Entropy in Evolutionary Algorithms - Statistical Mechanics Bearing Insight into Evolution

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Genetic algorithms (GAs) are an optimization technique inspired by natural selection. GAs have yielded good results in certain practical problems, yet there is still more to be understood about their behavior on a theoretical level. One approach is to look at the evolutionary process from the point of view of statistical mechanics, and interpreting jumps in fitness as phase transitions. Toward this goal we examine the behavior of entropy in a GA that optimizes a simple function. We find that entropy increases as a new species diversifies, but its upper bound decreases with most phase transitions (which correspond to evolutionary steps).

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