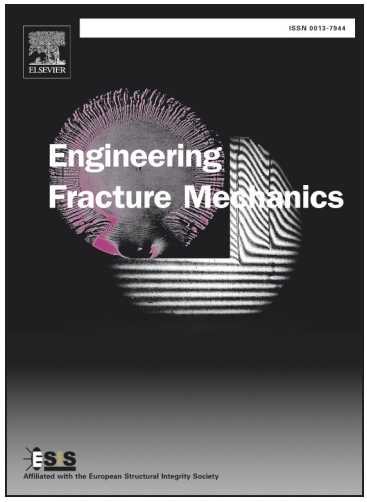

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Interaction effect of cracks on flutter and divergence instabilities of cracked beams under subtangential forces

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Abstract

The dynamic stability of cracked beams under conservative and non-conservative forces and for various boundary conditions is investigated. In order to extend the formulation of a previous paper by the first two authors, here doubly cracked Euler-Bernoulli beams subjected to triangularly distributed subtangential forces are considered. Cracked sections are modelled through the theory of fracture mechanics and involve a line-spring stiffness matrix. The finite element method (FEM) is used to perform numerical computations. The stability maps, obtained from the eigenvalue analysis, define the divergence and flutter domains. The proposed procedure can also tackle general multi-cracked beams.

Keywords: non-conservative, stability, interaction effect, crack, finite element

Nomenclature

p_α	sub-tangential force
p_v	conservative component of the sub-tangential force
p_t	non-conservative component of the sub-tangential force

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