
Linear Programming (poggers)

Very shortly put, it is simply optimizing a linear function w.r.t. linear constraints.

The matrix form of a maximization problem would be:

$$\text{Maximize } c^T x \tag{1}$$

$$\text{Subject to } Ax \leq b \tag{2}$$

Or, they could be split into many constraints instead, with both \leq , \geq , and $=$ between them.

The decision variables are x . An assignment to them is a solution. A solution satisfying the constraints is feasible. A feasible solution that actually minimizes/maximizes is optimal (sometimes denoted by an asterisk, i.e. P^*).

The set of feasible solutions, called F , is a convex polyhedron. That means it has n sides and has no two points such that a line may be drawn between them that crosses outside of the polyhedron. Usually, you need to traverse to a corner of the polyhedron to attain an optimal solution.

Two stinky cases: unbounded solutions, where an arbitrarily good solution may be found, and infeasible LP's, where the set of feasible solutions is empty.