



Escuela de Ingeniería en Computación
Ingeniería en Computación
IC-6400 - Investigación de Operaciones

Project 04

Simplex Report

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Chapter 1

Simplex Description

The simplex algorithm is a very simple algorithm.

Chapter 2

Solving Multiple

2.1 Mathematical representation

Maximize:

$$z = 60,0000abeja + 35,0000babuino + 20,0000coyote \quad (2.1)$$

Subject To:

$$8,0000abeja + 6,0000babuino + 1,00000coyote \leq 48,00000 \quad (2.2)$$

$$4,0000abeja + 2,0000babuino + 1,50000coyote \leq 20,00000 \quad (2.3)$$

$$2,0000abeja + 1,5000babuino + 0,50000coyote \leq 8,00000 \quad (2.4)$$

$$0,0000abeja + 1,0000babuino + 0,00000coyote \leq 5,00000 \quad (2.5)$$

2.2 The initial simplex table

Z	abeja	babuino	coyote	s ₁	s ₂	s ₃	s ₄	B
1,00000	-60,00000	-35,00000	-20,00000	0,00000	0,00000	0,00000	0,00000	0,00000
0,00000	8,00000	6,00000	1,00000	1,00000	0,00000	0,00000	0,00000	48,00000
0,00000	4,00000	2,00000	1,50000	0,00000	1,00000	0,00000	0,00000	20,00000
0,00000	2,00000	1,50000	0,50000	0,00000	0,00000	1,00000	0,00000	8,00000
0,00000	0,00000	1,00000	0,00000	0,00000	0,00000	0,00000	1,00000	5,00000

2.3 The final simplex table

Z	abeja	babuino	coyote	s ₁	s ₂	s ₃	s ₄	B
1,00000	0,00000	0,00000	0,00000	0,00000	10,00000	10,00000	0,00000	280,00000
0,00000	0,00000	-2,00000	0,00000	1,00000	2,00000	-8,00000	0,00000	24,00000
0,00000	0,00000	-2,00000	1,00000	0,00000	2,00000	-4,00000	0,00000	8,00000
0,00000	1,00000	1,25000	0,00000	0,00000	-0,50000	1,50000	0,00000	2,00000
0,00000	0,00000	1,00000	0,00000	0,00000	0,00000	0,00000	1,00000	5,00000

2.4 Solution

Solution 1:

abeja: 2,00000, babuino: 0,00000, coyote: 8,00000

Multiple optimal solutions were found because one of the non basic functions can be pivoted without penalty.

Solution 2:

abeja: 0,00000, babuino: 1,60000, coyote: 11,20000

By using the following formula, infinite optimal solutions can be found:

$$\alpha * \text{solution1} + (1 - \alpha) * \text{solution2} \quad (2.6)$$

$$0 \leq \alpha \leq 1$$

Solution 3:

abeja: 0,50000, babuino: 1,20000, coyote: 10,40000

Solution 4:

abeja: 1,00000, babuino: 0,80000, coyote: 9,60000

Solution 5:

abeja: 1,50000, babuino: 0,40000, coyote: 8,80000