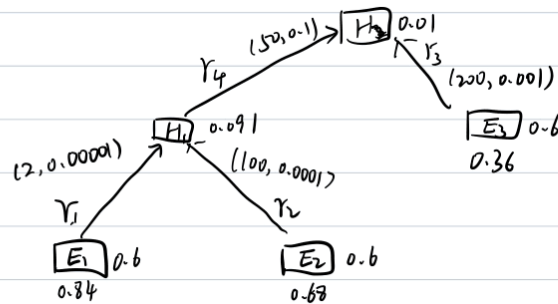## 3.5.

$$CF(E_2) = 0.6 \times 0.5 = 0.3$$

$$CF(E_4) = 0.7 \times \min\{CF(E_2), CF(E_3)\} = 0.21$$

$$CF_1(H) = CF(E_4) \times 0.8 = 0.21 \times 0.8 = 0.168$$

$$CF_2(H) = CF(E_5) \times 0.9 = 0.7 \times 0.9 = 0.63$$

$$CF_{1,2}(H) = CF_1(H_1) + CF_2(H_v) - CF_1(H) \times CF_2(H) = 0.69216$$

3.7

$$P(H_1|E_1) = \frac{2 \times 0.091}{0.091 + 1} = 0.16682$$

$$P(H_1|S_1) = \frac{0.16682 - 0.091}{1 - 0.6} \times (0.84 - 0.6) + 0.091 = 0.136492$$

$$O(H_1|S_1) = \frac{P(H_1|S_1)}{1 - P(H_1|S_1)} = 0.15807$$

$$P(H_1|E_2) = \frac{100 \times 0.091}{99 \times 0.091 + 1} = 0.90918$$

$$P(H_1|S_2) = \frac{0.90918 - 0.091}{1 - 0.6} \times (0.68 - 0.6) + 0.091 = 0.25464$$

$$O(H_1|S_2) = \frac{P(H_1|S_2)}{1 - P(H_1|S_2)} = 0.34163$$

$$O(H_1|S_1, S_2) = \frac{O(H_1|S_1)}{O(H_1)} \times \frac{O(H_1|S_2)}{O(H_1)} \times O(H_1) = 0.53942$$

$$P(H_1|S_1, S_2) = \frac{O(H_1|S_1, S_2)}{1 + O(H_1|S_1, S_2)} = 0.3504$$

$$P(H_2|H_1) = \frac{50 \times 0.01}{49 \times 0.01 + 1} = 0.33557$$

$$P(H_2|S_1, S_2) = \frac{0.33557 - 0.01}{1 - 0.091} \times (0.3504 - 0.091) + 0.01 = 0.10291$$

$$O(H_2|S_1, S_2) = \frac{0.10291}{1 - 0.10291} = 0.11472$$

$$P(H_2|E_3) = \frac{0.001 \times 0.01}{-0.999 \times 0.01 + 1} = 0.00001$$

$$P(H_2|S_3) = \frac{0.01 - 0.00001}{0.6 - 0} \times 0.36 + 0.00001 = 0.006$$

$$O(H_2|S_3) = \frac{0.006}{1 - 0.006} = 0.00604$$

$$O(H_2|S_1, S_2, S_3) = \frac{O(H_2|S_1, S_2)}{O(H_2)} \times \frac{O(H_2|S_3)}{O(H_2)} \times O(H_2) = 0.06832$$

$$P(H_2|S_1, S_2, S_3) = \frac{0.06832}{1 + 0.06832} = 0.06395$$

3.25

$$P(R|S,W) = \alpha P(R,S,W) = \alpha \sum_C P(R,S,W,C)$$

$$= \alpha \sum_C P(C) \cdot P(S|C) \cdot P(R|C) \cdot P(W|R,S)$$

$$= \alpha \times (\frac{1}{2} \times \frac{1}{10} \times \frac{6}{5} \times \frac{9}{10} + \frac{1}{2} \times \frac{1}{2} \times \frac{1}{5} \times \frac{9}{10})$$

$$= 0.081\alpha$$

同理，可求 $P(\neg R|S,W) = 0.189\alpha$

则 $\alpha = \frac{1}{0.081 + 0.189} = \frac{100}{27}$

则 $P(R|S,W) = 0.081 \times \frac{100}{27} = 0.3$

即下过雨的概率为 30%