Iteration 3: Agent took the action left and Observed green

$$b_2 = \left[\frac{870587}{1848350}, \frac{289}{924175}, \frac{62577}{132025}, \frac{8466}{924175}, \frac{3071}{184835}, \frac{10693}{369670} \right]$$

New belif array after the Iteration 3 i.e b_3

$$b_3(S_1) = 0.15 \left(0.83 \times b_2(S_1) + 0.83 \, b_2(S_2) \right)$$

$$= \frac{43384017}{739340000}$$

$$b_3(S_2) = 0.9 \left(\overset{0.17}{\cancel{0.83}} \times b_2(S_1) + 0.83 \times b_2(S_3) \right)$$

$$= \frac{781630077}{1848350000}$$

$$b_3(S_3) = 0.15 \left(0.17 \times b_2(S_2) + 0.83 \times b_2(S_4) \right)$$

$$= \frac{2122773}{1848350000}$$

$$b_3(S_4) = 0.9 \left(0.17 \times b_2(S_3) + 0.83 \times b_2(S_5) \right)$$

$$= \frac{9811269}{115521875}$$

$$b_3(S_5) = 0.9 \left(0.17 \times b_2(S_4) + 0.83 \times b_2(S_6) \right)$$

$$= \frac{42528951}{1848350000}$$

$$b_3(S_6) = 0.15 \left(0.17 \times b_2(S_5) + 0.17 \times b_2(S_6) \right)$$

$$= \frac{24531}{21124000}$$

$$S = \sum_i b_3(s_i) = \frac{10\,9986\,861}{18\,48\,35\,00\,00}$$

Calculating normalized probabilities:

The final Belief state

$$B_3 = \begin{bmatrix} 0 \cdot 09861181, & 0 \cdot 716112879, & 0 \cdot 001930024, \\ 0 \cdot 1427264153, & 0 \cdot 03866730136., & 0 \cdot 001951562650 \end{bmatrix}$$