## Our example:

$$\left[\begin{array}{ll} \text{Minimize} & C_{11}y_{11} + C_{12}y_{12} + C_{21}y_{21} + C_{22}y_{22} \\ \text{s.t.} & y_{11} + y_{12} - \alpha y_{11}p_{11}(1) - \alpha y_{21}p_{21}(1) - \alpha y_{12}p_{11}(2) - \alpha y_{22}p_{21}(2) = \beta_1 \\ & y_{21} + y_{22} - \alpha y_{11}p_{12}(1) - \alpha y_{21}p_{22}(1) - \alpha y_{12}p_{12}(2) - \alpha y_{22}p_{22}(2) = \beta_2 \\ & y_{11} \geq 0 \quad y_{12} \geq 0 \quad y_{21} \geq 0 \quad y_{22} \geq 0 \end{array}\right]$$

$$\left[\begin{array}{ll} \text{Minimize} & C^T y \\ \text{s.t.} & Ay = b \\ & y \geq 0 \end{array}\right] \quad \text{where} \quad C = \begin{bmatrix} c_{11} \\ c_{12} \\ c_{21} \\ c_{22} \end{bmatrix} = \begin{bmatrix} -350 \\ -400 \\ -50 \\ -250 \end{bmatrix} \quad y = \begin{bmatrix} y_{11} \\ y_{12} \\ y_{21} \\ y_{22} \end{bmatrix} \quad b = \begin{bmatrix} \beta_1 \\ \beta_2 \end{bmatrix}$$

$$\begin{bmatrix} 0{,}19 & 0{,}46 & -0{,}63 & -0{,}18 \\ -0{,}09 & -0{,}36 & 0{,}73 & 0{,}28 \end{bmatrix} = A = \begin{bmatrix} 1-\alpha p_{11}(1) & 1-\alpha p_{11}(2) & -\alpha p_{21}(1) & -\alpha p_{22}(2) \\ -\alpha p_{12}(1) & -\alpha p_{12}(2) & 1-\alpha p_{22}(1) & 1-\alpha p_{22}(2) \end{bmatrix}$$

$$\beta = \left[\tfrac{1}{2} \;\; \tfrac{1}{2}\right] \Rightarrow \hat{y} = \begin{pmatrix} 6{,}22 \\ 0 \\ 0 \\ 3{,}78 \end{pmatrix} \quad \hat{y} = \begin{bmatrix} 6{,}22 & 0 \\ 0 & 3{,}78 \end{bmatrix} \Rightarrow \hat{D} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Note: $\sum y_{ik} = 10 = \frac{1}{1-0{,}9}$

$$\hat{Z} = -3122 = \tfrac{1}{2}V_1(R_2) + \tfrac{1}{2}V_2(R_2) = \tfrac{1}{2}(-3257) + \tfrac{1}{2}(-2986)$$

from the policy iteration.

In fact, here:

$$\beta = [1 \;\; 0] \Rightarrow \hat{y} = \begin{pmatrix} 7{,}57 \\ 0 \\ 0 \\ 2{,}43 \end{pmatrix} \quad \hat{y} = \begin{bmatrix} 7{,}57 & 0 \\ 0 & 2{,}43 \end{bmatrix} \Rightarrow \hat{D} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\hat{Z} = -3257 = V_1(R_2)$$

$$\beta = [0 \;\; 1] \Rightarrow \hat{y} = \begin{pmatrix} 4{,}86 \\ 0 \\ 0 \\ 5{,}14 \end{pmatrix} \quad \hat{y} = \begin{bmatrix} 4{,}86 & 0 \\ 0 & 5{,}14 \end{bmatrix} \Rightarrow \hat{D} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\hat{Z} = -2986 = V_2(R_2)$$