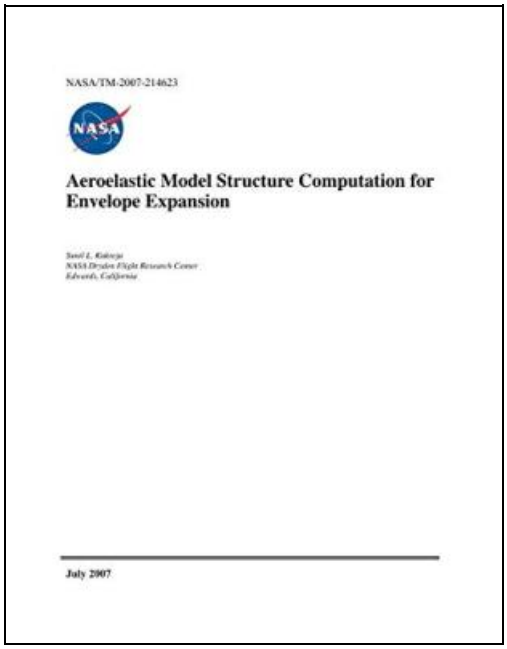
Aeroelastic Model Structure Computation for Envelope Expansion (Paperback)



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AEROELASTIC MODEL STRUCTURE COMPUTATION FOR ENVELOPE EXPANSION (PAPERBACK)

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Independently Published, United States, 2019. Paperback. Condition: New. Language: English. Brand new Book. Structure detection is a procedure for selecting a subset of candidate terms, from a full model description, that best describes the observed output. This is a necessary procedure to compute an efficient system description which may afford greater insight into the functionality of the system or a simpler controller design. Structure computation as a tool for black-box modeling may be of critical importance in the development of robust, parsimonious models for the flight-test community. Moreover, this approach may lead to efficient strategies for rapid envelope expansion that may save significant development time and costs. In this study, a least absolute shrinkage and selection operator (LASSO) technique is investigated for computing efficient model descriptions of non-linear aeroelastic systems. The LASSO minimises the residual sum of squares with the addition of an l(Sub 1) penalty term on the parameter vector of the traditional l(sub 2) minimisation problem. Its use for structure detection is a natural extension of this constrained minimisation approach to pseudo-linear regression problems which produces some model parameters that are exactly zero and, therefore, yields a parsimonious system description. Applicability of this technique for model structure computation for the F/A-18 (McDonnell Douglas, now The Boeing Company, Chicago, Illinois) Active Aeroelastic Wing project using flight test data is shown for several flight conditions (Mach numbers) by identifying a parsimonious system description with a high percent fit for cross-validated data. Kukreja, Sunil L. Armstrong Flight Research Center NASA/TM-2007-214623, H-2736, AIAA Paper 2007-2317.

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