



Stochastic similarities between natural processes and art: Application in the analysis and optimization of landscape aesthetics of renewable energy and civil works

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Stochastics help develop a unified perception for natural phenomena and expel dichotomies like random vs. deterministic, as both randomness and predictability coexist and are intrinsic to natural systems. A natural system can be deterministic and random at the same time, depending on the prediction horizon and the time scale. The high complexity and uncertainty of natural processes has been long identified through observations as well as extended analyses of hydrometeorological processes such as temperature, humidity, surface wind, precipitation, atmospheric pressure, river discharges etc. All these processes seem to exhibit high unpredictability due to the clustering of events.

Art is usually not considered a natural process, but other than a mix of determinism (e.g., certain rules have to be followed) it also includes stochasticity (e.g., creativity and inspiration). A stochastic analysis of works of art allows for the identification of a possible intrinsic uncertainty. This analysis includes the investigation of Hurst-Kolmogorov behaviour in the art of different historical periods (visual arts, music and poetry) and of similarities with natural processes. Based on the stochastic analysis of artworks, a method of image analysis is developed that is applied in analysing the landscape impact in cases of insertion of architectural elements in the natural landscape, formulating an indicator that can be used for analysing the impact of works of engineering on the landscape.