

Optimal Design of Concrete Shells by Modified Particle Community Algorithm Using Spinless Curves

Authors : Reza Abbasi, Ahmad Hamidi Benam

Abstract : Shell structures have many geometrical variables that modify some of these parameters to improve the mechanical behavior of the shell. On the other hand, the behavior of such structures depends on their geometry rather than on mass. Optimization techniques are useful in finding the geometrical shape of shell structures to improve mechanical behavior, especially to prevent or reduce bending anchors. The overall objective of this research is to optimize the shape of concrete shells using the thickness and height parameters along the reference curve and the overall shape of this curve. To implement the proposed scheme, the geometry of the structure was formulated using nonlinear curves. Shell optimization was performed under equivalent static loading conditions using the modified bird community algorithm. The results of this optimization show that without disrupting the initial design and with slight changes in the shell geometry, the structural behavior is significantly improved.

Keywords : concrete shells, shape optimization, spinless curves, modified particle community algorithm

Conference Title : ICTFCE 2020 : International Conference on Textile Fibers in Civil Engineering

Conference Location : Boston, United States

Conference Dates : April 23-24, 2020