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Lecture
Lecture questions due Oct 18, 2016 at 19:30 IST

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Problem 1

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PART A

1/1 point (graded)

Consider the NLP formulation below

- Decision variables: x_1, x_2
- Objective value: z

Formulation:

$$\left.\begin{array}{lll} \min & 100(x_2 - (\frac{1}{2} + x_1)^2)^2 + (1 - x_1)^2 & \\ \text{s.t.:} & & \\ (1) & & x_1 \geq 0 \\ (2) & & x_2 \geq 0 \end{array}\right\}$$

What is the (rounded) optimal solution?

- $x_1 = 1, x_2 = 0$
  $z = 506.25$

- Exit Survey

- [ ] $x_1 = 0, x_2 = 1$
  $z = 57.25$

- [ ] $x_1 = 2.25, x_2 = 1$
  $z = 4308.203$

- [ ] $x_1 = 1, x_2 = 1$
  $z = 156.25$

- [x] $x_1 = 1, x_2 = 2.25$
  $z = 0$

✔

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

PART B

1/1 point (graded)

Consider the NLP formulation below

- Decision variables: x_1, x_2, x_3
- Objective value: z

Formulation:

$$\left.\begin{array}{rl} \textbf{min} & (2x_1+3x_2+4x_3)^2 \\ \textbf{s.t.:} & \\ (1) & 10x_1+11x_2+12x_3 \leq 60 \\ (2) & 21x_1+22x_2+23x_3 \leq 150 \\ (3) & 21x_1+22x_2-23x_3 \geq 110 \\ (4) & 19x_1+34x_2-32x_3 = 180 \end{array}\right\}$$

What is the (rounded) optimal solution?

- [ ] $x_1 = 0, x_2 = 5.371, x_3 = 0.079$
  $z = 269.912$
- [ ] $x_1 = 0, x_2 = 0, x_3 = 0$
  $z = 0$
- [ ] $x_1 = 5.294, x_2 = 0, x_3 = 0$
  $z = 112.106$
- [x] $x_1 = 0, x_2 = 5.294, x_3 = 0$
  $z = 252.249$
- [ ] $x_1 = -\infty, x_2 = 0, x_3 = 0$
  $z = -\infty$

✔

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

PART C

1/1 point (graded)

Consider the maximization of the same NLP formulation

- Decision variables: x_1, x_2, x_3
- Objective value: z

Formulation:

$$\left.\begin{array}{rl} \textbf{max} & (2x_1 + 3x_2 + 4x_3)^2 \\ \textbf{s.t.:} & \\ (1) & 10x_1 + 11x_2 + 12x_3 \leq 60 \\ (2) & 21x_1 + 22x_2 + 23x_3 \leq 150 \\ (3) & 21x_1 + 22x_2 - 23x_3 \geq 110 \\ (4) & 19x_1 + 34x_2 - 32x_3 = 180 \end{array}\right\}$$

What is the rounded optimal solution?

☑ $x_1 = 0, x_2 = 5.368, x_3 = 0.079$
$z = 269.651$

- [ ] $x_1 = 0.079, x_2 = 0, x_3 = 0$
  $z = 0.025$

- [ ] $x_1 = 0, x_2 = 5.368, x_3 = 0$
  $z = 259.339$

- [ ] $x_1 = 0, x_2 = 5.294, x_3 = -\infty$
  $z = \infty$

- [ ] $x_1 = -\infty, x_2 = 0, x_3 = 0$
  $z = \infty$

✔

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)