

Solution for problem 3.6.7 in Karlin and Pinsky

Using the first step approach we get:

$$\begin{aligned} v_1 &= 1 + 0.7v_2 \\ v_2 &= 1 + 0.1v_1 \\ \Rightarrow v_1 &= \frac{170}{93} \approx 1,828 \\ v_2 &= \frac{110}{93} \end{aligned}$$

using equation (3.66) we need

$$\begin{aligned} q_1 &= 0,3 & p_1 &= 0,7 \\ q_2 &= 0,1 & p_2 &= 0,9 \\ \rho_1 &= \frac{3}{7} & \rho_2 &= \frac{3}{63} \\ \Phi_1 &= \frac{10}{7} & \Phi_2 &= \frac{80}{63} \\ v_1 &= \frac{\Phi_1 + \Phi_2}{1 + \rho_1 + \rho_2} \\ &= \frac{170}{93} \end{aligned}$$