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ANGULAR VELOCITY AND ANGULAR ACCELERATION IN THE ROTATIONAL MOTION OF A RIGID BODY

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ABSTRACT: - This article covers rotational motion, angular velocity, instantaneous angular velocity, angular acceleration, mechanical motion, material point.

KEYWORDS: Groundwork, angular velocity, instaneous, angular acceleration, mechanical motion,material point, pedagogical and practical staff.

INTRODUCTION

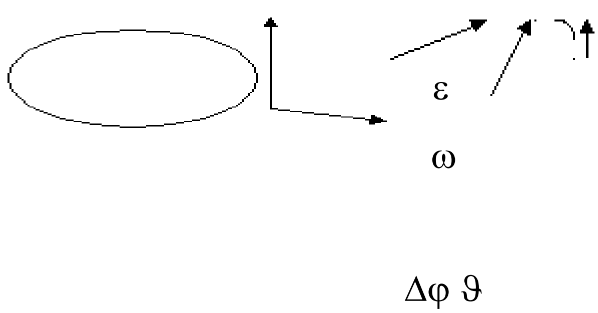
Only when the groundwork is laid for the development of any country will the future be great and prosperous. The builders of the future are the younger generation. In this regard, at any time in the education of the younger generation, serious attention is paid to the development of consciousness, thinking, health. To date, efforts have been made to further strengthen secondary special and vocational education institutions with qualified, pedagogical and practical staff.

It is a characteristic of our people to think about the future of their children, the spirit of the ancestors, to live with a sense of responsibility for the future of generations. The virtue at the heart of this virtue has gained more value since independence and has been put into practice. That is why the reforms in the education system are highly valued by the world community.

This means that well-thought-out reforms in the field of education, first of all, will lead to positive changes in the mind and thinking, and ultimately will be crucial in the development of the people's spirituality.

Rotational motion is a motion in which all points of a rigid body move in circles whose centers lie in a straight line. Rotational motion is characterized by angular velocity and angular acceleration magnitudes.

Harakterlanadi



Angular velocity is a quantity that represents the angle of rotation of a radius of rotation per unit time. The motion is smooth (t is the radius of rotation at time (angular velocity if angled): **$\omega=\Delta\varphi/\Delta t$**

instantaneous value of angular velocity

$$\omega_{on} = \lim_{\Delta t \to 0} \frac{\Delta \varphi}{\Delta t} = \frac{d\varphi}{\Delta t}$$

The instantaneous angular velocity is equal to the first-order product of the angle of rotation in time. The number of revolutions per unit time (if the angular velocity $\omega=2\pi\nu$ or

$\omega=2\pi/T$. ω Is determined by the right-hand rule) . Unit of measurement of angular velocity from SI system

$$[\omega]=[rad/sek] \text{ or } [\omega]=[1/sek]$$

A linear velocity is a quantity that represents the length of an arc moving in a circle in a unit time: $\vartheta=\Delta s/\Delta t$

The angle of rotation (when very small ($\Delta s=R\Delta\varphi$ () can be taken).

In that case

$$\vartheta=\frac{\Delta s}{\Delta t}=R\frac{\Delta\varphi}{\Delta t}=R\omega \qquad \vartheta=\omega R$$

The physical quantity that represents the change in angular velocity per unit time is called angular acceleration. Instantaneous value of angular acceleration if the motion changes arbitrarily.This means that the instantaneous angular acceleration is equal to the first-order product of the angular velocity in time. Instantaneous angular acceleration because . This means that the instantaneous angular acceleration is equal to the second-order product of the angle of rotation in time.

Normal acceleration an $a_n=v^2/R=(\omega R)^2/R=\omega^2 R$, (2 R, because (= (R, tangential acceleration) $a_t=dv/dt=d(\omega R)/dt=Rd\omega/dt=R\varepsilon$

In that case the total acceleration in the curvilinear motion. $a=\sqrt{(\omega^2 R)^2+(R\varepsilon)^2}$

The movement of objects or parts of a body relative to each other in space is called mechanical motion. When studying the mechanical motion of objects, it is often possible to ignore their shape and size. Under such conditions, the body can be considered as a material point. For example, if a child walks a certain distance from home to school, it is easier to look at the child's movements as a material point when studying their movements. But if this child does gymnastics by moving his arms and legs, he can no longer be considered a material point. Similarly, when we study the Earth's rotation around the Sun, we can look at the Earth as a material point, but when we study the Earth's daily rotation around its axis, we cannot look at the Earth as a material point. This means that an object whose shape and size can be ignored in the matter considered as a material point.

The position or motion of an object is always seen relative to another object, so the last body is called a counting body. In physics, the coordinate system is used as a number system. For example, a three-axis coordinate system at right angles to each other is obtained, the axes of which are denoted by the letters x, y, z. Such a coordinate system was introduced by the French scientist Descartes. There are other coordinate systems.

The branch of mechanics that studies the motion of a point without the cause of that motion is called kinematics. In kinematics, concepts such as trajectory, path, and displacement are used to consider mechanical motion. The line drawn during the motion of a material point is called the trajectory. If the trajectory consists of a straight line, the motion is called a linear motion. If the trajectory is curved, then the motion is curvilinear. The trajectory can also be a circle. In this case, the material point is moving in a circle.

The distance traveled by a material point along its trajectory is called the path. It is not characterized by direction. In physics, such quantities are called scalar quantities. The road is scalar. If a material point moves from one point to another, it is called a straight line joining these points and moving from point 1 to point 2.

In physics, directional physical quantities are called vector quantities. Displacement is a vector quantity. Let us now consider the two basic physical quantities seen in kinematics — velocity and acceleration.

When we say speed in life, we mean the path we have traveled in a unit of time. If a material point travels an equal distance in equal time intervals, such a motion is called a plane motion, and if the motion is linear, we have the following formula for the velocity of the plane motion.

In physics, velocity is usually defined as the physical quantity that characterizes the speed at which a material point moves along a trajectory and the direction of motion of a point at each moment. Therefore, the concept of instantaneous velocity is introduced for each point of the trajectory. To find the instantaneous velocity, we construct the trajectory of a motion in the plane of the x, u coordinate axes, divide the displacement ds corresponding to an infinitely small part of this trajectory dl, and transfer to it the radius vectors r1 and r2 from the origin. Now we find the instantaneous velocity for this point in the trajectory by dividing the displacement ds by the time interval dt at which the displacement occurred.

Here, V is the instantaneous velocity, ds is the infinitesimal displacement, and dt is the time interval. This means that the velocity is equal to the product of the radius of the point in time. The velocity V is directed along the trajectory. In the International System of Units, the unit of velocity is m / s, in the SGS system it is cm / s. In practice, speed is also measured in km / h.

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