We equate the velocity of an object as the rate of the change in its displacement over the change in time. Similarly acceleration is the rate of change of the velocity over the change in time. A sample velocity value would be meters/second; a sample acceleration value meters/seconds2. Due to the fact that the denominator of each equation is Δt, or the change in time, it must be an interval. Graphically we measure velocity as the slope of the graph that plots displacement against time. We take the slope of a given interval in time to measure velocity. We are unable, of course, to get an exact value for the velocity of a given point in time. To do so we would have to use an interval of time that is infinitely small, an interval that spans no time at all but lands only on a particular infinitely small point. This is impossible of course for us to measure, and we can only approximate it graphically and mathematically. Mathematically we cannot simply set the change in time to zero (0), for that would make the equation unsolvable. We must content ourselves with calculations where Δt approaches zero, with zero as its limit. As Δt becomes infinitesimally small, we come close to calculating the velocity for an exact moment in time.

Similarly, we are unable to measure the acceleration of an object but can approximate it as Δt2 becomes infinitesimally small.

The instantaneous rate of change of an automobile on a highway, then, can be viewed as the slope of the graph of time as a function of velocity. Only if the slope remains constant can we calculate that rate of change, but as the curve rises and falls due to the infallibility of human capability to retain a constant pressure on the gas pedal, the acceleration inevitably changes and the slope of the curve must be calculated for each individual point, a process that can be achieved using Calculus.

It can be said then that the instantaneous rate of change of an automobile on the highway is the calculated acceleration of that automobile as the Δt2 in the denominator of the equation approaches zero, or that it is the slope of the curve at a given point in time on the velocity vs. time graph.

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