Modal Characteristics of Planar Multi-story Frame Structures

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ABSTRACT
In linear system, in-plane motions are decoupled from out-of-plane motions for planar frame structures. A theoretical method is proposed that permits the efficient calculations of modal characteristics of planar multi-story frame structures. There are beam components for a planar m-story frame structure. By analyzing the transverse and longitudinal motions of each component simultaneously and considering the compatibility requirements across each frame joint, the undetermined variables of the entire m-story frame structure system can be reduced to six, regardless of the number of stories, and that can be determined by the application of the boundary conditions. The main feature of this method is to decrease the dimensions of the matrix involved in the finite element methods and certain other analytical methods.

Keywords: multi-story planar frame structures, eigensolutions, transfer matrix, mode shapes

REFERENCES