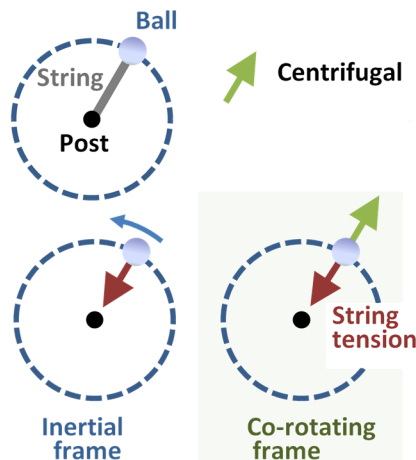


Centrifugal force

Consider again the object that moves along a circular orbit in the last article. See the figure. A ball is attached to the string and rotate around the post. If you see the left side, you will see that the centripetal force is exerted on the ball through string, which makes the ball rotate. However, there is an equally valid picture which you will find on the right side. The picture on the left side was drawn from the point of view of someone outside the ball. However, if you rotate along with ball, you will see the right picture. In this picture, you will see that the ball doesn't move as you move along with the ball. But, you will still see that the string pushes the ball inward, even though the ball doesn't move inward. The solution to this problem is that there is a fictitious force called "centrifugal force" exerted on the ball, if one sees from the point of view of co-rotating frame. The centrifugal force balances the string tension, so the ball remains "motion-less." This is indeed fictitious force, because it is not a real force, and appears only when you yourself are accelerating (i.e. rotating with the ball). Thus, it is an example of "inertial force" as explained in our earlier article "Newton's first law." In our later articles on Coriolis force we will see another example of inertial force present when the frame is rotating.

Summary

- Let's say that an object attached to a string is rotating by the centripetal force provided by the tension of the string. In the rotating frame, the object is not moving because the tension is balanced by the centrifugal force.
- Centrifugal force is an inertial force.



(The figure is adopted from http://en.wikipedia.org/wiki/File:Reactive_centrifugal_and_centrifugal_forces.PNG)