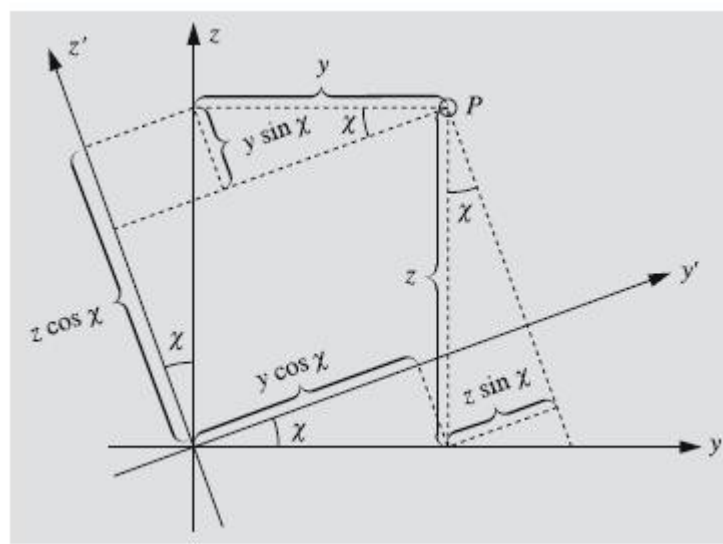
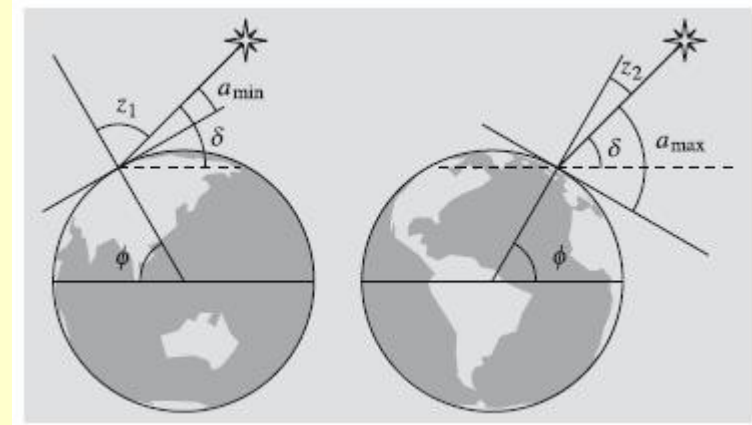
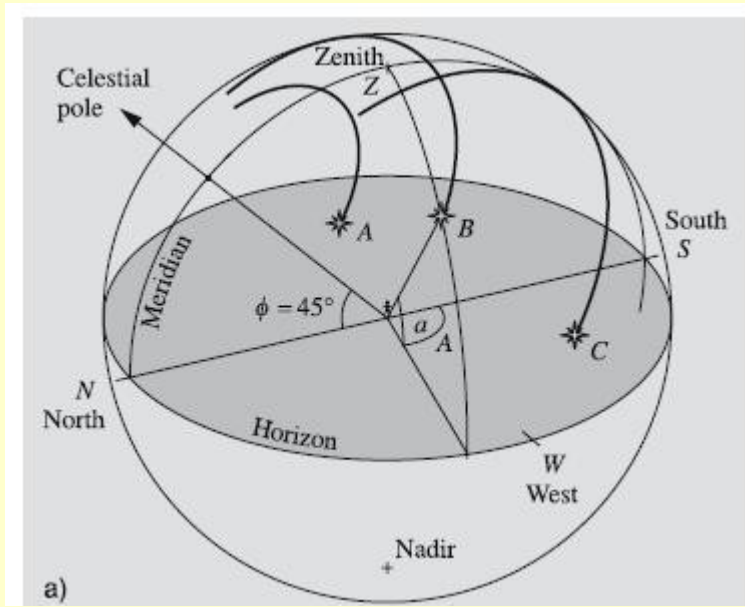


The diagram shows a sphere with center  $O$ . Two coordinate systems are shown:  $(x, y, z)$  and  $(x', y', z')$ . The  $z$ -axis is vertical, and the  $z'$ -axis is tilted at an angle  $\chi$  from the  $z$ -axis. A point  $P$  is on the sphere's surface. The angle between the vector  $OP$  and the  $z$ -axis is  $\theta$ . The angle between the projection of  $OP$  onto the  $xy$ -plane and the  $x$ -axis is  $\psi$ . The angle between the projection of  $OP$  onto the  $x'y'$ -plane and the  $x'$ -axis is  $\theta$ .

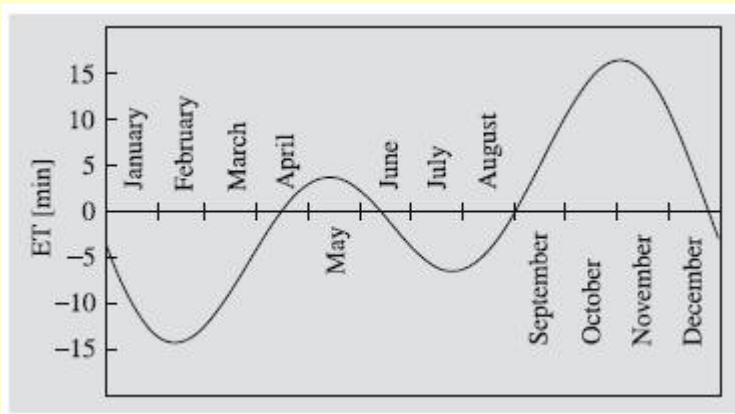


The diagram illustrates a sphere with two coordinate systems. The primary system has axes  $z$  (vertical) and  $y$  (horizontal). A secondary system is rotated, with axes  $z'$  and  $y'$ . A point on the sphere's surface is defined by its polar angle  $\theta$  from the  $z$ -axis and  $\theta'$  from the  $z'$ -axis. A shaded spherical triangle is formed by three points, with interior angles labeled  $A$ ,  $B$ , and  $C$ , and side lengths labeled  $a$ ,  $b$ , and  $c$ . At the bottom of the sphere, two horizontal vectors are shown, labeled  $\psi$  and  $\psi'$ , representing azimuthal angles. The intersection of the  $z$  and  $z'$  axes is marked with a right-angle symbol.

# Celestial Coordinates: useful plots



Motion of stars. Stars visibility....



Equation of time.