1062-37-171   **Erik M Bollt*** (`bolltem@clarkson.edu`), Dept of Mathematics & Computer Science, Clarkson University, Potsdam, NY 13699-5815, and **Jie Sun** and **Takashi Nishikawa**. *Judging Model Reduction of Chaotic Systems via Optimal Shadowing Criteria.*

A common goal in the study of high dimensional and complex system is to model the system by a low order representation. We propose a general approach for assessing the quality of a reduced order model from high dimensional chaotic systems through shadowing, and combined with dimensionality reduction techniques. Rather than quantify the quality of a model based on predictions, which can be irrelevant for comparison of models since even excellent models can do poorly, we suggest that a good model should allow shadowing by modeled data for long times; this principle leads directly to an optimal shadowing criterion of model reduction. We shall gives examples with interval arithmetic computations to validate upper bounding of the shadowing time cost function used. Our discussions will include a motivating goal of shadowing criterion toward understanding low-dimensional models of coupled systems. (Received August 06, 2010)

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