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NPTEL

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Courses » Applied Optimization for Wireless, Machine Learning, Big-Data

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 1 - How to access the portal

Course outline

How to access the portal

- How to access the home page?
- : How to access the course page?
- How to access the MCQ, MSQ and Programming assignments?
- Quiz : Assignment-0

Week 1 : Introduction to properties of Vectors, Norms, Positive Semi-Definite matrices and Gaussian Random Vectors

DOWNLOAD VIDEOS

Week 2: Introduction to Convex Optimization – Convex sets, Hyperplanes/ Half-spaces etc.

Assignment-0

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

Due on 2018-07-29, 23:59 IST.

1) The optimal value of an objective (or cost) function is *1 point*

- The minimum or maximum value of objective function
- Can only be obtained if the objective function is differentiable
- Any point where is derivative of the cost function equals 0
- Any region where the cost function is increasing

No, the answer is incorrect.
Score: 0

Accepted Answers:
The minimum or maximum value of objective function

2) Principles of optimization can be employed in *1 point*

- Wireless Communication
- Signal Processing
- Machine Learning
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

3) Consider the vector $\bar{\mathbf{x}} = [x_1, x_2, \ldots, x_n]^T$. The unit-norm vector along the same direction as $\bar{\mathbf{x}}$ is *1 point*

- $\bar{\mathbf{x}}$

$\frac{\bar{\mathbf{x}}}{\|\bar{\mathbf{x}}\|^2}$

$\frac{\|\bar{\mathbf{x}}\|}{\bar{\mathbf{x}}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{\bar{\mathbf{x}}}{\|\bar{\mathbf{x}}\|}$

4) An example of a convex function is **1 point**

e^x

e^{-x}

$x \ln x$

All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

5) The optimal value of the optimization problem $\min x \ln x, x \geq 0$ is **1 point**

1

0

e

$-\frac{1}{e}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$-\frac{1}{e}$

6) The eigenvalues of the matrix $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$ are **1 point**

$1, -1$

$2, -2$

$\sqrt{2}, -\sqrt{2}$

$1, 0$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\sqrt{2}, -\sqrt{2}$

7) The probability density function of the Gaussian random variable X with mean $\mu = 4$ and variance $\sigma^2 = 10$ is *1 point*

- $\frac{1}{\sqrt{200\pi}} e^{-\frac{(x-4)^2}{200}}, -\infty < x < \infty$
- $\frac{1}{\sqrt{10\pi}} e^{-\frac{(x-4)}{10}}, 0 \leq x < \infty$
- $\frac{1}{\sqrt{20\pi}} e^{-\frac{(x-4)^2}{20}}, -\infty < x < \infty$
- $\frac{1}{\sqrt{20\pi}} e^{-\frac{|x-4|}{20}}, -\infty < x < \infty$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{1}{\sqrt{20\pi}} e^{-\frac{(x-4)^2}{20}}, -\infty < x < \infty$

8) The standard l_2 norm of a possibly complex vector $\bar{\mathbf{x}} = [x_1, x_2, \ldots, x_n]^T$ is defined as *1 point*

- $x_1 + x_2 + \cdots + x_n$
- $x_1^2 + x_2^2 + \cdots + x_n^2$
- $|x_1| + |x_2| + \cdots + |x_n|$
- $\sqrt{|x_1|^2 + |x_2|^2 + \cdots + |x_n|^2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\sqrt{|x_1|^2 + |x_2|^2 + \cdots + |x_n|^2}$

9) Given a possibly complex vector $\bar{\mathbf{x}} = [x_1, x_2, \ldots, x_n]^T$, the l_2 norm square denoted by $\|\bar{\mathbf{x}}\|^2$ equals *1 point*

- $\bar{\mathbf{x}}\bar{\mathbf{x}}^H$
- $\bar{\mathbf{x}}^H\bar{\mathbf{x}}$
- $\bar{\mathbf{x}}^T\bar{\mathbf{x}}$

- $|\bar{\mathbf{x}}^2|$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\bar{\mathbf{x}}^H\bar{\mathbf{x}}$

10) Consider two real vectors $\bar{\mathbf{x}} = [x_1, x_2, \ldots, x_n]^T, \bar{\mathbf{y}} = [y_1, y_2, \ldots, y_n]^T$. Their dot product is given as *1 point*

- $\bar{\mathbf{x}}\bar{\mathbf{y}}^T$
- $\bar{\mathbf{x}}^T\bar{\mathbf{y}}$
- $|\bar{\mathbf{x}}^T\bar{\mathbf{y}}|$
- $\|\bar{\mathbf{x}}\|^2\|\bar{\mathbf{y}}\|^2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\bar{\mathbf{x}}^T\bar{\mathbf{y}}$

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