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Title: Random Persistence Diagram Generation

Abstract:
Topological data analysis (TDA) studies the shape patterns of data. Persistent homology (PH) is a widely used method in TDA that summarizes homological features of data at multiple scales and stores them in persistence diagrams (PDs). In this talk we will discuss a random persistence diagram generation (RPDG) method that generates a sequence of random PDs from the ones produced by the data. RPDG is underpinned by (i) a model based on pairwise interacting point processes for inference of persistence diagrams, and (ii) by a reversible jump Markov chain Monte Carlo (RJ-MCMC) algorithm for generating samples of PDs. An example on a materials science problem will demonstrate the applicability of the RPDG method.