X

Unit 7 - Week 5: Jensen's Inequality, Operations that preserve Convexity, Examples,Beamforming in Multi-antenna Wireless Communication

Assignment-5

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

Due on 2018-09-12, 23:59 IST.

1) The set of positive semi-definite matrices is *1 point*

- Concave
- Convex
- Affine
- Quasi-concave

No, the answer is incorrect.
Score: 0

Accepted Answers:
Convex

2) Set S is affine if for any two points $\bar{\mathbf{x}}_1,\ \bar{\mathbf{x}}_2 \in S,$ *1 point*

- $\theta\bar{\mathbf{x}}_1 + \theta\bar{\mathbf{x}}_2 \in S, \ \text{for all} \ \theta \geq 0$
- $\theta\bar{\mathbf{x}}_1 + \theta\bar{\mathbf{x}}_2 \in S, \ \text{for all} \ 1 \geq \theta \geq 0$
- $\theta\bar{\mathbf{x}}_1 + (1-\theta)\bar{\mathbf{x}}_2 \in S, \ \text{for all} \ 1 \geq \theta \geq 0$
- $\theta\bar{\mathbf{x}}_1 + (1-\theta)\bar{\mathbf{x}}_2 \in S, \ \text{for all} \ \theta$

No, the answer is incorrect.
Score: 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

4) The set $\{\bar{\mathbf{x}} \in R^n | \bar{\mathbf{x}}^T \bar{\mathbf{y}} \leq 1 \text{ for all } \| \bar{\mathbf{y}} \| = 1\}$ is convex **1 point**

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

5) The set of two-dimensional positive semidefinite matrices $\mathbf{X} = \begin{bmatrix} x & y \\ y & z \end{bmatrix}$ can be equivalently expressed as **1 point**

- $\{x, y, z \in \mathrm{R} \mid x \geq 0, z \geq 0, y \geq 0\}$
- $\{x, y, z \in \mathrm{R} \mid xz \geq y^2\}$
- $\{x, y, z \in \mathrm{R} \mid x \geq 0, z \geq 0, xz \geq y^2\}$
- $\{x, y, z \in \mathrm{R}\}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\{x, y, z \in \mathrm{R} \mid x \geq 0, z \geq 0, xz \geq y^2\}$

6) The set $\left\{ \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \in \mathrm{R}^2 \mid x_1 x_2 \geq 1 \right\}$ can be expressed as the intersection of infinite number of half-spaces given by **1 point**

- $x_1 + x_2 \geq 2\alpha,\ \alpha \geq 0$
- $\alpha^2 x_2 + x_1 \geq 2\alpha,\ \alpha \geq 0$
- $\alpha x_2 + x_1 \geq 2\alpha^2,\ \alpha \geq 0$
- $\alpha x_2 + \alpha^2 x_1 \geq 2,\ \alpha \geq 0$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\alpha^2 x_2 + x_1 \geq 2\alpha,\ \alpha \geq 0$

7) The set $\{\bar{\mathbf{x}} \in \mathrm{R}^n \mid \| \bar{\mathbf{x}} \|_\infty \leq 1\}$ is a **1 point**

- Norm ball
- Norm cone
- Halfspace

- Polyhedron

No, the answer is incorrect.
Score: 0

Accepted Answers:
Polyhedron

8) Which of the following sets is convex? ***1 point***

i. $\left\{ \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \in \mathrm{R}^2 \mid x_1^2 + 2ix_1x_2 + i^2x_2^2 \leq 1 \text{ for } i = 1, 2, \cdots, 10 \right\}$

ii. $\{\bar{\mathbf{x}} \in \mathrm{R} \mid \min x_i = 1\}$

- i only
- ii only
- Both i and ii
- Neither i nor ii

No, the answer is incorrect.
Score: 0

Accepted Answers:
i only

9) Let X be a real-valued random variable with $\Pr(X = a_i) = p_i,\ i = 1, 2, \cdots, n$. The set of vectors $\bar{\mathbf{p}}$ that satisfy the constraint quartile $(X) \geq \alpha$, where quartile $(X) = \inf\{\beta \mid \Pr(X \leq \beta) \geq 0.25\}$ is ***1 point***

- Norm cone
- Not-convex
- Half-Space
- Norm Ball

No, the answer is incorrect.
Score: 0

Accepted Answers:
Half-Space

10) The l_1 norm ball in R^2 is a ***1 point***

- Circle with center at origin
- Square with sides parallel to axes
- Square with diagonals on axes
- Hexagon with center at origin

No, the answer is incorrect.
Score: 0

Accepted Answers:
Square with diagonals on axes

Previous Page End