Anatomy of a Jerk: A Dissertation on the Effects of the Third Derivative on Graphs in the Two Dimensional Cartesian Plane

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Abstract

While the numerical properties of the third derivative, known in physics as the jerk, as well as its practical uses, have been well established, very little literature exists to describe the visual properties of the original function impacted by its third derivative. To attempt to answer this, 25 equations, split into groups of 5, were quasi-randomly selected and graphed, along with their third derivatives, then analyzed to find correlations. These correlations were then logically explained in an attempt to filter out coincidences. The conclusion drawn was that the changing concavity caused by the third derivative would create an “s” shape in the graph, with the sign of the third derivative describing which direction the “s” shape took and the absolute value of the third derivative dictating how compressed or elongated the “s” shape is.