

Operations Research

Code:MSM5027

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3

System of linear equations and inequations - Convex functions - formulation of linear programming problem - Theory of simplex method - Simplex Algorithm - Charnes M - Method - Two phase method Computational complexity of simplex Algorithm - Karmarkars Algorithm. Duality in linear programming Dual simplex method- Sensitivity analysis- Bounded variable problem - Transportation problem - Integrity property - MODI Method - Degeneracy - Unbalanced problem Assignment problem - Development of Hungarian method - Routing problems

Nature of Dynamic programming problem - Bellmanns optimality principle - Cargo loading problem - Replacement problem - Multistage production planning and allocation problem - Rectangular Games - Two ,persons zero sum games - Pure and mixed strategies- 2 n and m 2 games - Relation between theory of games and linear programming Critical path analysis-Probability consideration in PERT. Distinction between PERT and CPM. Resources Analysis in networking scheduling - Time cost optimization algorithm - Linear programming formulation - Introduction to optimization softwares. Non -linear programming problems.

References

1. M.S. Bazaara, J.J. Jarvis and H.D. Sherali, Linear programming and Network flows , John Wiley, 2nd Edition, 2009.
2. M.S. Bazaara, H.D. Sherali and C.M. Shetty, Nonlinear programming Theory and Algorithms, John Wiley, 2nd Edition, 12006.
3. Taha, H. A., Operation Research- An Introduction , Prentice Hall India, 7th Edn., 2006
4. Hadley, G., Linear Programming, Narosa Book Distributors, 2002.

Optimization Techniques and Control Theory

Code:MSM5028

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3

Functions taking values in extended reals, proper convex functions, Subgradients, Directional derivative, Conjugate functions, Conjugate duality. Gradient descent method, gradient projection method, Newton's method, Conjugate gradient method.

Dynamic programming, Bellman's principle of optimality, Allocation problem Cargo load problem, Stage coach problem.

Optimal control problem, Classical approach to solve variational problem, Pontryagin's maximum principle, Dynamic programming and maximum principle.

References

1. M.Avriel, Nonlinear Programming: Analysis and Methods, Dover Publications, New York, 2012.
2. O.Guler, Foundation of Optimization, Springer, 2010.
3. F.Hollier, G.J.Lieberman, Introduction to Operations Research, McGraw-Hill College, 2009.
4. D.Liberzon, Calculus of variation and Optimal Control Theory: A Concise Introduction, Princeton University Press, 2012.