

The Coriolis Force (The Compound Centrifugal Force)

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Abstract. The Coriolis force is generally associated with the Earth's rotation, although it can arise in connection with any kind of rotation. In a paper which he wrote in 1835, French scientist Gaspard-Gustave Coriolis referred to it as the "*compound centrifugal force*", and that is exactly what it is. It is a compound inertial force which results when a compound motion causes two opposing centrifugal pressures to press differentially on either side of an object. When an object moves through the medium for the propagation of light, this induces an inertial pressure around the object which is manifested as kinetic energy. When this inertial pressure is asymmetrical, such as is the case in a radial or in a solenoidal field, the asymmetry is manifested as an inertial force. In meteorology, the asymmetry which leads to the Coriolis force being induced in cyclones is complicated by the fact that there are two centres of rotation involved, and hence we are dealing with a double Coriolis force. With the double Coriolis force in meteorology, there is the rotation that is centred on the Earth, and there is also the rotation that is centred on the cyclone itself.

Inertia

I. For the purposes of the inertial forces, inertia means kinetic energy. Kinetic energy is an inflation of aether pressure that is induced when an object undergoes absolute motion through the medium for the propagation of light. [1] When a collision occurs between two objects, kinetic energy is transferred, but it is impossible to tell what amount of absolute kinetic energy was initially possessed by each of the two objects. The magnitude of the collision is based on the relative motion of the two objects and the absolute motions remain unknown. This uncertainty led to Galileo's erroneous "Principle of Relativity" in which all frames of reference that are in relative uniform motion are equivalent. Galileo was not however considering rotation or electromagnetic effects, and so it didn't matter too much. The deficiency of Galileo's principle of relativity however became exacerbated when Einstein attempted to extrapolate it to electromagnetism. Einstein's special theory of relativity resulted from the absurd proposition that electromagnetic effects do not arise from a physical medium and that hence, as per Galileo's "Principle of Relativity", there exists frames of reference in relative uniform motion which are physically equivalent for electromagnetic purposes. Galileo himself does not have guilty knowledge as regards the creation of

Einstein's special theory of relativity, but he inadvertently did the groundwork.

The Compound Centrifugal Force

II. The inertial forces are manifested by an asymmetry in the inertial pressure, and this occurs in a radial or a solenoidal field, or in connection with a forced precession or a rotation about an asymmetrical axis. [1] The Coriolis force is typically a transverse force that arises in a radial field when an object undergoes a compound motion involving both transverse and radial motion simultaneously. The radial field involves the linear polarization of the tiny dipolar vortices that form the medium for the propagation of light. The compound motion causes an asymmetry in the centrifugal pressure in the transverse direction. The Coriolis force is therefore a compound centrifugal force. [2] The transverse motion is in effect a rotational motion with an associated angular speed about the origin of the radial field. The mathematical expression for the Coriolis force reflects its compound nature. When the Coriolis force is derived using polar coordinates, we can see how the final result is a sum of two separate components related to the two separate aspects of the motion. Hence, the mathematical expression for the Coriolis force is twice that of the simple centrifugal force. The Coriolis force is physically similar in nature to the force which acts on a particle that is moving through a magnetic field, although the magnetic force is caused by the solenoidal alignment of the tiny vortices that form the medium for the propagation of light. [3], [4] The magnetic force is in fact an inertial force, and it is the differential centrifugal pressure acting at right angles to the direction of motion, due to the solenoidal alignment of the tiny vortices.

Double Coriolis Force

III. In the fairground ride that is known as the cyclones, we have a rotation within a rotation, and hence we have two centres of rotation. Likewise with the atmospheric cyclones where we will therefore have two separate Coriolis forces operating within the system. There is the Coriolis force that is based on the Earth-centred rotation. This acts on north-south air currents and sets the direction of rotation. There is also a similar Earth-centred inertial force acting on air currents in any direction, but when we are considering air currents in the east-west direction, we are really looking at a kind of "*Archimedes' Principle*" connected with the slackening and the tightening up of the radial centrifugal force.

Then there is the Coriolis force that is associated with the axis of rotation of the cyclone itself. This Coriolis force leads to conservation of angular momentum. Its origins are somewhat similar to the '*Axial Coriolis force*' that arises in a gyroscope, but since we are dealing with a fluid in the atmospheric cyclones, and with radial motion towards an origin, then the degrees of freedom are different. In the cyclone, the principle motion is radial, whereas with the gyroscope, the principle motion is transverse. In the gyroscope, the background medium for the propagation of light is rendered into a solenoidal field through Ampère's circuital law, whereas the radial motion of the fluid in an atmospheric cyclone results in a radial field, and as such the luminiferous medium becomes linearly polarized. In the case of the cyclone, the transverse motion in the linearly polarized radial field, results in a differential centrifugal pressure across the transverse direction. This is the Coriolis force which causes an increase in the transverse speed as the radial distance from the centre of rotation decreases, resulting in the conservation of angular momentum.

Conclusion

IV. The Coriolis force is not what it is said to be in modern textbooks. It is not a fictitious illusion which is merely a product of making an observation from a rotating frame of reference. The cyclones in the atmosphere are observable absolutely, and they arise from two very real compound inertial forces, and these inertial forces have a physical cause which is closely related to, but not identical to, the magnetic forces.

References

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