

Information and Communication Theory

Problem Set 2 - Solutions

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- (a) 0.12
(b) 0.1
- $f_{X_1, X_2, X_3}(2, 3, 1) \approx 0.013$,
 $f_{X_1, X_2, X_3}(2, 1, 3) = 0$,
 $f_{X_2, X_4}(1, 3) = 0.044$
- $f_{X_2} = [\frac{11}{30}, \frac{8}{15}, \frac{1}{10}]$, $f_{X_3} = [\frac{13}{30}, \frac{9}{20}, \frac{7}{60}]$
- Yes.
- $\mu = [\frac{\beta}{\alpha+\beta}, \frac{\alpha}{\alpha+\beta}]$
- $H'(X) = \frac{\beta}{\alpha+\beta}H(\alpha, 1 - \alpha) + \frac{\alpha}{\alpha+\beta}H(\beta, 1 - \beta)$
- (a) $\mu = [\frac{2}{11}, \frac{4}{11}, \frac{5}{11}]$, $H'(X) = \frac{14}{11}$
(b) $H(\mu) \approx 1.495$
- (a) $\mu = [\frac{4}{7}, \frac{1}{7}, \frac{2}{7}]$, $H'(X) \approx 1.379$
(b) $H(\mu) \approx 0.86$
- $\mu = [\frac{1}{3}, \frac{1}{3}, \frac{1}{3}]$, $H'(X) = 1$
- $H'(X) \approx 1.439$
- $\mu = [\frac{1}{3}, \frac{1}{3}, \frac{1}{3}]$, $H'(X) \approx 1.459$