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MASS EXTINCTIONS AS LOGNORMAL STOCHASTIC PROCESSES

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### ABSTRACT

In a recent paper (ref. [1]), this author investigated a mathematical model representing a Mass Extinction as a lognormal stochastic process in the number of Living Species suddenly undergoing a decrease.

Cases of practical interest developed by the author analytically in detail were:

- 1) The K-Pg mass extinction (“end of dinosaurs”, 65 million years ago) where the mean value decreased like an exponential (“Geometric Brownian Motion”) or like the descending branch of a parabola.
- 2) The case when the mean value changed in time like a cubic (Markov-Korotayev model of Evolution).

The new, important mathematical feature presented in this paper is the case when the mean value curve of this lognormal process is **arbitrary**, so that the model may be used to represent mass extinctions of any kind.

We extend the results in [1] for the benefit of simulating future mass extinctions that could be caused by the impact of an asteroid or a comet on Earth.

### REFERENCE

- [1] C. Maccone, “Evolution and Mass Extinctions as Lognormal Stochastic Processes”, International Journal of Astrobiology, Vol. 13, issue 4, pages 290-309 (2014).