

Application of Vectors

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Abstract: - This presentation deals with the day to day life application of vectors. Vectors are one the technique that an individual deals from the beginning of their educations. Navigating a person to go to a particular location is a type of vector application. Identifying someone located on the earth in terms of latitudes and longitude can also compare to the height of sea level is a form of vector. We are also going to discuss the various ways in which an individual can apply vector in their routine without their own remembrance. In this presentation, we give a brief idea about the uses of vector like different cases of rain umbrella, projectile application and relative velocity concepts in our surroundings.

Keywords: - Longitude and latitude, projectile application, Relative velocity.

I. INTRODUCTION

A vector is a quantity or phenomenon that has two independent properties: magnitude and direction. The term also denotes the mathematical or geometrical representation of such a quantity.

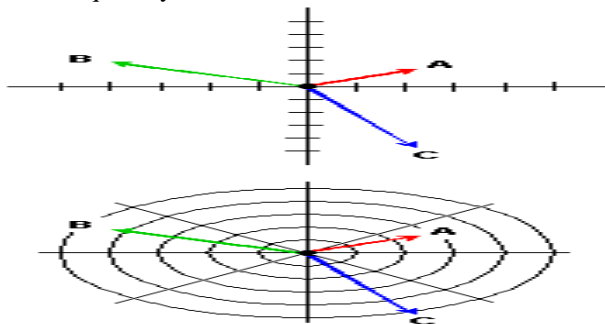


Fig.1

Examples of vectors in nature are velocity, momentum, force, electromagnetic fields, and weight. (Weight is the force produced by the acceleration of gravity acting on a mass.) A quantity or phenomenon that exhibits magnitude only, with no specific direction, is called a scalar. Examples of scalars include speed, mass, electrical resistance, and hard-drive storage capacity. The mathematical tools used in books, perhaps none are more important than the vector. For example, we use vectors to extend our study of motion from one dimension to two dimensions. More generally,

vectors are indispensable when a physical quantity has a direction associated with it. Suppose, for example, that a pilot wants to fly from Bangalore to Raipur. If the air is still, the pilot can simply head the plane toward the destination. If there is a wind blowing from west to east, however, the pilot must use vectors to determine the correct heading so that the plane and its passengers will arrive in Raipur and not Little Rock.

II. NAVIGATION AND PROJECTILE

Vector also helps in the navigation of individual from one place to another. Suppose if you want a way to library in a large campus of college then you can take help of navigating devices which in term use vector to make you reach your destination.

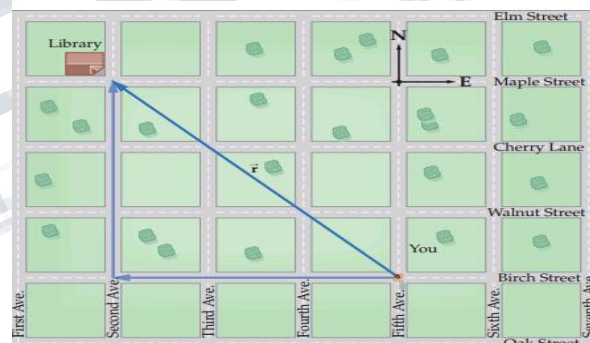


Fig.2

£: To a good approximation, this snow Geese are all moving in the same direction With the same speed. As a result, their Velocity vectors are equal, even though their Positions are different. Often times an object is moving within a medium which is moving relative to its surroundings. For instance, a plane moves through air which (due to winds) is moving relative to the land below. And a boat moves through water which (due to currents) is moving relative to the land on the shore. In such situations, an observer on land will observe the plane or the boat to move at a different velocity than an observer in the boat or the plane would observe. It's a matter of reference frame. One's perception of a motion is dependent upon one's reference frame - whether the person is in the boat, the plane or on land.

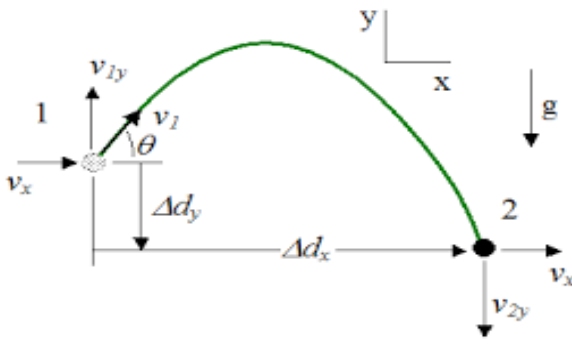


Fig.3

III. RELATIVE VELOCITY AND RIVER BOAT

In a relative velocity problem, information is typically stated about the motion of the plane relative to the air (plane velocity) or the motion of the boat relative to the water (boat velocity). And information about the motion of the air relative to the ground (wind velocity or air velocity) or the motion of the water relative to the shore (water velocity or river velocity) is typically stated.

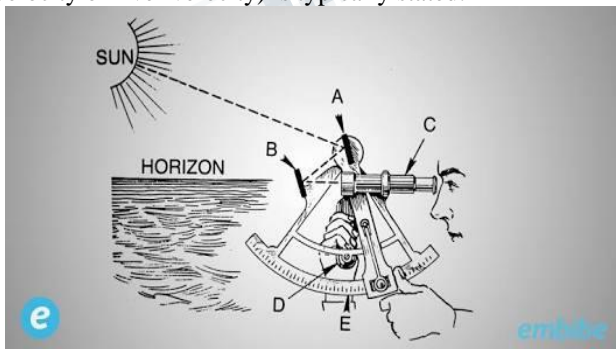


Fig.4

the problem centres around relating these two components of the plane or boat motion to the resulting velocity. The resulting velocity of the plane or boat relative to the land is simply the vector sum of the plane or boat velocity and the wind or river velocity.

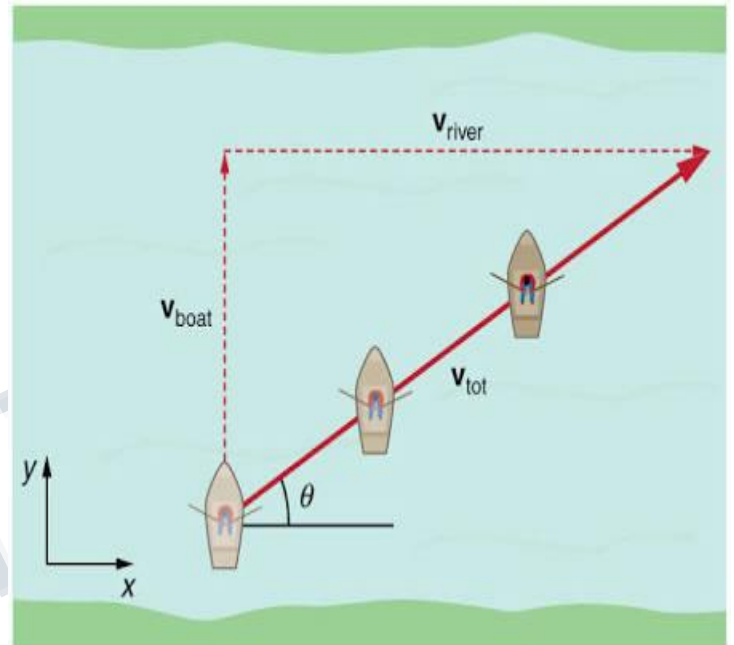


Fig.5

Vectors which have a specific direction associated with them, Time is the only quantity which is a scalar. As a scalar, time can be listed in an x-y table in either the horizontal or the vertical columns. In a sense, time is the one quantity which bridges the gap between the two columns. While horizontal and vertical components of motion are independent of each other, both types of quantities are dependent upon time. This is best illustrated when inspecting the kinematic equations which are used to solve projectile motion problems.

$$v_{fx} = v_{ox} + a_x \cdot t \quad x = v_{ox} \cdot t + \frac{1}{2} \cdot a_x \cdot t^2$$

$$v_{fx}^2 = v_{ox}^2 + 2 \cdot a_x \cdot x \quad x = \frac{v_{ox} + v_{fx}}{2} \cdot t$$

and

$$v_{fy} = v_{oy} + a_y \cdot t \quad y = v_{oy} \cdot t + \frac{1}{2} \cdot a_y \cdot t^2$$

$$v_{fy}^2 = v_{oy}^2 + 2 \cdot a_y \cdot y \quad y = \frac{v_{oy} + v_{fy}}{2} \cdot t$$

Equations

As we are aware of roller coaster amusement ride. The motion in a roller coaster ride is a response to the earth's gravitational pull. After the train reaches the top of the first slope the highest point on the ride train rolls downhill and gain speed under the earth gravitational pull. The process occurs over and over again until all the train energy has been lost to friction. Here vectors of forces, acceleration and velocity are important in order for the safety system.

IV. CONCLUSION

This model in terms of application of vectors gives a brief idea about the world wide practices of vector in our routine. Hence this shows that how vector plays a vital role in all aspects of life. However, we conclude by saying that vectors help to deal with various concepts and conditions like mathematics, physics, astronomy, navigation and many more which are beyond our thinking.

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