

1. 3 Review Problems Problem 52

- $x_{i,j,k}$ papers from source j that are processed use method k to produce pulp of grade i
- $j = 1$ Box board
- $j = 2$ Tissue paper
- $j = 3$ Newsprint
- $j = 4$ Book paper
- $k = 1$ de-inking
- $k = 2$ asphalt dispersion

Objective Function:

$$\begin{aligned} \min \quad & 5 \sum_{i=1}^3 \sum_{k=1}^2 x_{i,1,k} + 6 \sum_{i=1}^3 \sum_{k=1}^2 x_{i,2,k} + 8 \sum_{i=1}^3 \sum_{k=1}^2 x_{i,3,k} + \\ & 10 \sum_{i=1}^3 \sum_{k=1}^2 x_{i,4,k} + 20 \sum_{i=1}^3 \sum_{j=1}^4 x_{i,j,1} + 15 \sum_{i=1}^3 \sum_{j=1}^4 x_{i,j,2} \end{aligned}$$

s.t.

$$\sum_{k=1}^2 x_{1,1,k} = 0$$

$$\sum_{k=1}^2 x_{1,2,k} = 0$$

$$\sum_{k=1}^2 x_{2,3,k} = 0$$

$$\sum_{k=1}^2 x_{3,4,k} = 0$$

$$\sum_{i=1}^3 \sum_{j=1}^4 \sum_{k=1}^2 x_{i,j,k} \leq 3000$$

$$0.9(0.3x_{1,3,1} + 0.4x_{1,4,1}) + 0.8(0.3x_{1,3,2} + 0.4x_{1,4,2}) \geq 500$$

$$0.9(0.15x_{2,1,1}+0.2x_{2,2,1}+0.4x_{2,4,1})+0.8(0.15x_{2,1,2}+0.2x_{2,2,2}+0.4x_{2,4,2}) \geq 500$$

$$0.9(0.15x_{2,1,1}+0.2x_{2,2,1}+0.3x_{2,3,1})+0.8(0.15x_{2,1,2}+0.2x_{2,2,2}+0.3x_{2,3,2}) \geq 600$$

$$0.05x_1 + 0.15x_2 + 0.1y_0 + 0.2y_1 + 0.3y_2 + 0.5y_3 \geq 1000$$