Problem 17–2

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- $x_{1,1}$ Resource 1 usage in the 1st decade
- $x_{2,1}$ Resource 2 usage in the 1st decade
- $x_{3,1}$ Resource 3 usage in the 1st decade
- $x^s_{1,2}$ Resource 1 usage in the 2nd decade in scenario s
- $x_{2,2}$ Resource 2 usage in the 2nd decade
- $x_{3,2}$ Resource 3 usage in the 2nd decade
- y_1 Investment in resource 1
- y_2 Investment in resource 2

$$\min 5x_{1,1} + 5(0.5x^1_{1,2} + 0.5x^2_{1,2}) + 10x_{2,1} + 10x_{2,2} + 16.7x_{3,1} + 16.7x_{3,2} + y_1 + y_2$$

Resources Capacity in 1st Decade

$$x_{1,1} \leq 25$$
$$x_{2,1} \leq 10$$

Resources Capacity in 2nd Decade

$$x^2_{1,2} \leq 25 + y_1$$
$$x^1_{1,2} \leq 25 + 0.1y_1$$
$$x_{2,2} \leq 10 + y_2$$

Demands in 1st Decade

$$x_{1,1} + x_{2,1} + x_{3,1} \leq 10$$

Demands in 2nd Decade

$$x^s_{1,2} + x_{2,2} + x_{3,2} \leq 25 \quad \forall s \in [1, 2]$$