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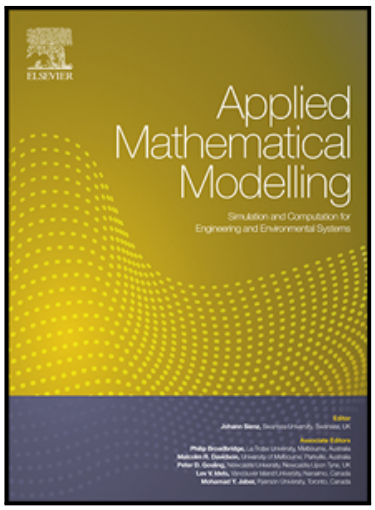

Bending, second-order and buckling analysis of non-prismatic beam-columns by differential quadrature method

Behnam Golfam , Ebrahim Nazarimofrad , Seyed Mehdi Zahrai

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Highlight

- Using GDQ method to solve beam-column differential equation
- Using SBCGS technique to perform second-order and buckling analysis of beam-columns
- Analysis of non-prismatic beam-columns with different boundary conditions
- Beam-columns with different tapered ratios under end or distributed axial load
- Rigorous second-order analysis of beam-column member just by one iteration

Bending, second-order and buckling analysis of non-prismatic beam-columns by differential quadrature method

Behnam Golfam[a], Ebrahim Nazarimofrad[a], Seyed Mehdi Zahrai[b*]

[a]Civil Engineering Department, Bu-Ali Sina University, Hamedan, Iran

[b]Center of Excellence for Engineering & Management of Civil Infrastructures, School of Civil Engineering, The University of Tehran, P.O. Box 11155-4563, Tehran, Iran

[*]Corresponding author. E-mail addresses: behnam.golfam@gmail.com (B. Golfam), enazarimofrad@yahoo.com (E. Nazarimofrad), mzahrai@ut.ac.ir (S.M. Zahrai).

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ABSTRACT

While classical matrix and finite-element methods are very powerful for structural analysis, some essential shortcomings such as not placing the transverse and axial loads in their actual locations on a member, as well as necessity of a large number of iterations or subdivisions of the structural element for exact second-order analysis should be still taken into consideration. To overcome such drawbacks, Generalized Differential Quadrature (GDQ) is a new semi-numerical method for analysis of the engineering problems. The aim of this paper is to use SBCGS (Satisfaction of Boundary Conditions in the General Solution) technique to perform second-order and buckling analysis of beam-columns under different geometrical and boundary conditions by solving beam- column differential equation in matrix form. In addition, a comparison is made between the results of SBCGS technique and those of other methods available in literature for the analysis of non-prismatic beam-columns with different tapered ratios when subjected to end or distributed axial loads.

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