

Incredible Chairs

The Incredible Chairs assignment is discussed in full detail in the Linear Programming chapter.

Problem

- Maximize the profit by optimizing the chair production plan.

Sets

This problem has not sets.

Parameters

In this problem the data is typed directly into the constraints. This is changed in Incredible Chairs 2.

Decision variables

- Amount of A chairs produced each month m : $x_A \geq 0$.
- Amount of B chairs stored each month m : $x_B \geq 0$.

Model

Objective:

- Total storage costs to be minimized:

$$4 \cdot x_A + 6 \cdot x_B$$

Constraints:

- Production line 1: $2 \cdot x_A \leq 14$
- Production line 2: $3 \cdot x_B \leq 15$
- Production line 3: $4 \cdot x_A + 3 \cdot x_B \leq 35$

The above model is a simple example of a small production planning problem with capacity limitations.

The full model in Julia/JuMP, available with the name

`IncredibleChairs.jl`

from the book web-site, is given below:

```

*****
# Incredible Chairs, Simple LP
using JuMP
using HiGHS
*****

*****
# PARAMETERS

# no parameters

*****

*****
# Model
IC = Model(HiGHS.Optimizer)

@variable(IC, 0 <= xA)
@variable(IC, 0 <= xB)

@objective(IC, Max, 4*xA+6*xB)

@constraint(IC, 2*xA <= 14)
@constraint(IC, 3*xB <= 15)
@constraint(IC, 4*xA+3*xB <= 36)
*****

*****
# Solve
solution = optimize!(IC)

```

```
println("Termination status: $(termination_status(IC))")
#####

#####
# Solution
if termination_status(IC) == MOI.OPTIMAL
    println("Optimal objective value: $(objective_value(IC))")
    println("Production of chair A: ",value(xA))
    println("Production of chair B: ",value(xB))
else
    println("No optimal solution available")
end
#####
```