

VII. International Conference on Mathematics and its Applications in Science and Engineering

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Title: Ensemble Data Assimilation in High-Dimensional Chaotic Systems: Exploiting Low-Dimensional Structures

Abstract: Data assimilation is a framework that combines mathematical models with observational data, originally developed in numerical weather prediction. We present its mathematical foundations and then focus on ensemble-based algorithms that exploit the essential low-dimensional structures of high-dimensional chaotic systems arising in atmospheric models. Recent advances are highlighted, and future directions are discussed.