

Optimization of Reinforced Concrete Buildings According to the Algerian Seismic Code

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Abstract : Recent decades have witnessed significant efforts being made to optimize different types of structures and components. The concept of cost optimization in reinforced concrete structures, which aims at minimizing financial resources while ensuring maximum building safety, comprises multiple materials, and the objective function for their optimal design is derived from the construction cost of the steel as well as concrete that significantly contribute to the overall weight of reinforced concrete (RC) structures. To achieve this objective, this work has been devoted to optimizing the structural design of 3D RC frame buildings which integrates, for the first time, the Algerian regulations. Three different test examples were investigated to assess the efficiency of our work in optimizing RC frame buildings. The hybrid GWOPSO algorithm is used, and 30000 generations are made. The cost of the building is reduced by iteration each time. Concrete and reinforcement bars are used in the building cost. As a result, the cost of a reinforced concrete structure is reduced by 30% compared with the initial design. This result means that the 3D cost-design optimization of the framed structure is successfully achieved.

Keywords : optimization, automation, API, Malab, RC structures

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