



Existing : Computer Application in Aerospace Engineering (3-0-0 3)

Numerical solutions of (a) linear and non-linear algebraic equations, (b) ordinary differential equations and (c) partial differential equations.

Elements of modern artificial intelligence (AI) related techniques. Introduction to Genetic Algorithms and Artificial Neural Nets. Examples related to Aerospace Engineering.

SCP Version: Computer Application in Aerospace Engineering (3-0-0 3)

Numerical solutions of (a) linear and non-linear algebraic equations, (b) ordinary differential equations and (c) partial differential equations.

Optimization techniques with computer applications.

ENGINEERING APPLICATIONS OF OPTIMIZATION

- 1.** Design of aircraft and aerospace structures for minimum weight
- 2.** Finding the optimal trajectories of space vehicles
- 3.** Design of civil engineering structures such as frames, foundations, bridges, towers, chimneys, and dams for minimum cost
- 4.** Minimum-weight design of structures for earthquake, wind, and other types of random loading
- 5.** Design of water resources systems for maximum benefit
- 6.** Optimal plastic design of structures
- 7.** Optimum design of linkages, cams, gears, machine tools, and other mechanical components
- 8.** Selection of machining conditions in metal-cutting processes for minimum production cost
- 9.** Design of material handling equipment, such as conveyors, trucks, and cranes, for minimum cost
- 10.** Design of pumps, turbines, and heat transfer equipment for maximum efficiency

- 11.** Optimum design of electrical machinery such as motors, generators, and transformers
- 12.** Optimum design of electrical networks
- 13.** Shortest route taken by a salesperson visiting various cities during one tour
- 14.** Optimal production planning, controlling, and scheduling
- 15.** Analysis of statistical data and building empirical models from experimental results to obtain the most accurate representation of the physical phenomenon
- 16.** Optimum design of chemical processing equipment and plants
- 17.** Design of optimum pipeline networks for process industries
- 18.** Selection of a site for an industry
- 19.** Planning of maintenance and replacement of equipment to reduce operating costs
- 20.** Inventory control
- 21.** Allocation of resources or services among several activities to maximize the benefit
- 22.** Controlling the waiting and idle times and queueing in production lines to reduce the costs
- 23.** Planning the best strategy to obtain maximum profit in the presence of a competitor

24. Optimum design of control systems

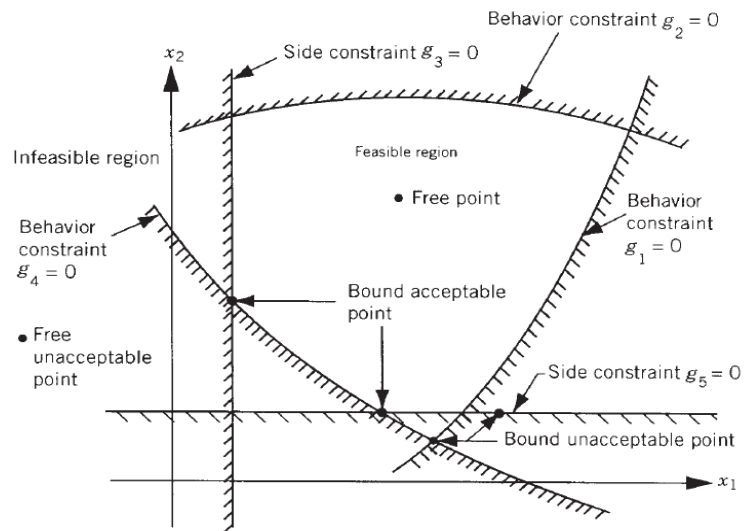


Figure 1.4 Constraint surfaces in a hypothetical two-dimensional design space.

