

Adali, S.; Richter, A.; Verijenko, V. E.

Non-probabilistic modelling and design of sandwich plates subject to uncertain loads and initial deflections. (English) Zbl 0899.73218

Int. J. Eng. Sci. 33, No. 6, 855-866 (1995).

Summary: Analysis and design of simply supported sandwich plates are given under uncertain loading and initial conditions by means of convex modelling. The transverse load and initial conditions are allowed to vary arbitrarily around their average values, but the uncertain components of these functions are required to be bounded in L_2 norm and expressed using a finite number of terms. The effect of uncertainties in loading and initial conditions on bending and design are investigated and the least favourable deflections and the corresponding uncertainty functions are determined. The design problem involves the computation of the minimum thickness of the surface layers such that the least favourable deflection does not exceed a given bound under a specified level of uncertainty in loading and/or initial conditions. Design for minimum thickness is given subject to buckling and material failure constraints.

MSC:

74K20 Plates

74E30 Composite and mixture properties

Cited in **2** Documents

Full Text: [DOI](#)

References:

- [1] Elishakoff, I., Probabilistic Methods in The Theory of Structures (1983), Wiley-Interscience: Wiley-Interscience New York · [Zbl 0572.73094](#)
- [2] Ben-Haim, Y.; Elishakoff, I., Convex Models of Uncertainty in Applied Mechanics (1990), Elsevier: Elsevier Amsterdam, The Netherlands · [Zbl 0703.73100](#)
- [3] Ben-Haim, Y.; Elishakoff, I., *ASME J. Appl. Mech.*, 56, 403 (1989)
- [4] Elishakoff, I.; Ben-Haim, Y., *Int. J. Struct. Safety*, 8, 103 (1990)
- [5] Ben-Haim, Y., *ASME J. Appl. Mech.*, 60, 683 (1992)
- [6] Elishakoff, I.; Elisseff, P.; Glegg, S. A.L., *AIAA JI*, 32, 843 (1994)
- [7] Givoli, D.; Elishakoff, I., *ASME J. Appl. Mech.*, 59, S65 (1992)
- [8] Sadek, I. S.; Sloss, J. M.; Adali, S.; Bruch, J. C., *Math. Comp. Modell.*, 18, 59 (1993)
- [9] Ben-Haim, Y., *Int. J. Engng Sci.*, 31, 989 (1993)
- [10] Elishakoff, I.; Colombi, P., *Comp. Meth. Appl. Mech. Engng*, 104, 187 (1993)
- [11] Adali, S., Convex and fuzzy modellings of uncertainties in the optimal design of composite structures, (Proceedings of IUTAM Symposium on Optimal Design with Advanced Materials. Proceedings of IUTAM Symposium on Optimal Design with Advanced Materials, Lyngby, Denmark (1992))
- [12] Faupel, J. H., *Engineering Design* (1964), Wiley: Wiley New York
- [13] Macdonald, D. C.; Chen, Y. T., *Fibre Sci. Technol.*, 10, 65 (1977)
- [14] Kelly, P. J.; Weiss, W. L., *Geometry and Convexity: A Study in Mathematical Methods* (1979), Wiley: Wiley New York · [Zbl 0409.52001](#)
- [15] Ding, Y., *Comp. Struct.*, 25, 51 (1987)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.