Advance Engineering Mathematics(AEM)

Branch :Information Technology, Sem:IIIrd

Dr. Kashish Parwani

Associate Professor, Dept. of Mathematics

JECRC, Sitapura Jaipur

Vision of the Institute

To become a renowned centre of outcome based learning, and work towards academic, professional, cultural and social enrichment of the lives of individuals and communities

Mission of the Institute

- Focus on evaluation of learning outcomes and motivate students to inculcate research aptitude by project based learning.
- Identify, based on informed perception of Indian, regional and global needs, the areas of focus and provide platform to gain knowledge and solutions.
- Offer opportunities for interaction between academia and industry.
- Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders may emerge.

Course Outcomes

- **CO1:** To learn the concepts and principles of Random variables and Probability distribution
- **CO2:** To learn the formulation of different mathematical problems into optimization problems.
- **CO3:** Apply the principles of optimization using differential calculus.
- **CO4:** To understand the concepts of Linear Programming

Solve the following LPP by Two Phase Method

Max. $Z = 5x_1+8x_2$

Sub. to

$$3x_1 +2x_2 \geq 3$$

$$x_1+4x_2 \geq 4$$

$$x_1+x_2 \leq 5$$

$$x_1, x_2 \geq 0$$

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Phase 1 : The Problem of phase 1 is

Max. $Z^1 = 0.x_1 + 0.x_2 + 0.S_1 + 0.S_2 - 0.S_3 - 0S_4 + 0S_5$

s.to

$$3x_1 + 2x_2 - S_1 + S_3 = 3$$

$$x_1 + 4x_2 - S_2 + S_4 = 4$$

$$x_1 + x_2 + S_5 = 5$$

$$x_1, x_2, S_1, S_2, S_3, S_4, S_5 \geq 0$$

Table 1.

C_B	B.v.	C_j / X_B	0 / x_1	0 / x_2	0 / s_1	0 / s_2	-1 / s_3	-1 / s_4	0 / s_5	Mini Ratio
-1	s_3	3	3	2	-1	0	1	0	0	3/2
-1	S_4	4	1	4	0	-1	0	1	0	4/4
0	S_5	5	1	1	0	0	0	0	1	5/1
	Z_J	$-C_J$	-4	-6	1	1	0	0	0	
				↑				↓		

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Table 2.

C_B	B.v.	C_j / X_B	0 / x_1	0 / x_2	0 / s_1	0 / s_2	-1 / s_3	0 / s_5	Mini Ratio
-1	s_3	1	5/2	0	-1	1/2	1	0	2/5
0	X_2	1	1/4	1	0	-1/4	0	0	4
0	S_5	4	3/4	0	0	1/4	0	1	16/3
	Z_J	$-C_J$	-5/2	0	1	-1/2	0	0	
			↑				↓		

Table 3.

C_B	B.v.	X_B	x_1	x_2	s_1	s_2	s_5
0	X_1	2/5	1	0	-2/5	1/5	0
0	X_2	9/10	0	1	1/10	-3/10	0
0	S_5	37/10	0	0	3/10	1/10	1
			0	0	0	0	0

Phase I ends.

Phase II.

		Cj	5	8	0	0	0	Mini
C_B	B.v.	X_B	x_1	x_2	s_1	s_2	s_5	Ratio
5	X_1	2/5	1	0	-2/5	1/5	0	2/5*5/1 =2
8	X_2	9/10	0	1	1/10	-3/10	0	-
0	S_5	37/10	0	0	3/10	1/10	1	37
			0	0	-6/5	-7/5	0	
			↓			↑		

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Phase II, Table 2.

C_B	B.v.	X_B	x_1	X_2	s_1	s_2	s_5	Mini Ratio
0 8 0	S_2 X_2 S_5	2 3/2 7/2	5 3/2 -1/2	0 1 0	-2 -1/2 1/2	1 0 0	0 0 1	- - 7
			7	0	-4		0	
					↑		↓	

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Phase II, Table 3.

C_B	B.v.	X_B	x_1	X_2	s_1	s_2	s_5
0 8 0	S_2 X_2 S_1	16 5 7	3 1 -1	0 1 0	0 0 1	1 0 0	4 1 2
			3	0	0	0	8

Optimal Solution is

$X_1=0$, $X_2=5$ and $Z_{max}=40$

Thank You

Dr. Kashish Parwani
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