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Title: Degradation Model and Related Applications: From Light Intensity to Network Reliability

Abstract: In engineering and sciences, the process that a system reduces in performance, reliability, or life span of assets gradually and irreversibly is known as a degradation process. Degradation measurements are recorded over time for prognostics and health management purposes. The degradation models based on stochastic processes have been used to characterize the evolution of degradation measurements. In this talk, I will first introduce the gamma and Wiener degradation models. Then, I will introduce a multi-phase gamma degradation model and discuss the likelihood and Bayesian inference for this model. The gamma process model and the inferential methods are applied to analyze a real data set of light-emitting diodes (LEDs). I will also discuss the application of the degradation models in power grid network reliability analysis and other applications such as network design and cybersecurity. In addition to engineering applications, an application of the degradation models in biopharmaceutical statistics will also be discussed briefly.