

CONVEX ANALYSIS WORKSHOP

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1. CONVEX FUNCTIONS

1.1. Definitions and basic properties.

Definition 1.1.1: Let $S \subseteq \mathbb{R}^n$. A function $f : S \rightarrow \mathbb{R} \cup \{\infty\}$ is convex if $\mathbf{dom} f$ is a convex set and

$$\forall \mathbf{x}, \mathbf{y} \in \mathbf{dom} f, \forall t \in \{0, 1\}, f(t\mathbf{x} + (1-t)\mathbf{y}) \leq tf(\mathbf{x}) + (1-t)f(\mathbf{y})$$

where $\mathbf{dom} f$ is the effective domain of f :

$$\mathbf{dom} f := \{\mathbf{x} \in S \mid f(\mathbf{x}) < \infty\}.$$

[1]

REFERENCES

1. Boyd, S., Vandenberghe, L.: Convex Optimization. Cambridge University Press (2004)

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