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Title : Actuarial modeling for the systemic component of Cyber-risk

Abstract :With the rise of digital economy, cyber risk has become a major threat for the financial system, while the scale of losses linked to cyber-risk is rising sharply (more than 1% of the global GDP). Facing this risk, cyber insurance is an essential lever for economic resilience, but its development encounters some pitfalls, with important uncertainties. Indeed the emerging and evolving nature of cyber-risk and its potential systemic component questions its insurability. After an introduction to the specificities on cyber-risk, we present a stochastic model to capture the cluster features in the arrival of cyber-events, namely Marked Hawkes processes. These mathematical objects turn out to be difficult to study. Using new technics at the crossroad of the so-called Poisson imbedding and Malliavin's calculus, we develop theoretical results on such processes and present several applications in terms of risk quantification.