Optimum Design of Grillage Systems Using Firefly Algorithm Optimization Method

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Abstract : In this study, firefly optimization based optimum design algorithm is presented for the grillage systems. Naming of the algorithm is derived from the fireflies, whose sense of movement is taken as a model in the development of the algorithm. Fireflies' being unisex and attraction between each other constitute the basis of the algorithm. The design algorithm considers the displacement and strength constraints which are implemented from LRFD-AISC (Load and Resistance Factor Design-American Institute of Steel Construction). It selects the appropriate W (Wide Flange)-sections for the transverse and longitudinal beams of the grillage system among 272 discrete W-section designations given in LRFD-AISC so that the design limitations described in LRFD are satisfied and the weight of the system is confined to be minimal. Number of design examples is considered to demonstrate the efficiency of the algorithm presented.