

# Optimization and Anti-Optimization of Structures Under Uncertainty

Isaac Elishakoff • Makoto Ohsaki



Imperial College Press

# Optimization And Anti Optimization Of Structures Under Uncertainty

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## **Optimization And Anti Optimization Of Structures Under Uncertainty:**

**Optimization And Anti-optimization Of Structures Under Uncertainty** Isaac E Elishakoff,Makoto Ohsaki,2010-03-08 The volume presents a collaboration between internationally recognized experts on anti optimization and structural optimization and summarizes various novel ideas methodologies and results studied over 20 years The book vividly demonstrates how the concept of uncertainty should be incorporated in a rigorous manner during the process of designing real world structures The necessity of anti optimization approach is first demonstrated then the anti optimization techniques are applied to static dynamic and buckling problems thus covering the broadest possible set of applications Finally anti optimization is fully utilized by a combination of structural optimization to produce the optimal design considering the worst case scenario This is currently the only book that covers the combination of optimization and anti optimization It shows how various optimization techniques are used in the novel anti optimization technique and how the structural optimization can be exponentially enhanced by incorporating the concept of worst case scenario thereby increasing the safety of the structures designed in various fields of engineering a

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increasing the safety of the structures designed in various fields of engineering [Dramatic Effect of Cross-Correlations in Random Vibrations of Discrete Systems, Beams, Plates, and Shells](#) Isaac Elishakoff,2020-04-11 This volume explains the dramatic effect of cross correlations in forming the structural response of aircraft in turbulent excitation ships in rough seas cars on irregular roads and other dynamic regimes It brings into sharp focus the dramatic effect of cross correlations often neglected due to the analytical difficulty of their evaluation Veteran author Professor Isaac Elishakoff illustrates how neglect of cross correlations could result in underestimation of the response by tens or hundreds of percentages the effect of the random vibrations of structures main elements including beams plates and shells

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**Division** ,2007 **Computer Aided Optimum Design of Structures V** Santiago Hernández,S. Hernández,C. A. Brebbia,1997 Containing the proceedings of the 5th International Conference on Computer Aided Optimum Design of Structures this volume looks at recent advances in structural optimization and demonstrates how optimization can best be applied to engineering practice **Journal of Mechanical Design** ,2008 **AIAA Journal** American Institute of Aeronautics and Astronautics,2007 *Proceedings of the American Society for Composites ... Technical Conference* ,1999 **Proceedings of the ... ASME Design Engineering Technical Conferences** ,2003 **Uncertainty** H. G. Natke,Yakov Ben-Haim,1997 Uncertainty influences the individual as well as society so it is important to enhance our understanding of uncertainty First of all do we all agree on a unique definition of uncertainty in the natural and technological worlds Secondly how can we model uncertainty Is it purely a state of mind the lack of complete knowledge or is it a phenomenon in its own right What heuristic and mathematical models are available What types of questions about uncertainty can be formulated What questions can be realistically answered Do scholars in diverse fields agree on these issues These and other questions are addressed by 20 scholars from mechanical civil electrical material aerospace and ocean engineering from applied mathematics economics industrial engineering and operations research control theory geodesy systems science and philosophy *Robust Design Optimization of Structures Under Uncertainties* Zhan Kang,2005 **Mathematical Reviews** ,2005 **Reliability and Robust Design in Automotive Engineering 2006** ,2006 Collection of papers from the Reliability Robust Design in Automotive Engineering session of the SAE 2006 World Congress held April 3 6 in Detroit Michigan **Computer Aided Optimum Design of Structures VI** Santiago Hernández,Alain J. Kassab,C. A. Brebbia,1999 In this text researchers from research centres and industry present current advances in structural optimization The 35 papers include the following topics shape and topology optimization optimal control advances in numerical optimization and emergent applications of design optimization *A Collection of Technical Papers* ,2001 **SME Technical Paper** Society of Manufacturing Engineers,2003 **Engineering Structures Under Extreme Conditions** A. Ibrahimbegović,Boštjan Brank,2005 Presently there is a strong need for better understanding of the limits of the multi scale and multi physics methodology in terms of its practical value for modeling the behavior of a given engineering structure regarding the solution cost result interpretation and model reliability The issues concerning the formulation of a multi physics problem capturing the different scales in the solution and providing error estimates and bounds on the computed solution should all be examined Another key issue in that sense concerns our ability to bring these advances in multi scale and multi physics nonlinear analysis to bear upon the solution of practically unlimited new capabilities of achieving the optimal design of structures under extreme conditions In other words the necessity for introducing a refined modeling approach is not only created by available computational tools but more importantly to provide a better insight into any potential weakness of a structural system on hand and thus achieve a more economical design requirements of the market economies where in a

number of very competitive industrial sectors the need for economic design leads naturally towards the criteria based on ultimate limit state of a particular structural system on hand This book allows exchange of the ideas on advanced computational models and techniques applicable to interdisciplinary coupled and interaction problems which are governing the complex behavior of engineering structures

**Proceedings of the First World Congress of Structural and**

**Multidisciplinary Optimization** Niels Olhoff,G. I. N. Rozvany,1995 Hardbound The First World Congress of Structural and Multidisciplinary Optimization WCSMO 1 was held in Goslar Lower Saxony Germany from 28 May to 2 June 1995 Its aim was to bring together at a single international meeting researchers and practitioners in the field of structural optimization This aim was met and these proceedings contain contributed papers presented at WCSMO 1 demonstrating the strong activity recent advances and increasing importance of the field of optimum design The book facilitates overview and easy access to these papers by categorizing them under 26 topics of modern optimization and by providing author and keyword indices

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