X

Unit 7 - Week 6

Week 6 Assignment 6

The due date for submitting this assignment has passed. **Due on 2018-09-19, 23:59 IST.**
As per our records you have not submitted this assignment.

1) ***1 point***

A Constrained NLP with inequality constraints can be solved with the help of:

i. Lagrange Multipliers
ii. Karush-Kuhn-Tucker Conditions (KKT Conditions)
iii. Both Lagrange Multipliers and KKT Conditions
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
ii.

2) ***1 point***

While solving a Constrained NLP with equality constraints, Number of Lagrange multipl will be dependent on:

i. Number of decision variables
ii. Number of equality constraints
iii. Degree of nonlinearity
iv. None of the above

- i.
- ii.
- iii.
- iv.

Linear constraints can be considered as:

i. Convex function only
ii. Concave function only
iii. Both convex and concave
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii.

4) ***1 point***

Objective function can have a global maximum, if the objective function is a:

i. Convex function
ii. Concave function
iii. Linear function
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
ii.

5) ***1 point***

An NLP can be termed as a convex program, if:

i. Objective function and constraints are concave
ii. Objective function and constraints are convex
iii. Objective function is convex but constraints are concave
iv. Objective function is concave but constraints are convex

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv.

6) ***1 point***

Consider the NLP with equality constraint: Max $f(x) = 2x1+3x2$ s.t. $g(x) = x1^2+x2^2 = 6$
At the optimum point, we can observe this about Gradient of $f(x)$ and Gradient of $g(x)$:

i. Gradient of $f(x)$ is parallel to Gradient of $g(x)$
ii. Gradient of $f(x)$ is perpendicular to Gradient of $g(x)$
iii. Gradient of $f(x)$ is neither perpendicular nor parallel to Gradient of $g(x)$
iv. Nothing can be concluded about the gradients

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
i.

7) ***1 point***

Consider the NLP with equality constraint: Max $f(x) = 2x1+3x2$ s.t. $g(x): x1^2+x2^2 = 6$
If 'a' is the Lagrange Multiplier, then the Lagrange Function for the problem will be:

i. $L(x, a) = 2x1+3x2 - a(x1^2+x2^2 - 6)$
ii. $L(x, a) = x1^2+x2^2 - a(2x1+3x2)$
iii. $L(x, a) = 2x1+3x2 - a(x1^2+x2^2) - 6$
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
i.

8) ***1 point***

Consider the NLP with equality constraint: Max $f(x) = 2x1+3x2$ s.t. $g(x) = x1^2+x2^2 = 6$
'a' is the Lagrange Multiplier. L(x, a) is the Lagrange Function. Necessary Conditions for optimality will be obtained by:

i. Differentiating L(x, a) with respect to *x1* only
ii. Differentiating L(x, a) with respect to *x1* as well as with respect to *x2*
iii. Differentiating L(x, a) with respect to *x1*, *x2*, and also with respect to 'a'
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.

Score: 0

Accepted Answers:

iii.

9) ***1 point***

While solving the Constrained NLP: Max $f(r, h) = -6.28r^2 - 6.28\,rh$ s.t. $3.14r^2h = 100$
Where r is the radius of a right circular cylinder and h is the height.
If 'a' is a Lagrange Multiplier, then the Lagrange Function will be:

i. $L(r, h, a) = -6.28r^2 - 6.28rh - a(2\ln r + \ln h + \ln 3.14)$
ii. $L(r, h, a) = -6.28r^2 - 6.28rh - a(2\ln r + \ln h + \ln 3.14 - \ln 100)$
iii. $L(r, h, a) = -6.28r^2 - 6.28rh - a(2\ln r + \ln h)$
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:

ii.

10) ***1 point***

Consider Question 9 again. After solving, the condition of optimality will be:

i. $r = 2h$
ii. $r = h$
iii. $r = h/2$
iv. $r = h/3$

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:

iii.

11) ***1 point***

Consider a Constrained NLP Problem as follows:
Max $f(x1, x2) = 20x1 - 2x1^2 + 25x2 - 5x2^2$ s.t. $x1+x2 <= 10$; and $x1>= 0$, $x2>= 0$
Assuming u as a multiplier, which of the following is not a valid KKT Condition?

i. $x1(20 - 4x1 - u) = 0$
ii. $x2(25 - 10x2 - u) = 0$
iii. $u(x1 + x2 - 10) = 0$
iv. $u(x1 + x2) = 0$

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv.

12) ***1 point***

Consider Question 11 again. It is additionally given that x1 > 0 and x2 > 0. Which of the following relation will then not be directly implied from the KKT Conditions?

i. x1 + x2 = 10
ii. u = 20 – 4x1
iii. u = 25 – 10x2
iv. x1 + x2 <= 10

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
i.

13) ***1 point***

Consider a Constrained NLP Problem with equality constraint as follows:
Max $f(x1, x2) = 20x1 – 2x1^2 + 25x2 – 5x2^2$ s.t. x1 + x2 = 10; and x1>= 0, x2>= 0
Can this problem be solved with KKT Conditions?

i. Yes, it can be solved by KKT Conditions, but by taking x1+x2 <= 10
ii. Yes, it can be solved by KKT Conditions, but by taking x1+x2 >= 10
iii. No, it cannot be solved by KKT Conditions
iv. Yes, It can be solved by KKT Conditions

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv.

14) ***1 point***

Constraints in a Quadratic problem are:

i. Linear functions
ii. Quadratic functions
iii. Polynomial functions
iv. None of the above

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
i.

15) ***1 point***

While using Modified Simplex method for Quadrating Programming Problems, we have:

i. All constraints are linear
ii. Some of the constraints are linear
iii. All constraints are nonlinear except the complimentary condition
iv. All constraints are linear except the complimentary condition

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv.

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