



THE GRAVITATIONAL FORCE OF THE HEAVIER CELESTIAL BODY IS DIRECTLY PROPORTIONAL TO THE PRODUCT OF THE MASS AND ACCELERATION OF THE LIGHTER CELESTIAL BODY

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ABSTRACT

The Universe consists of infinitely infinite darkness, galaxies , stars ,planets ,satellites and meteors etc . The fishes and other aquatic animals reside in the water of the ocean, so they create ,live and destroy in that water of the ocean .Similarly the celestial bodies reside in the infinite darkness of the Universe , so they create ,live and destroy in that infinite darkness of the Universe . All the celestial bodies move in the infinite darkness like the fishes and other aquatic animals move in the ocean. The infinite darkness moves faster than the light in the universe accompanying the celestial bodies .

A big magnet attracts the small magnet towards it but the converse does not happen .If a stone is thrown into the sky then the stone is pulled back to the Earth. So the gravitational force acts always from the heavier body towards the lighter body .Similarly every heavier celestial body attracts every other lighter celestial body with the gravitational force in the Universe. When the gravitational field of a lighter celestial body comes in contact with the gravitational field of a heavier celestial body then the heavier celestial body pulls the lighter celestial body by a gravitational force. The lighter celestial body moves by the gravitational force of the heavier celestial body, where the lighter celestial body has no role to play in this respect .The force of motion of the lighter celestial body is equal to the gravitational force of the heavier celestial body .

Rotation is motion and vice versa. If a force is applied on a wheel and that force simultaneously converts to the centripetal force as well as the centrifugal force then the wheel moves forward. So every point of the wheel moves vertically in a cycloid path by the centripetal force to cover horizontally on a straight line path by the centrifugal force . The following four laws are derived from the motion of a wheel on the road

LAW OF MOTION ----- Nrasingh's 1st law

(a) INERTIA OF REST - A body is at rest, until the applied force on it , converts to the centripetal force as well as the centrifugal force .

(b) INERTIA OF MOTION - A body is at motion, as long as the applied force on it , converts to the centripetal force as well as the centrifugal force .

The following law is derived from **Nrusingh's 1st law**

“THE FORCE OF ACTION IS ALWAYS EQUAL TO THE SUM OF OPPOSITE REACTION AND ABSORPTION” ----- Nrusingh's 2nd law

This implies that **“14 PARTS ACTION = 11 PARTS REACTION + 3 PARTS ABSORPTION “**

The following law is derived from **Nrusingh's 2nd law**

Force = (11/14) mass * acceleration ----- Nrusingh's 3rd law

where (11/14) is the constant of proportionality

The following law is derived from **Nrusingh's 3rd law**

Energy = (11/14) mass (velocity of light)² ----- Nrusingh's 4th law

Gravity is a force of attraction that exists between any two bodies or any two particles. Like charges repel in electromagnetism but in case of gravitation like charges attract one another . The above facts state that ,

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Hence **Gravitational Force = (11/14) mass * acceleration**

where (11/14) is the constant of gravitational proportionality

KEY WORDS : Gravitational force ,Absorption, Action, Reaction, Cycloid path, Straight line path , Centripetal force, Centrifugal force , Force , Acceleration , Mass .

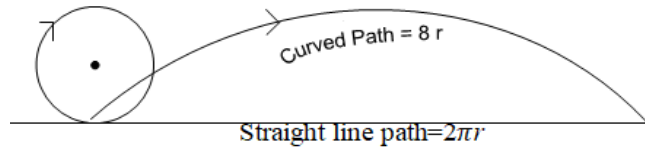
INTRODUCTION :

When a force is applied on a body and that applied force , simultaneously converts to the centripetal force as well as the centrifugal force then the body moves some distance. Due to the action on the body ,the body moves some distance by

its reaction and absorption .

The wheel of a vehicle moves uniformly on a road. So the action, reaction and absorption relation can be derived accurately from the motion of a wheel on the road.

If a force is applied to a wheel, and simultaneously That applied force converts to the centripetal force and the centrifugal force .



So that every point on it ,which touches the road moves vertically on a cycloid path to cover horizontally on a straight line path in its every rotation .

The cycloid is a curved path, which is traced out by a point on a circle that rolls on a straight line .Cycloid path is a part of the circular path. Hence the centripetal force acts on the cycloid path. Centripetal force is a force, which is required to move a body uniformly on a circle.This force acts along the radius and directed towards the centre of the circle.

While moving along a circle the body has a constant tendency to regain its natural straight line path .This tendency gives rise to a force, which is called the centrifugal force . It acts along the radius and away from the centre of the circle .

Centripetal force is the action force and centrifugal force is the reaction force and absorption force. So where is centripetal force, there is centrifugal force .

Every point of the wheel moves vertically **8r length** by the centripetal force and simultaneously the same point covers horizontally **$2\pi r$ length** by the centrifugal force.

Suppose s_1 = length of the cycloid path and s_2 = length of the straight line path
So $s_1 = 8r$ and $s_2 = 2\pi r$

Here $8r > 2\pi r \Rightarrow s_1 > s_2$

As $s_1 > s_2 \Rightarrow \frac{ds_1}{dt} > \frac{ds_2}{dt}$

Let $v_1 = \frac{ds_1}{dt}$ = velocity of the point

and $v_2 = \frac{ds_2}{dt}$ = velocity of the same point

So $v_1 > v_2 \Rightarrow mv_1 > mv_2$

$\Rightarrow m \frac{dv_1}{dt} > m \frac{dv_2}{dt} \Rightarrow ma_1 > ma_2$

where $\frac{dv_1}{dt} = a_1$ = acceleration of point

and $\frac{dv_2}{dt} = a_2$ = acceleration of same point

Since $ma_1 > ma_2 \Rightarrow F_1 > F_2$

where $F_1 = ma_1$ and $F_2 = ma_2$

The magnitude of the centripetal force is equal to the magnitude of the centrifugal force and the directions are opposite to each other . This implies that,

$F_1 = F_2 + \text{SOME ABSORBED FORCE}$

As $F_1 > F_2$

Here CENTRIPETAL FORCE

= F_1 = ACTION FORCE

But F_2 = REACTION FORCE

Hence **CENTRIFUGAL FORCE = $F_2 + \text{SOME ABSORBED FORCE}$**

\Rightarrow **CENTRIFUGAL FORCE =**

REACTION FORCE + ABSORPTION FORCE

This implies that , **ACTION FORCE =**

REACTION FORCE + ABSORPTION FORCE

So **ACTION = REACTION + ABSORPTION**

If force is applied to a wheel then every point of it moves vertically $8r$ length by the centripetal force and simultaneously the same point covers $2\pi r$ length horizontally by the centrifugal force .

$$F_1 : F_2 =$$

ACTION OF CENTRIPETAL FORCE :

REACTION OF CENTRIFUGAL FORCE

This implies that

$$\begin{aligned} F_1 : F_2 &= 8r : 2\pi r = 8 : 2\pi \\ &= 8 : (2 * 22/7) = (8 * 7/7) : (2 * 22/7) \\ &= 56/7 : 44/7 = 56 : 44 = 14 : 11 \end{aligned}$$

Hence

“ TO EVERY 14 PARTS OF ACTION, THERE IS 11 PARTS OF REACTION ”

The magnitude of the centripetal force is equal to the magnitude of the centrifugal force .

So each one of the centripetal force as well as centrifugal force must do equal amount of work .But here centripetal force does more work than the centrifugal force.

This implies that ,

Some amount of centrifugal force is absorbed in the road .So the centrifugal force could not do equal amount of work with centripetal force .

So 14 PARTS ACTION – 11 PARTS REACTION

= 3 PARTS ABSORPTION

This implies that , To every 14 parts of action, there is 11 parts of reaction and 3 parts of absorption .

This implies that , **14 PARTS ACTION + 11 PARTS REACTION + 3 PARTS ABSORPTION**

So **ACTION = REACTION + ABSORPTION**

SUBJECT MATTER

The gravitational force is an attractive force and it is also a force , by which the heavier celestial body attracts the lighter celestial body towards it .

The mass of a celestial body is directly propotional to its gravitational force .

Nrusingh's 2nd law states that

“ THE FORCE OF ACTION IS ALWAYS EQUAL TO THE SUM OF OPPOSITE REACTION AND ABSORPTION ”

This implies that

14 PARTS ACTION = 11 PARTS REACTION

+ 3 PARTS ABSORPTION

So this force is expressed in the following form .

Force = (11/14) mass * acceleration

If 14 parts of force is applied to a wheel and that force is simultaneously converted to the centripetal force and the centrifugal force then 3 parts of that force is absorbed by the road and the rest 11 parts of force makes the wheel to move .

The road is within the Earth, So the Earth absorbs 3parts of the force out of the 14 parts of the force of the wheel . Hence the Earth acquires the gravity by which it pulls the objects towards its centre .

Earth is a sphere and it rotates in the space like a wheel moves on the road. So every point of the Earth moves on a cycloid path to cover a straight line path in its every rotation .

Earth is a celestial body. So every celestial body rotates in the space like a wheel moves on the road. Due to this reason every celestial body acquires the gravitational force . Every celestial body moves in the space by its own force.

If a lighter celestial body comes in contact with the gravitational field of a heavier celestial body then the heavier celestial body pulls the lighter celestial body by its gravitational force and that gravitational force becomes the applied force on the lighter celestial body .

Then that applied force is converted to the centripetal force as well as the centrifugal force on the lighter celestial body. So the lighter celestial body moves in a vertical cycloid path of length 8R to cover on a horizontal straight line path of length $2\pi R$ towards the heavier celestial body.

Where R is the radius of the lighter celestial body .

So the gravitational force is expressed in the form of the following force formula ,

$$\text{Force} = (11/14) \text{ mass} * \text{acceleration}$$

The above fact states the following law ,

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Mathematically, it can be stated as follows

$$G \propto m * a$$

Where **G = Gravitational force of the heavier celestial body, a = acceleration of the lighter celestial body and**

m = mass of the lighter celestial body

$$\text{But } G \propto m * a$$

$$\Rightarrow G = C * m * a \text{ -----(1)}$$

where C = Universal gravitational constant of proportionality.

Every point on any celestial body moves on a vertical cycloid path to cover a horizontal straight line path . So every object on any celestial body moves on rotations such that every point of the object moves on a cycloid path to cover on a straight line path on that celestial body . But **Nrusingh's 2nd law** states that ,

$$\text{1 PART ACTION} = (11/14) \text{ PART REACTION} + (3/14) \text{ PART ABSORPTION}$$

So **1 part of the centrifugal force = (11/14) part of the centrifugal force used for motion + (3/14) part of the centrifugal force used for absorption.**

Hence (3/14) part of force of the lighter celestial body is absorbed in the way and the rest (11/14) part of the force of the lighter celestial body makes it to move on a straight line path towards the heavier celestial body .

$$\text{So } C = (11/14)$$

Hence putting the value of $C = (11/14)$ in the equation (1) , it is obtained that

$$G = C * m * a = (11/14) * m * a$$

$$\Rightarrow G = (11/14) \text{ mass } * \text{ acceleration}$$

----- Nrusingh's Gravitational force law
Hence every heavier celestial body pulls any lighter celestial body by its resultant gravitational force $G = (11/14)m*a$ part and simultaneously the rest $(3/14)m*a$ part of the gravitational force is absorbed in the way of the motion in the space .

CONCLUSION :

Moon is a celestial body and it moves in the space like the motion of a wheel on the road. So Moon has the gravitational force $G = (11/14)m*a$

A soft landing is any type of aircraft, rocket or spacecraft landing that does not result in significant damage to or destruction of the vehicle or its payload .

The average vertical speed of the Moon in a soft landing should be about 2 meters per second or less .

Man has no power to decrease the gravitational force of the Moon .But man has the intellect to decrease the force of motion of the space craft by decreasing its acceleration as a result (3/14) part of force of the space craft is absorbed in the way and the rest (11/14) part of force makes the space craft to land on the Moon.

So by using the above law of gravitational force, the acceleration of the spacecraft may be decreased to 2 meters per second squared or less for the safe soft landing on the Moon .

REFERENCES :

The followings are the published papers of the IJSER and GSJ journals .

1) Nrusingh's 1st law

IJSER , volume 10 , issue 12

December-2019 , ISSN 2229-5518

2) Nrusingh's 2nd law

IJSER , volume 6 , issue 7

July-2015 , ISSN 2229-5518

3) Nrusingh's 3rd law

IJSER , volume 11 , issue 3

March-2020 , ISSN 2229-5518

4) Nrusingh's 4rth law

GSJ , volume 8 , issue 9

September-2020 , ISSN 2320-9186