

Abstract Submitted  
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**Characterizing and Understanding Parameterized Models through Information Topology** KOLTEN BARFUSS, DR. MARK TRANSTRUM, Brigham Young University Department of Physics and Astronomy, ALEXANDER SHUMWAY, Brigham Young University Department of Mathematics — Information Topology can be used to characterize and reduce complex models. Varying the parameters of a model through all possible values gives a manifold of possible predictions. The boundaries of the manifold correspond to reduced-parameter models, and are a topological feature. Our past work has focused on the cluster expansion often used in statistical mechanics. We have now developed a method suited to a much wider class of models. Analyzing this class of models has led to definition of new properties characterizing posets for which a minimal amount of information is sufficient to construct the entire manifold topology. We have characterized this class of models and identified several existing models that fall within it. Further, we have designed and implemented an algorithm for reconstructing the manifold topology from said minimal information. Characterizing the manifold topology of a complex model allows us to recognize relationships among behaviors of the model and simplified models.

Kolten Barfuss  
Brigham Young University Department of Physics and Astronomy

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