= g (?2 / k) , since ?2 =
k ?1 . For example , let the path of the first particle be an ellipse
<formula>
where A and B are constants ; then , the path of the second particle is given by
<formula>

Orbital precession

If k is close , but not equal , to one , the second orbit resembles the first , but revolves gradually about the center of force ; this is known as orbital precession (Figure 3) . If k is greater than one , the orbit precesses in the same direction as the orbit (Figure 3) ; if k is less than one , the orbit precesses in the opposite direction .

Although the orbit in Figure 3 may seem to rotate uniformly , i.e. , at a constant angular speed , this is true only for circular orbits . If the orbit rotates at an angular speed ? , the angular speed of the second particle is faster or slower than that of the first particle by ? ; in other words , the angular speeds would satisfy the equation ?2
= ?1 + ? . However , Newton 's theorem of revolving orbits states that the angular speeds are related by multiplication : ?2 =
k?1 , where k is a constant . Combining these two equations shows that the angular speed of the precession equals ? = (k ? 1) ?1 . Hence , ? is constant only if ?1 is constant . According to the conservation of angular momentum , ?1 changes with the radius r
<formula>
where m and L1 are the first particle 's mass and angular momentum , respectively , both of which are constant . Hence , ?1 is constant only if the radius r is constant , i.e. , when the orbit is a circle . However , in that case , the orbit does not change as it precesses .

Illustrative example : Cotes 's spirals