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Free Vibration Analysis of Gabled Frame Considering Elastic Supports and Semi-Rigid Connections

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Abstract : Free vibration analysis of a gabled frame with elastic support and semi-rigid connections is performed by using a program in OpenSees software. Natural frequencies and mode shape details of frame are obtained for two states, which are semi-rigid connections and elastic supports, separately. The members of this structure are analyzed as a prismatic nonlinear beam-column element in software. The mass of structure is considered as two equal lumped masses at the head of two columns in horizontal and vertical directions. Note that the degree of freedom, allocated to all nodes, is equal to three. Furthermore, the mode shapes of frame are achieved. Conclusively, the effects of connections and supports flexibility on the natural frequencies and mode shapes of structure are investigated.

Keywords : natural frequency, mode shape, gabled frame, semi-rigid connection, elastic support, OpenSees software
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