

An approach based on the catenary equation to deal with static analysis of three dimensional cable structures

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Abstract-

In this paper a novel method to solve three dimensional cable structures based on the catenary equation is proposed. The method is a generalization of a previous engineering application to compute the initial equilibrium of railway overheads. The major contributions of this paper are: the extension of the previous engineering application to simulate arbitrary three dimensional cable structures; cable elasticity is incorporated into the formulation; and due to the fact that the method relies on the analytical catenary equations, high numerical efficiency is exhibited. In order to show the validity of the method, comparisons with several well reported cable structure problems are presented. The agreement between the proposed method and published results is excellent.

Index Terms- Cable structures; Catenary; Non-linear analysis

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