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John T. Nardini* (jtnardin@ncsu.edu). *TDA discriminates parameters in models of angiogenesis.*

Spatial networks naturally arise in many phenomena from biology, physics, and political science. Methods from algebraic topology are gaining popularity for inferring the properties of networks that arise over many scales, yet determining which methods are appropriate for certain applications can be challenging. We focus on the analysis of networks that arise from tumor-induced blood vessel formation, where the network structure critically determines its function in both healthy and abnormal biological tissue. A simple agent-based model of this process shows that the network morphology changes based on the model's underlying parameters. We propose two novel approaches to analyze the topology of these simulated networks and demonstrate how they can be combined with methods from data science to perform a global sensitivity analysis for the model. We find that one method, which we call a plane sweeping approach, can perform a sensitivity analysis that reliably separates parameter space into regions that produce similar network structures. We propose that this methodology can be used in combination with experimental images to infer how such networks developed. (Received September 14, 2020)