Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2018-09-26, 23:59 IST.

3) Taking $X_1 = (0, 0)^T$ as the initial guess for the problem
\[ \min f(x_1, x_2) = 4x_1^2 - 2x_1x_2 + x_2^2 + 3x_1 + 5, \quad (x_1, x_2) \in \mathbb{R}^2, \]
$X_1$ (the next iterative point) obtained by steepest method is
- $(0, 0)^T$
- $(-\frac{3}{2}, 0)^T$
- $(-\frac{1}{2}, 0)^T$
- $(-1, 0)^T$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- $(-\frac{1}{2}, 0)^T$

7) Consider the problem: $\min f(x_1, x_2) = 8x_1^2 - 4x_1x_2 + 5x_2^2, \quad (x_1, x_2) \in \mathbb{R}^2$.
Taking $X_0 = (5, 2)^T$ (as initial guess) and $X_1$, (the point obtained in the next iteration), using Newton's method, then $X_1 - X_0$ equals
- $(-5, -2)^T$
- $(0, 2)^T$
- $(0, -2)^T$
- $(-1, -2)^T$
- $(1, 2)^T$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- $(-5, -2)^T$

3) The direction $(a, b)^T$ conjugate to $(-1, 2)^T$ with respect to the matrix
\[ Q = \begin{bmatrix} 2 & 1 \\ 1 & 4 \end{bmatrix} \]
will satisfy the equation
- $(0, 1)^T$
- $(1, 1)^T$
- $(2, 1)^T$
- $(1, 0)^T$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- $(1, 0)^T$

4) Using the conjugate gradient method to min $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2, \quad (x_1, x_2) \in \mathbb{R}^2$, $X_0 = (0, 0)^T$, $X_1$ (the second iterative
- $(-1, \frac{3}{2})^T$
- $(1, \frac{3}{2})^T$
Nonlinear Programming - Unit 5 - Week-4 https://onlinecourses.nptel.ac.in/noc18_ma20/un...

No, the answer is incorrect.
Score: 0
Accepted Answers:
\(-1, \frac{1}{2}\)

5) Which of the following is NOT a unimodal function?

\[
\begin{align*}
\max f(x) &= \begin{cases} 
0x & \text{if } 0 \leq x \leq 2, \\
16 - 2x & \text{if } 2 \leq x \leq 4 
\end{cases} & \text{in } [0, 4] \\
\max f(x) &= \begin{cases} 
x & \text{if } 0 \leq x \leq 1, \\
-2x + 3 & \text{if } 1 \leq x \leq 1.5 
\end{cases} & \text{in } [0, 1.5] \\
\min f(x) &= \begin{cases} 
x & \text{if } 0 \leq x \leq 2, \\
x - 2 & \text{if } 2 \leq x \leq 4 
\end{cases} & \text{in } [0, 4] \\
\min f(x) &= \begin{cases} 
-2x & \text{if } 0 \leq x \leq 2, \\
x - 6 & \text{if } 2 \leq x \leq 6 
\end{cases} & \text{in } [0, 6]
\end{align*}
\]

No, the answer is incorrect.
Score: 0
Accepted Answers:
\[-1, \frac{1}{2}\]

6) The next interval while maximizing \(f(x) = \begin{cases} 
2x & \text{if } 0 \leq x \leq 1.5, \\
-x + 4.5 & \text{if } 1.5 \leq x \leq 3 
\end{cases}
\) using Fibonacci search technique, taking \(n = 4\) is

\([0,1.1]\)
\([1.1,2]\)
\([0,1.2]\)
\([1.2,3]\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\([0,1.1]\), \([1.1,2]\), \([0,1.2]\), \([1.2,3]\)

7) Consider the problem: \(\min f(x) = x(x - 3)\) in the interval [0, 2].

Using Dichotomous search method, the first two experiments obtained using a value of \(\delta = 0.001\), are

0.4449, 0.9995
0.9995, 2
0, 0.9995
0.9995, 1.0005

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.9995, 1.0005

8) Let \( f : [-5, 15] \to \mathbb{R} \) be a unimodal \( \min \) function with \( f(7) = 12 \) and \( f(13) = 10 \), then the point \( x_{\text{max}} \) lies in the interval

\([7,10]\)
\([-5,12]\)
\([-5,7]\)
\([7,13]\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\([7,10]\), \([-5,12]\), \([-5,7]\), \([7,13]\)

9) An investor has 4000 Rs. to invest. This amount can be invested in any of the three ventures \( A, B \) and \( C \) available to him. But he must invest in units of 1000 Rs.

The potential return from investment in any one venture depends upon the amount invested according to the following table

<table>
<thead>
<tr>
<th>Return</th>
<th>Rs. 4</th>
<th>Rs. 4.5</th>
<th>Rs. 5.4</th>
</tr>
</thead>
</table>

The maximum potential return is

\(5.4\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
4.5

10) The optimal value of the problem

\[
\begin{align*}
\max z &= xy \\
x + 2y &= 12, \\
x, y &\geq 0.
\end{align*}
\]

(using dynamic programming), is

\(12\)
\(18\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
12, 18
No, the answer is incorrect.
Score: 0
Accepted Answers: 18