

OPTIMIZATION TECHNIQUES

Quadratic Programming: Basic Concepts - Convex function and its properties, Method of Lagrange multiplier, Karush-Kuhn-Tucker optimality conditions, Wolfe's method

Dynamic Programming: Multistage decision processes, Recursive nature of computations, Forward and Backward recursion, Bellman's principle of optimality, Selective dynamic programming applications involving additive and multiplicative separable returns for objective as well as constraint functions, Problem of dimensionality.

Goal Programming: Weighted and pre-emptive goal programming, graphical solution

Decision Analysis: Decision making under risk – Decision tree analysis, Posterior (Baye's) probabilities, Decision under uncertainty- criterion of pessimism, criterion of optimism, Laplace criterion, criterion of realism, criterion of regret.

WEEK – WISE LAYOUT

Convex function and its properties

[2]: Chapter 7: Pages 255-267

Method of Lagrange multiplier, Karush-Kuhn-Tucker optimality conditions, Wolfe's method.

[2]: Chapter 7: Pages 276-292 (Proofs of Theorem 7.7.1 and 7.7.2 not to be done)

Multistage decision processes, Recursive nature of computations, Forward and Backward recursion, Bellman's principle of optimality.

[1]: Chapter 10: Pages 380-385

Selective dynamic programming applications involving additive and multiplicative separable returns for objective as well as constraint functions, Problem of dimensionality

[1]: Chapter 10: Pages 386-404, 408-410

Weighted and pre-emptive goal programming, graphical solution

[1]: Chapter 8: Pages 323-331.

[2]: Chapter 13: Pages 495-502, 507-508

Decision making under risk – Decision tree analysis, Posterior (Baye's) probabilities

[1]: Chapter 13: Pages 486-497

Decision under uncertainty- criterion of pessimism, criterion of optimism, Laplace criterion, criterion of realism, criterion of regret

[1]: Chapter 13: Pages 500-505

Text Book Readings:

1. **Hamdy A. Taha:** Operations Research-An Introduction, Prentice Hall, 8th Edition, 2008
2. **S. Chandra, Jayadeva, Aparna Mehra:** Numerical Optimization with Application, Narosa Publishing House, 2009

Additional Readings:

1. **Ravindran, D. T. Phillips and James J. Solberg:** Operations Research-Principles and Practice, Wiley India Edition, 2009
2. **S.M. Sinha :** Mathematical Programming-Theory and Methods, Elsevier Science, 1st Edition, 2006
3. **F.S. Hillier and G.J. Lieberman :** Introduction to Operations Research-Concepts and Cases, 9th Edition, Tata Mc Graw Hill, 2010