

In the name of God

Advanced Operation Research Exam

Master of Sciences

Quchan University of Advanced Technology

Time Allowed: 2.5 hours

Note: Different questions have different marks.

Q1: Consider the following linear programming problem.

$$\begin{aligned} &\text{Minimize } CX \\ &AX=b, \\ &X>0. \end{aligned}$$

In the absence of degeneracy, prove that a point is a basic feasible solution if and only if it is an extreme point.

Q2: Assume that $B = \{a_1, \dots, a_j, \dots, a_n\}$ is a basis of E^n and $\hat{B} = \{a_1, \dots, \hat{a}, \dots, a_n\}$. What is the condition that guarantees \hat{B} still form a basis?

Q3: Consider the following linear programming problem.

$$\begin{aligned} &\text{Minimize } CX \\ &AX=b, \\ &X>0. \end{aligned}$$

Discuss a procedure that moves from one basis to an adjacent basis by introducing one variable into the basis, and removing another variable from the basis. (Derive the optimality and feasibility conditions)

Good luck

*Examiner: Dr. Farhadinia
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