

Important theorems on both linear and nonlinear programmings

1. Farkas Lemma is the lemma of the alternative. This lemma is focusing on the fact that there is a hyperplane that separate a point from a convex cone. This lemma also proves a solution to a linear programming. For more interpretation, please refer to nonlinear programming by Mangasarian.

2.

**Definition 1.** lshfgigndslg nmdbfhud f. This is a sample

**Theorem 0.1** (Farkas' Lemma). *Let  $c \in \mathbb{R}^n$  and  $A \in \mathbb{R}^{m \times n}$ . Then exactly one of the following systems has a solution:*

a.  $Ax \leq 0, c^\top x > 0$ .

b.  $A^\top y = c, y \geq 0$ .