EVALUATION OF RESULTANT PLASTICITY AND FIBER BEAM-COLUMN ELEMENTS FOR THE SIMULATION OF THE NONLINEAR RESPONSE OF STEEL STRUCTURES

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Abstract: This paper evaluates the accuracy and computational efficiency of three beam-column elements for the simulation of the global and local response of steel buildings under monotonic and cyclic loading conditions. The first element is a resultant plasticity model with polynomial yield surface that accounts for the interaction between axial force and biaxial bending moment, the second is a fiber beam-column element with very fine discretization of the wide flange cross section, and the third is a fiber beam-column element with a small number of fibers for optimum accuracy and computational efficiency under biaxial response (reduced discretization).

Key words: nonlinear analysis, resultant plasticity, fiber beam-column element, cross-section discretization.

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