Work Assignment Linear Programming

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Task

10 people will be assigned to working on 23 projects over the course of 42 months.

In the initial definition of the problem, it is defined how much a person should work on a project in full time equivalents (FTE).

Model

Index Sets:		
Set of Projects:	J	
Set of People:	P	
Set of Months:	M	
Constants:		
Fixed work pP per project:	fix_{jp}	$\forall j, p \in J, P$
Capacity pP per month:	cap_{pm}	$\forall p, m \in P, M$
Decision Variables:		
Working Time:	x_{jpm}	$\forall j \in J, \forall p \in P, \forall m \in M$
Soft constraint *capacity*:	$zcap_{pm}$	$\forall p \in P, \forall m \in M$
Soft constraint *"should"/soll*:	$zsoll_{jp}$	$\forall j \in J, \forall p \in P$

$$min \sum_p (\sum_m zcap_{pm} + \sum_j zsoll_{jp})$$

s.t.

$$\sum_j x_{jpm} \leq cap_{pm} \quad \forall p, m \quad \text{working time pP \& month not above their capacity}$$

$$\sum_j x_{jpm} + zcap_{pm} = cap_{pm} \quad \forall p, m \quad \text{though with soft constraint}$$

$$\sum_m x_{jpm} + zsoll_{jp} = fix_{jp} \quad \forall j, p \quad \text{working time assigned to project pP w/ soft constr.}$$

$$x_{jpm} \leq y_{jpm} \quad \forall j, p, m \quad \text{activation in case of no contract for month m}$$

$$x_{jpm} \geq 0 \quad \text{Non-negativity constraint}$$

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