AP Physics
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Pseudo, False and Fictitious Forces

Definitions of “pseudo” force:

- Any force that is postulated to account for apparent deviations from Newton's laws of motion appearing in an accelerated reference system.
- A physically apparent but nonexistent force felt by an observer in a non-inertial frame (that is, a frame undergoing acceleration). Newton's laws of motion hold true within such a reference frame only if the existence of such a force is presumed. The centrifugal force is an example of a pseudo force.

To understand pseudo force, you must know what is Non-Inertial Frame of Reference (NIFR). When observer is present in an accelerated frame while taking observation, the frame is called a non0inertial reference frame.

So, what is pseudo force?
Its literal meaning is an unreal or fictitious force. It means, a force which is not actually applied due to any real source, but yet your body feels it.

In understanding the law of inertia I had to consider the motion of bodies screened from the so called "real forces".

- What characterizes these real forces?
- What makes us call them real?
- Or what is separating the forces called true or real from another group of forces called fictitious/pseudo forces?

Many forces called true are also invisible just like the centripetal force or other pseudo forces.

- Then what is making them special and different?

Real forces are those which arises due to actual interactions between objects. But pseudo forces are not the result of any interaction between objects rather they arise due to a change of reference frame and that is why it is pseudo or false.

A clear comprehension of the Newtonian notion of force remains elusive to many students due to lack of experience with observations in a non-inertial frame of reference. In this article is described a software that can be easily run on a desktop computer and which acquaints the student user with the Newtonian notion of force. Fundamental principles of causality and determinism in Newtonian mechanics are elucidated.

Example of a **Pseudo Force**:
Consider a train in which a mass hangs from a string attached to the train’s ceiling. If the train is at rest or is moving with a uniform speed in a straight line the string will be vertical. A passenger will observe that the mass is in equilibrium and infer that the net force acting on the mass is zero. If the train begins to accelerate, the string will rotate and make an angle with respect to the vertical. In this case, the passenger observing this effect will infer that the mass has accelerated and therefore must invent a net force to account for this acceleration, The force they invent as a result of their observation is a pseudo force. It is a false due to the fact that it does not arise from any real source applying it.