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MATH 8150

HW9

1 (a) Code

(b) $P(X_0 = i_0, \dots X_T = i_T \mid Y_0 = j_0, \dots, Y_T = j_T) = \dfrac{P(X_0 = i_0, \dots, X_T = i_T, Y_0 = i_0, \dots, Y_T = i_T)}{P(Y_0 = j_0, \dots, Y_T = j_T)} = \dfrac{P(X_0 = i_0, \dots, Y_T = j_T)}{Z}$

$$= v_{i_0} \frac{M_{i_0 i_1} G_{i_1}(j_1) M_{i_1 i_2} G_{i_2}(j_2) \dots M_{i_{T-1} i_T} G_{i_T}(j_T)}{\sum_{X_0} \sum_{X_1} \dots \sum_{X_T} P(Y_0 = j_0, \dots, Y_T = j_T, X_0 = i_0, \dots, X_T = i_T)}$$, Note $\boxed{v_{i_0} = 1, i_0 = F}$

$$= \frac{\prod_{m=0}^{T-1} M_{m\, m+1} G_{m+1}(j_m)}{\sum_{X_{i_t} = C,F} \prod_{t=0}^{T} G_{i_t}(j_t) P(X_0 = i_0, \dots, X_T = i_T)}$$

$$Z = \sum_{X_{i_t} = C,F} \prod_{t=0}^{T} G_{i_t}(j_t) P(X_0 = i_0, \dots, X_T = i_T)$$

(c) Code

2 (a) Code

(b) Code

(c) Code