Blank Quiz

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Consider the following two sets and select the correct option

$$X = \{(x, y) \mid xy \geq 1, x, y > 0\} \text{ and } Y = \{(x, y) \mid x \leq 0\}.$$

- ○ X and Y are disjoint convex sets but strictly seperated
- ○ X and Y are not disjoint convex sets
- ◉ X and Y are disjoint convex sets and not strictly seperated
- ○ X and Y are not convex sets

Clear selection

$A\ convex\ functions\ must\ be\ define\ on\ all\ of\ \mathbb{R}^n.$

- ○ True
- ◉ False

Clear selection

The function $f(x) = \frac{x^2+2}{x+2}$ with dom f=(-$\infty, -2) is$:

- (•) concave
- ( ) convex
- ( ) Neither
- ( ) Other: ______

Clear selection

Equivalent representation of a norm ball of radius r and center $\bar{\mathbf{x}}_c$ is

$$S = \{\bar{\mathbf{x}}_c + r\bar{\mathbf{u}}| \ \ ||\bar{\mathbf{u}}|| \leq 1\}$$

- (selected) Option 1

$$S = \{\bar{\mathbf{x}}_c + r\bar{\mathbf{u}}\}$$

- Option 2

$$S = \{\bar{\mathbf{x}}_c + r\bar{\mathbf{u}}| \ \ ||\bar{\mathbf{u}}|| = 1\}$$

- Option 3

$$S = \{r\bar{\mathbf{x}}_c + \bar{\mathbf{u}}| \ \ ||\bar{\mathbf{u}}|| \leq 1\}$$

- Option 4
- Other:

Clear selection

Pick the false statement

- (selected) The reciprocal of postive convex function is convex
- The square of convex nonnegtive function is convex
- Leasts square is special case of convex problem
- Convex problem are always attractive because they always have unique solution
- Other: ______

Clear selection

A cone $K \subseteq R^n$ is called a proper cone if

- [x] K is convex
- [x] K is closed
- [x] K is solid, which means it has nonempty interior
- [x] K is pointed, which means that it contains no line

For a point x to be considered feasible with respect to a given optimization problem, which of the following need not be true about x?

- x satisfies the constraints of the objective function;
- x minimizes the objective function;
- $x \in D$, where D is the intersection of domains of functions defining the optimization problem
- (selected) None of the above.

Clear selection

The norm cone can be represented as a set of vectors

Consider the vector $\bar{\mathbf{x}} = [x_1 \quad x_2 \quad \cdots \quad x_n]^T$.

$\|\bar{\mathbf{x}}\| \leq r$

(selected) Option 1

$\|\mathbf{A}\bar{\mathbf{x}}\| \leq r$

Option 2

$\bar{\mathbf{a}}^T\bar{\mathbf{x}} \leq r$

Option 3

$\left\|[x_1 \quad x_2 \quad \cdots \quad x_{n-1}]^T\right\| \leq x_n$

Option 4

Other:

Clear selection

$Affine\ function\ f(x) = a^T x + b\ is\ both\ convex\ and\ concave$

- (•) True
- ( ) False

Clear selection

$$Consider\ the\ following\ two\ functions$$
$$f_1(x) = \frac{1}{x}\ with\ \mathbf{Dom}\, f = \mathbb{R}/\{0\}(zero\ is\ exculded)$$
$$f_2(x) = \frac{1}{x}\ with\ \mathbf{Dom}\, f = \mathbb{R}_{++}$$

- ( ) Both f1 and f2 are convex.
- ( ) f1 is convex but f2 is not convex.
- (•) f2 is convex but f1 is not convex.
- ( ) Both f1 and f2 are not convex.

Clear selection

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