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Network Diffusion Capacity

Abstract: Improving the understanding of diffusive processes in networks is one of the main challenges of today's complexity science. Intrinsicly, structures possess a diffusive potential that depends on their topological configuration. However, the diffusion of a process depends not only on this characteristic but also on the dynamical process itself.

In this work, we introduce a measure called Diffusion Capacity that quantifies the potential of an element or a system as a diffusive agent. Quantifying this potential will allow the design of more efficient systems in which it is necessary either to weaken or enhance diffusion. As a theoretical example, we present a heat diffusion model, and as examples, we study the heat diffusion of superficial air on Earth.

We show how Diffusion Capacity provides an efficient tool to study the dynamics of diffusive systems and how they can be used to identify structural modifications that could improve diffusion mechanisms.