SUVAT DHIRASEDH : OPTIMUM DESIGN OF PLANE TRUSSES.
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The development of an optimum design for plane trusses, including buckling effects of compression members, is presented in this thesis. Stress, displacement and side constraints are used as boundary terms to obtain size of members. The least weight or least volume of the structure, on the other hand, is used as an objective term.

In the mathematical model, stress and displacement constraints are generated by estimating changes in bar forces and nodal displacement compared to changes in bar areas. The approximation employs first-order Taylor's series expansion. Simplex algorithm is then used to obtain values of the design variables.

The solution is obtained by first assuming member sizes and then performing a structural analysis. The variables thus obtained are scaled to get feasible values. A mathematical model is then generated and the inequality equations are solved by using the simplex method to get new member sizes. The iterative procedure is applied until the solution converges to an optimal point.

The proposed method can be applied to both determinate and indeterminate plane trusses. For indeterminate plane trusses, the total volume obtained is approximately 10-14 % less than that obtained by the usual design procedure. For determinate plane trusses, however, both methods yield equal total volume.