EE411 · Information Theory and Coding

Assignment 11

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Let $Y = AX$, then $g_Y(y) = \frac{1}{|A|} f_X(A^{-1}y)$, $dy = |A|dx$, and we have

$$\begin{aligned} h(AX) &= -\int g(y) \ln g(y) dy \\ &= -\int \frac{1}{|A|} f(A^{-1}y)[\ln f(A^{-1}y) - \log |A|] dy \\ &= -\int \frac{1}{|A|} f(x)[\ln f(x) - \log |A|] |A| dx \\ &= h(X) + \log |A| \end{aligned}$$