B-Tech. Project Report

Topological Optimization of Truss structures using Genetic Algorithm

Under the guidance of:

Prof. Baidurya Bhattacharya
Department of Civil Engineering
IIT Kharagpur

Submitted by:

Robi Pramanik
(12CE10040)

Department of Civil Engineering
IIT Kharagpur

ABSTRACT

The area of design optimization, especially structural optimization, has been and continues to be an active area of research. There are several reasons for the interest, including the need to handle a wider class of problems, to include realistic definitions of design variables, to find techniques to locate the global optimum, and to improve the efficiency of the numerical procedure. This report contains an application of the methods of Genetic Algorithm (GA) to the topological optimization of truss.

KEYWORDS: Topological Optimization, Genetic Algorithm, Truss Structures

INTRODUCTION

The work of optimization of truss falls under two broad disciplines.

- Topological Optimization
- Shape Optimization

Topological Optimization: It starts with a basic shape of a truss and tries to achieve optimality by relocating the free nodes.

Shape Optimization: It selects a set of nodes from a population and adds members to them trying to reach optimality.

I have worked on topological optimization, using the concepts of stochastic programming, operational research, genetic and evolutionary algorithm to create an optimal truss for a given loading and support condition.