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The Derivative

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1. Introduction

The derivative operator is one of the most important concepts in calculus, and one of the fundamental building blocks for all advanced studies regarding STEM. Therefore, it is good to know the basics behind the subject. I will be introducing them from the perspective of infinitesimal number, or the hyperreal number system as it is more formally known.

Imagine that you are a physicist studying rate of change. You can measure the position of a certain object through time, and you want to describe the average velocity of the object. Since you know that:

$$v_{average} = \frac{\Delta d(t)}{\Delta t}$$

where $\Delta d(t)$