

On the solving of equilibrium problem for the soft network shell with a load concentrated at the point

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Abstract

A spatial equilibrium problem of a soft network shell in the presence of external point load concentrated at some point is considered. A network shell is understood to mean the shell which has as its strength basement the net formed by two families of mutually intersecting, absolutely flexible, elastic threads. It is supposed that functions describing physical relations in the threads are continuous, nondecreasing, and have the linear growth at infinity. The generalized problem in the form of operator equation in the Sobolev space is formulated. It is proved that the set of solutions of the generalized problem is non-empty, convex, and closed. The finite dimensional approximations of the problem are constructed and their convergence is investigated. To solve the problem, we used a two-layer iterative method. This method was realized numerically. The numerical experiments made for the model problems confirmed the efficiency of the iterative method.

Keywords

Finite dimensional approximations, Mathematical simulation, Point load, Soft network shell, Two-layer iterative method