Univ. Prof. Dr. rer. nat. Wolfgang H. MÜLLER **09.03.2011**

Technische Universität Berlin
Fakultät V – Institut für Mechanik
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Sekr. MS 2, Einsteinufer 5, 10587 Berlin

Ankündigung eines Gastvortrages

im Rahmen des Mechanik Seminars

zum Thema

Cellular buckling in I-beams under pure bending

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Gastdozent:

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Abstract:

Beams made from thin-walled elements, while very efficient in terms of the structural strength and stiffness to weight ratios, are highly susceptible to complex instability phenomena. The interaction between global lateral-torsional buckling and local buckling of a flange plate suggests that failure will localize into the centre. A variational formulation, leading to a system of nonlinear differential equations subject to integral constraints, describes the post-buckling response.
These are solved by numerical continuation techniques, such that the response far into the unstable post-buckling range can be portrayed.
Cellular buckling, which occurs as a result of progressive destabilization and restabilization, is theoretically predicted for the first time. The destabilization is attributed to the interaction of buckling modes and the restabilization is attributed to the membrane stretching that is inherent in plate post-buckling phenomena. Solutions from the model are compared very favourably with a series of recently conducted tests which also exhibit the theoretically predicted sequence of localized followed by cellular buckling.