
Quantifying the Zero Force Evolutionary Law

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Abstract

This paper presents the first mathematical representation of the Zero Force Evolution Law (ZFEL). Using the framework developed by Price (1970), I derive an expression for change in phenotypic variance over time and establish that the ZFEL is inherently true in this framework. In other words, I show, formally, that in a system with variation and heredity, if selection and constraints are absent, variance will increase. I use this formalization to investigate 1) the ZFEL as a background tendency in evolutionary systems, and 2) the ZFEL as a strongly driven trend over the history of life. I conclude by illustrating how this formal model can be applied to real data by comparing human nucleotide mutation rates in coding and noncoding regions of the genome.

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