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 seperate a ponit 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.

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