

ECS452 2013 Formula Sheet

012	$I(X;Y) = H(X) - H(X Y) = H(Y) - H(Y X) = H(X) + H(Y) - H(X,Y)$
020	$C = \max_p I(p,Q) = \log_2 S_y - H(\underline{r})$ weak/sym $= \log_2 S_x $ non over
055	$P(\epsilon) = \sum_i p_i P[\epsilon S_i]$
123	rows of Q are same $\rightarrow X \perp\!\!\!\perp Y ; q = Q ; I = 0 ; C = 0$
188	$E_b = \frac{E_s}{\log_2 M} = \frac{\sum P_i \ s^{(i)}\ ^2}{\log_2 M}$
220	$S_x(f) = \int_{-\infty}^{\infty} R_x(\tau) e^{-2j\pi f\tau} d\tau$
339	$\tau^* = \frac{\sigma^2}{s^{(2)} - s^{(1)}} \ln\left(\frac{P_1}{P_2}\right) + \frac{s^{(1)} + s^{(2)}}{2}$
388	$W_{MAP}(r) = \arg \max \langle r, s^{(i)} \rangle + \sigma^2 \ln P_i - \frac{1}{2} \ s^{(i)}\ ^2$ $= \arg \min \ r - s^{(i)}\ ^2 - 2\sigma^2 \ln P_i$
467	mean $m_N(t) = E[N(t)]$; auto-cor $R_N(t_1, t_2) = E[N(t_1)N(t_2)]$
477	$H(Y X) = \sum_x p_x(x) H(Y X) = H(X,Y) - H(X)$
483	$H(x) = -\sum_x p_x(x) \log_2 p_x(x) = \int f_x(x) \log_2 f_x(x) dx$
527	$Q\left(\frac{d}{2\sigma}\right) = Q\left(\sqrt{\frac{d^2}{2N_0}}\right) = Q\left(\sqrt{\frac{2E_b}{N_0}}\right) = Q\left(\sqrt{\frac{E_b}{N_0}}\right)$ Antipodal BiOrth
610	#parity $m = n - k$, $n = 2^m - 1$, $H = [I_m P]$, $G = [P^T I_k]$, $\underline{X} = \underline{b}G$, $\underline{s} = \underline{y}H^T$
627	detect $= d_{min} - 1$ correct $= \frac{d_{min} - 1}{2}$
659	$P[W=j W=i] = Q\left(\frac{a_j - s^{(i)}}{\sigma}\right) - Q\left(\frac{b_j - s^{(i)}}{\sigma}\right) = P[a_j < R < b_j S^{(i)}]$
675	corner $(2q - q^2)$ middle $(3q - 2q^2)$ center $(4q - 4q^2)$
709	$E_s(1D) = \frac{d^2}{12}(M^2 - 1)$; $E_s(2D) = \frac{d^2}{12}(M_1^2 + M_2^2 - 2)$