Linear Programming in Economics

Your Name

1 Introduction

This document covers the application of linear programming in economics.

2 Optimization Problems

2.1 Maximizing Profit

2.2 Example Problem

A company produces two products, A and B. The profit for A is $3 per unit, and the profit for B is $5 per unit. The production of A requires 2 hours of labor and 3 hours of machine time, and the production of B requires 4 hours of labor and 2 hours of machine time. The company has 100 hours of labor and 90 hours of machine time available. How many units of each product should be produced to maximize profit?

Solution

Let x be the number of units of product A and y be the number of units of product B. The objective function to maximize is:

$$P = 3x + 5y.$$

The constraints are:

$$2x + 4y \leq 100 \quad \text{(labor hours)},$$

$$3x + 2y \leq 90 \quad \text{(machine hours)},$$

$$x \geq 0, \quad y \geq 0.$$

Graphing these constraints and finding the feasible region, the vertices of the feasible region are evaluated in the objective function to find the maximum profit.