Problem Set 6

Noella James

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collaborators: none

Problem 6-1: Job Assignment revisited

Solution

Let $h_1, h_2, \ldots, h_n$ be the hours worked by each worker $1 \ldots n$. The goal is to find an allocation such that $min(\sum_{k=1}^{n} h_k)$.

Assume there are p tasks, $t_1 \ldots t_p$. The equation for task t_1 would be $(h_1 \times M[1,1] + h_2 \times M[2,1] + \ldots + h_n \times M[n,1]) \geq 1$.
The equation for task t_k would be $(h_1 \times M[1,k] + h_2 \times M[2,k] + \ldots + h_n \times M[n,k]) \geq 1$ for $k = 1 \ldots p$.
Each worker can work a maximum of 10 hours. Thus we have a set of equations $h_i \leq 10$ for $i = 1 \ldots n$.
Each worker can work a minimum of 0 or more hours. Thus we have a set of equations $h_i \geq 0$ for $i = 1 \ldots n$.

Thus the linear programming solution for the above problem is :
$min(\sum_{k=1}^{n} h_k)$.
such that :
$(h_1 \times M[1,k] + h_2 \times M[2,k] + \ldots + h_n \times M[n,k]) \geq 1$ for $k = 1 \ldots p$
and
$h_i \leq 10$ for $i = 1 \ldots n$.
and
$h_i \geq 0$ for $i = 1 \ldots n$.