Interval local buckling analysis of concrete-filled steel tubular column considering creep and shrinkage

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This paper presents a theoretical analysis for the long-term elastic local buckling of concrete-filled steel tubular (CFST) columns by accounting for the uncertainties of creep and shrinkage of the concrete core. An interval analytical model based on the algebraically tractable age-adjusted effective modulus method is proposed for the uncertain local buckling analysis of CFST columns under sustained loading. An interval finite element method based on perturbation method to predict the long-term behavior of CFST columns is developed. The results obtained from the mathematical model and interval FE model were compared with experimental results for columns under sustained loads. It is observed that the proposed model predicts well the columns and beams behavior compared with the experimental results.

Keywords: local buckling, interval analysis, creep, shrinkage, perturbation method