Aerospace Seminar

Paul Constantine

Assistant Professor, Computer Science, CU Boulder

Parameter Reduction Techniques for Aerospace Models: Applications to Design and Uncertainty Quantification

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Abstract: Scientists and engineers use computer simulations to study relationships between a physical model's input parameters and its output predictions. However, thorough parameter studies---e.g., constructing response surfaces, optimizing or averaging---are challenging or rimpossible when the simulation is expensive and the model has several inputs. To enable parameter studies in these instances, engineers may attempt to reduce the dimension of the model's input parameter space using techniques such as sensitivity analysis or variable screening to identify unimportant variables that can be fixed for analysis. Generalizing classical coordinate-based reduction, there are several emerging subspace-based dimension reduction tools that identify important directions in the input parameter space with respect to a particular model output.

In this seminar, Professor Constantine will motivate and review recent subspace-based dimension reduction techniques and discuss strategies for exploiting such low-dimensional structures to enable otherwise infeasible parameter studies.

Bio: Paul Constantine is an assistant professor in the Department of Computer Science at the University of Colorado Boulder. He received his PhD from Stanford's Institute for Computational and Mathematical Engineering and was awarded the John von Neumann Postdoctoral Fellowship at Sandia National Labs. His interdisciplinary research interests include parameter reduction and uncertainty quantification for computational science and engineering models. For more information, see *www.cs.colorado.edu/~paco3637*

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