Abstract Submitted
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Piecemeal Model Reduction[1] BENJAMIN FRANCIS, MARK TRANSTRUM, Brigham Young University — Many systems can be modeled as a complicated network of interacting components. Often the level of detail in the model exceeds the richness of the available data, or makes the model computationally intensive to use or difficult to interpret. Such models can be improved by reducing their complexity. If a model of a network is very large, it may be desirable to split it into pieces and reduce them separately, recombining them after reduction. We discuss piecemeal reduction of a network in the context of the Manifold Boundary Approximation Method (MBAM), including its advantages over other reduction methods. We show that MBAM transforms the model reduction problem into one of selecting a model from a partially ordered set (poset). In some cases, the poset can be factored into components. This is equivalent to decomposing the model into pieces that can be reduced separately. We use this insight to propose a strategy for piecemeal reduction via MBAM. We demonstrate on a resistor network and show that MBAM finds a reduced model that introduces less bias than similar models with randomly selected reductions.

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