Math 370

Section 7.3: Linear Programming II: Algebraic Solutions

Summary of geometric approach:

1. Find all intersection points of the constraints.
2. Determine which intersection points, if any, are feasible to obtain the extreme points.
3. Evaluate the objective function at each extreme point.
4. Choose the extreme point that optimizes the objective function.

Algebraic approach:

Introduce nonnegative "slack variables" for each constraint equation, i.e. the variable y_i is added to the left side of inequality constraint i to convert it to an equality.

If any two decision or slack variables simultaneously have the value 0, then we have characterized an intersection point in the x_1x_2-plane. All possible intersection points can be determined by setting all distinguishable pairs of variables to zero and solving for the remaining dependent variables. A negative value for any variable indicates that a constraint is not satisfied, and such an intersection point would be infeasible.