

Co-active subspace methods for adjacent computer models

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Active subspace methods have become a popular tool for global sensitivity analysis and dimension reduction for a computer model [1]. In this talk, we discuss an elegant generalization of traditional active subspace methods to perform a joint analysis of two “adjacent” computer models [2]. This approach allows us to define co-active direction, joint sensitivity indices (co-activity), and a scalar metric called “concordance” which measures the alignment (or non-alignment) of the gradient spaces of the two functions. An algorithm, based on [3], permits fast computation and implemented in a publicly available R package.

References:

- [1] Constantine PG. Active subspaces: Emerging ideas for dimension reduction in parameter studies. Society for Industrial and Applied Mathematics; 2015 Mar 18.
- [2] Rumsey K.N., Hardy Z.K., Ahrens C, Vander Wiel S. ”Co-Active Subspace Methods for the Joint Analysis of Adjacent Computer Models.” *Technometrics* (2024; in production).
- [3] Rumsey K.N., Francom D, and Vander Wiel S. ”Discovering Active Subspaces for High-Dimensional Computer Models.” *Journal of Computational and Graphical Statistics* (2023): 1-13

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