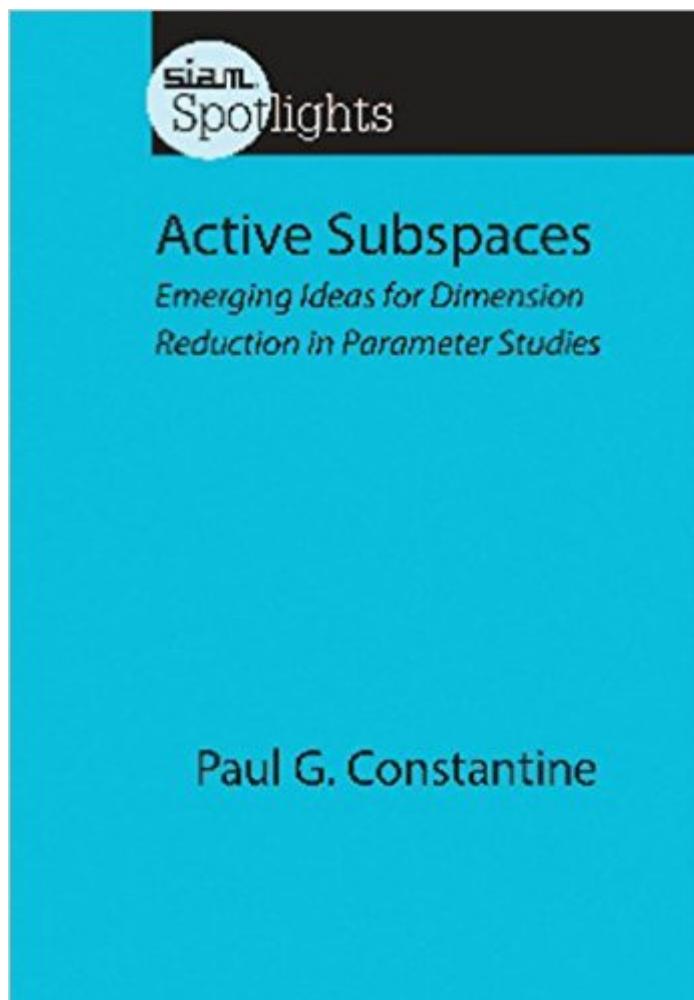


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Active Subspaces: Emerging Ideas For Dimension Reduction In Parameter Studies



Synopsis

Scientists and engineers use computer simulations to study relationships between a model's input parameters and its outputs. However, thorough parameter studies are challenging, if not impossible, when the simulation is expensive and the model has several inputs. To enable studies in these instances, the engineer may attempt to reduce the dimension of the model's input parameter space.

Active subspaces are an emerging set of dimension reduction tools that identify important directions in the parameter space. This book describes techniques for discovering a model's active subspace and proposes methods for exploiting the reduced dimension to enable otherwise infeasible parameter studies. Readers will find new ideas for dimension reduction, easy-to-implement algorithms, and several examples of active subspaces in action. Audience: This book is intended for researchers and graduate students in computational science, applied mathematics, statistics, and engineering. Contents: Preface; Chapter 1: Quick Start; Chapter 2: Parameterized Models in Physics and Engineering; Chapter 3: Discover the Active Subspace; Chapter 4: Exploit the Active Subspace; Chapter 5: Active Subspaces in Action; Chapter 6: Summary and Future Directions; Bibliography; Index.

Book Information

Paperback: 110 pages

Publisher: SIAM-Society for Industrial and Applied Mathematics (March 17, 2015)

Language: English

ISBN-10: 1611973856

ISBN-13: 978-1611973853

Product Dimensions: 6.8 x 0.3 x 9.7 inches

Shipping Weight: 5.6 ounces (View shipping rates and policies)

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Best Sellers Rank: #2,558,589 in Books (See Top 100 in Books) #79 in Books > Science & Math > Mathematics > Transformations #531138 in Books > Reference

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