Announcing the Final Examination of Tiancheng Wang for the degree of Master of Science

Time & Location: July 1, 2020 at 11:00 AM in Virtual Defense
https://ucf.zoom.us/j/9887827582?pwd=eVI4UE5mNDdmYmp0bEg5VTNnbzFNdz09
Title: Seismic Design Optimization of Steel Structures Using Genetic Algorithm

Current seismic codes do not incorporate a well-established methodology for the selection of passive dampers type and their topological distribution and properties along the height of structures. Achieving the intended performance is made more complicated when structures are subject to extreme events and operate well within their inelastic range. This thesis utilizes a self-organizing genetic algorithm (soGA) with probabilistic gene-by-gene crossover and an adaptive active ground motion subset scheme to efficiently find optimal designs of low-rise steel frames subject to large number of extreme ground motions. Different types of passive dampers were considered, while the steel frames were modeled using the modified Ibarra-Medina-Krawinkler deterioration model with bilinear hysteretic response. Optimal design topologies were identified for different types of dampers that satisfied predefined performance levels in terms of story drift and floor acceleration demand parameters. With the capability to consider an active ground motion subset scheme, the computational effort was significantly reduced without prohibiting soGA to find optimal design solutions that satisfy the performance levels for the full ground motion set.

Major: Civil Engineering

Educational Career:
Bachelor’s of Civil Engineering, BS, 2013, Guangxi University
Master’s of Civil Engineering, MS, 2017, Texas Tech University

Committee in Charge:
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Approved for distribution by Georgios Apostolakis, Committee Chair, on June 12, 2020.

The public is welcome to attend.