

1067-60-2

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Stanford University, Stanford, CA 94305. *Mathematical problems in systemic risk.*

The quantification of uncertainty in complex systems depends on the individual uncertainty of their components, the connectivity of the system and on the way uncertainty evolves over time. Quantifying systemic risk for a complex system means identifying regimes in which small changes in individual components can cause catastrophic failure of the whole system. How can we characterize mathematically such regimes of fragility that may remain hidden and difficult to detect? I will address the mathematical modeling of systemic risk in complex systems and give examples from finance (banking, credit cards), power systems, ecological systems, complex engineering systems, etc., and discuss some old and some new mathematical methods for dealing with these issues. (Received September 19, 2010)