

Abstract Submitted  
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**Reconstructing the information topology of models of complex systems** KOLTEN BARFUSS, MARK TRANSTRUM, Brigham Young University — Multi-parameter models of complex systems are ubiquitous throughout science. We interpret models geometrically as manifolds with parameters acting as coordinates. For many models, the manifold is bounded by a hierarchy of boundaries. These boundaries are themselves manifolds which correspond to simpler models with fewer parameters. The hierarchical structure of the boundaries induces a partial ordering relationship among these approximate models that forms a topological space and can be visually represented by a Hasse diagram. The Hasse diagram of the model manifold provides a global summary of the model structure and a road map from the intricate, fully parameterized description of a complex system through various types of approximations to the set of distinct behavior regimes the model enables. I describe two methods for reconstructing the entire Hasse diagram of complex models and discuss applications to models in statistical mechanics and biological differential equation models.

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