Engineering Decision Theory, Quiz 4

University of Moratuwa, December 2019

Problem 1

Show that the range of matrix $A \in \mathbb{R}^{m \times n}$

$$\mathcal{R}(A) = \{Ax \mid x \in \mathbb{R}^n\} \tag{1}$$

is an affine set.

Problem 2

Show that the range of matrix $A \in \mathbb{R}^{m \times n}$

$$\mathcal{R}(A) = \{Ax \mid x \in \mathbb{R}^n\} \tag{2}$$

is convex.

Problem 3

Show that the set of solution $\mathcal{S}$ of a linear system, i.e.,

$$\mathcal{S} = \{x \in \mathbb{R}^n \mid Ax = b\},\ A \in \mathbb{R}^{m \times n}, b \in \mathbb{R}^m, \tag{3}$$

is affine.

Problem 4

Show that the set of solution $\mathcal{S}$ of a linear system, i.e.,

$$\mathcal{S} = \{x \in \mathbb{R}^n \mid Ax = b\},\ A \in \mathbb{R}^{m \times n}, b \in \mathbb{R}^m, \tag{4}$$

is convex.