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Ankündigung eines Gastvortrages

im Rahmen des Mechanik Seminars

zum Thema

Buckling and Vibrations of Structures using a Finite Element Based Perturbation Method

Ort: **Technische Universität Berlin, Gebäude MS**

Raum MS 107

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Gastdozent:

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Abstract:

A finite element based perturbation approach is presented for geometrically nonlinear analysis of thin-walled structures. Geometrically nonlinear static and dynamic analyses are essential for this class of structures. Nowadays nonlinear analysis of thin-walled shell structures is often done using finite element based incremental-iterative procedures for static analysis or using time integration for dynamic analysis. However, standard finite element based nonlinear analysis of many practical structures is still computationally expensive and not suitable for repeated runs necessary for a design and optimization process, and also the interpretation of the results can be difficult.

Koiter introduced a perturbation approach for static buckling analysis which captures the characteristics of the nonlinear behavior of the structure around a bifurcation point. The outcome is a computationally inexpensive reduced order model providing a good insight in the buckling behavior of the structure. The extension of this perturbation approach to dynamic buckling analysis, and the use of a similar perturbation method for nonlinear vibration analysis of structures are discussed.A finite element implementation of these perturbation approaches is presented. The effectiveness of the approach is illustrated through applications in the area of buckling, dynamic buckling, and nonlinear vibrations of composite shells.