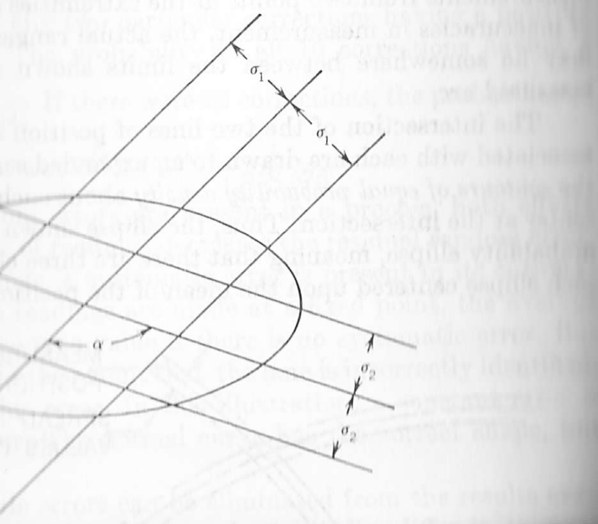
n place and time by means of the system used to
f navigation accuracy, the following assumptions
ors have been removed, leaving only the random
or is assumed to be zero.
ned to be normally distributed.
two intersecting lines of position are assumed to
ies that a change in the error of one line of position
med to be straight lines in the small area in the
n. This assumption is valid so long as the standard
dius of curvature of the line of position.
to the two-dimensional case.
ral case of the intersection of two lines of position
values of error associated with each line of position
ure Q6c shows the ellipse simplified to geometrical



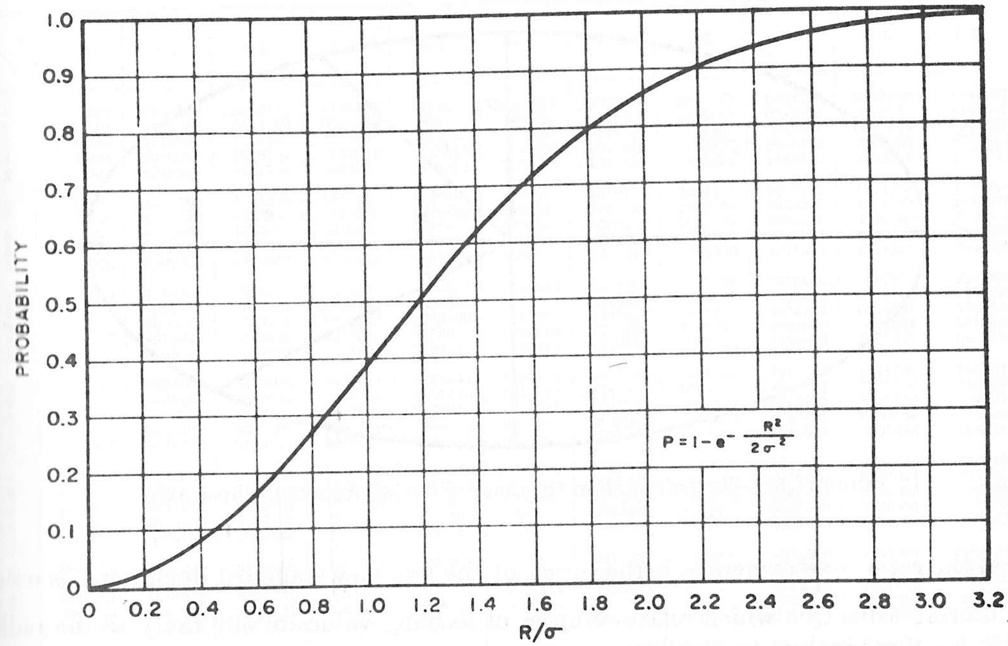


FIGURE Q6d.—Circular normal distribution.

One may readily surmise from figure Q6c that the exact shape of the error figure varies with the magnitudes of the two one-dimensional input errors, σ_1 and σ_2 as well as with the angle of cut, α. The angle α is also the angle between the two values of sigma because the standard deviations are mutually perpendicular to their corresponding lines of position. These variations can be calculated to provide the probability that a point is located within a circle of stated radius. *When this is done, the error is stated in terms more meaningful to the practicing navigator.* The basis of this concept may best be seen by first considering the special case when the two errors are equal, and the angle of intersection of the lines of position is a right angle. In this case, *and in this case alone,* the error figure becomes a circle and is described by the circular normal distribution. A plot of this special function is given in figure Q6d. In this plot, the horizontal axis is measured in terms of R/σ, R being the stated radius of the circle and σ being the