

Physics, Networks, and the Hidden Geometry of Complex Contagion Phenomena

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The global spread of epidemics, rumors, opinions, and innovations are complex, network-driven dynamic processes. I will explain how a combination of physical principles, network theory and a very simple trick [1] can help us understand complex spatiotemporal spreading patterns and how they can be reduced to surprisingly simple, homogeneous wave propagation patterns. I will also discuss the history of mathematical models in epidemiology, the first use of differential equations in this context, briefly discuss scientific animosities of the 17th century, elaborate on the uses and abuses of mathematics in biology, introduce the so called “assume count” by which publications can be evaluated and conjecture about the future of the use of physical and mathematical thought in epidemiology.

[1] D. Brockmann, D. Helbing, *Science* (2013)