Errata

Digital Communications

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(This is a cumulative errata, many of these have been corrected in recent printings

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Page	Location	Incorrect	Correct
25	Eq. 2.1-19	$\int_{-\infty}^{\infty} \lvert X(f)\rvert^2\, dt$	$\int_{-\infty}^{\infty} \lvert X(f)\rvert^2\, df$
31	line 12	Equation 2.2-23	Equation 2.2-24
32	Eq. 2.2-34	Change x_n to s_n	
32	last line	Change $x(t)$ to $s(t)$ and x_n to s_n	
35	Fig. 2.2-1	Change the label of the figure on the right from $s_2(t)$ to $s_4(t)$	
41	Eq. 2.3-6	$\frac{b-a}{2}$	$\frac{b+a}{2}$
52	line 6	where	where $m = n/2$ and
58	line 3	$\alpha \int_{\alpha}^{\infty} xp(x)\, dx$	$\alpha \int_{\alpha}^{\infty} p(x)\, dx$
66	Eq. 2.6.29	$(\boldsymbol{z} - \boldsymbol{m})^{\dagger}$	$(\boldsymbol{z} - \boldsymbol{m})^{H}$
69	line 18	38×10^{-23}	1.38×10^{-23}
71	Eq. 2.7-35	$E[Z(t+\tau)Z^*(t)]$	$E\left[(Z(t+\tau) - E\left[Z(t+\tau)\right]) \times (Z^*(t) - E\left[Z^*(t)\right])\right]$
71	Eq. 2.7-35	$E[Z(t+\tau)Z(t)]$	$E\left[(Z(t+\tau) - E\left[Z(t+\tau)\right]) \times (Z(t) - E\left[Z(t)\right])\right]$
80	line 7 from bottom	$\lvert f\rvert < 0$	$\lvert f\rvert < f_0$
104	Eq. 3.2-36	Substitute r_m with $r_m g(t)$ in both lines	
110	line 8 from bottom	Note that $\Delta f = \frac{1}{2T} \ldots$	Note that $\Delta f = \frac{1}{T} \ldots$
117	Eq. 3.3-10 line 1	$2\pi f_d q(t-nT) I_n$	$4\pi f_d T I_n q(t-nT)$
124	line 8 from bottom	with a duration $2T_b$,	with a duration $2T$,
124	line 7 from bottom	again of duration $2T_b$.	again of duration $2T$, where T is the bit interval.
124	lines 2, 3, 5 from bottom	T_b	T
125	Fig. 3.3-12	Change all T_b's to T's.	

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Page	Location	Incorrect	Correct
125	Fig. 3.3-12	$d_l(t)$	$d_I(t)$
125	line 11 from bottom	misaligned by T_b.	misaligned by T.
131	3rd line after (3.4-1)	I_n is stationary ...	I_n is a stationary ...
172	Eq. 4.4-21	$\boldsymbol{r} \cdot (\boldsymbol{s}_m - \boldsymbol{s}_{m'}) > \eta_m - \eta_{m'}$	$\boldsymbol{r} \cdot (\boldsymbol{s}_m - \boldsymbol{s}_{m'}) = \eta_{m'} - \eta_m$
172	Eq. 4.2.23	$\\|\boldsymbol{s}\\|^2$	$\\|\boldsymbol{s}_m\\|^2$
180	Eq. 4.2-51	$\int_{-\infty}^{\infty} H(f)S(f)e^{j2\pi ft}\,dt$	$\int_{-\infty}^{\infty} H(f)S(f)e^{j2\pi fT}\,df$
181	Eq. 4.2-54	Change the first line to $y_s^2(T) = \left(\int_{-\infty}^{\infty} H(f)S(f)e^{j2\pi fT}\,df\right)^2$	
188	line 10	from $d_{\min}$ from	$d_{\min}$ from
197	line 9	Change to: This signal constellation is known to be approximately within 0.4 dB of the best eight-point (hexagonal) QAM constellation, which requires the least average power for a given minimum distance between signal points. For more details see Section 4.7.	
207	line 5	$P_e \to \infty$	$P_e \to 0$
220	line 5	$\sigma_2 = 2\mathscr{E}_s N_0$	$\sigma^2 = 2\mathscr{E}_s N_0$
229	line 8	$P_M = 10^{-5}$	$P_e = 10^{-5}$
229	Figure 4.6-1	$P_M = 10^{-5}$	$P_e = 10^{-5}$
236	last line	Change all n's to 2's.	
237	line 2	Change all n's to 2's.	
237	line 6	$d_{\min}(\boldsymbol{D}_4) = \sqrt{2}$, and and	$d_{\min}(\boldsymbol{D}_4) = \sqrt{2}$, $B_4 = \frac{\pi^2}{2}$, and
237	Equation 4.7-20	$\Delta(\boldsymbol{A}_2) = \frac{B_n}{V(\Lambda)}\left(\frac{d_{\min}(\Lambda)}{2}\right)^n =$	$\Delta(\boldsymbol{D}_4) = \frac{B_4}{V(\Lambda)}\left(\frac{d_{\min}(\Lambda)}{2}\right)^4 =$
239	line 8 from bottom	$2\ell + 2$	2ℓ
268	Figure P4.7	$\frac{1}{\sqrt{2\sigma}}\, e^{-\|n\|\sqrt{2}/\sigma}$	$\frac{1}{\sqrt{2}\sigma}\, e^{-\|n\|\sqrt{2}/\sigma}$
276	line 10	$c_l p(t - iT_c)$	$c_i p(t - iT_c)$
283	line 6 from bottom	E_b	$\mathscr{E}_b$
287	line 5	$p(\boldsymbol{y})$	$p(\boldsymbol{R})$
287	line 9 from bottom	the boundary of this lattice	a boundary for this lattice
287	line 5 from bottom	$\beta = 2\ell + 2$	$\beta = 2\ell$
287	last line	$\gamma_s(\mathcal{R}) = 1$	$\gamma_s(\mathcal{R}) \approx 1$
333	Property 3 (line 12)	$I(X;Y) \le \min\{\|\mathscr{X}\|, \|\mathscr{Y}\|\}$	$I(X;Y) \le \min\{\log_2 \|\mathscr{X}\|, \log_2 \|\mathscr{Y}\|\}$

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Page	Location	Incorrect	Correct
335	Eq. 6.2-12, second line	$\ldots, X_n = x_{n-1}$	$\ldots, X_n = x_n$
360	Eq. 6.5-21	$2\frac{P}{W}$	$\frac{P}{2W}$
360	line 16	a discrete-memoryless	a binary symmetric
362	Eqn. 6.5-29	$1 + p\log 2p + (1-p)\log 2(1-p)$	$1 + p\log_2 p + (1-p)\log_2(1-p)$
363	Eqn. 6.5-31	$C = \frac{1}{2}g\left(\frac{A}{\sigma}\right) + \frac{1}{2}\left(-\frac{A}{\sigma}\right)$	$C = \frac{1}{2}g\left(\frac{A}{\sigma}\right) + \frac{1}{2}g\left(-\frac{A}{\sigma}\right) = g\left(\frac{A}{\sigma}\right)$
363	Figure 6.5-5	Substitute the figure with the one shown following the errata table.	
366	Figure 6.5-7	Substitute the figure with the one shown following the errata table.	
396	Problem 6.69	$C \leq \frac{1}{2}(C_1 + C_2)$	$C < \frac{1}{2}(C_1 + C_2)$
373	Eq. 6.8-13 line 2	$\sqrt{p(1-p) + (1-p)p}$	$\left(\sqrt{p(1-p)} + \sqrt{(1-p)p}\right)$
374	Eq. 6.8-15, first line	$\sum_{\boldsymbol{x}_m \in \mathscr{X}^n} \sum_{\boldsymbol{x}_{m'} \in \mathscr{X}^n} P_{m\to m'}$	$\sum_{\boldsymbol{x}_m \in \mathscr{X}^n} \sum_{\boldsymbol{x}_{m'} \in \mathscr{X}^n} p(\boldsymbol{x}_m)p(\boldsymbol{x}_{m'})P_{m\to m'}$
376	line 5	Change to: In addition, in these channels the PDF...	
378	lines 8 and 10	$Q\left(\sqrt{R_0\gamma_b}\right)$	$Q\left(\sqrt{2R_0\gamma_b}\right)$
378	line 13	$Q\left(\sqrt{R_0\gamma_b}\right)$	$Q\left(\sqrt{2C\gamma_b}\right)$
388	Problem 6.38	$R(D) = \log M + \cdots$	$R(D) = \log M - H_b(D) - D\log(M-1)$ for $0 \leq D \leq \frac{M-1}{M}$ and $R(D) = 0$ otherwise.
390	line 3 from bottom	1.585.	1.585
394	line 13 from bottom	E_b	$\mathscr{E}_b$
396	last line	$\epsilon = 0.57$	$\epsilon = 0.5$
399	line 4 from bottom	$\left(\int_{-\infty}^{\infty} p_n(y - \sqrt{\mathscr{E}})p_n(y)\,dy\right)^2$	$\left(\int_{-\infty}^{\infty} \sqrt{p_n(y - \sqrt{\mathscr{E}})p_n(y)}\,dy\right)^2$
399	last line	$e^{-\mathscr{E}/N_0}$	$e^{-\mathscr{E}/2N_0}$
406	Table 7.1-3, row 7, col. 7	$X + 2 + X + 1$	$X^2 + X + 1$
414	line 9 from bottom	$\boldsymbol{H}$ has dimension $d_{\min} - 1$	$\boldsymbol{H}$ has dimension at least $d_{\min} - 1$
421	Eq. 7.3-4	Z^{m-1}	$Z^{2^{m-1}}$
422	line before Ex. 7.3-2	r rows of $\boldsymbol{G}_2$ at a time	r rows of $\boldsymbol{G}_1$ at a time
430	line before standard array	$n \times (n-k)$	$2^{n-k} \times 2^k$
439	line 5	we obtain the result	we obtain the result (see Figure 6.5-5)
440	two lines before Eq. 7.7-1	is equal to $d_{\min} - 1$	is at least equal to $d_{\min} - 1$
473	line 2	$14 \times 8 + 2 = 114$ bits	$15 \times 8 + 1 = 121$ bits

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Page	Location	Incorrect	Correct
483	line 2	is an Abelian group and	has distinct elements and
487	lines 3, 5 from bottom	$\sum_{i=0}^{n}$	$\sum_{i=0}^{t}$
490	Prob. 7.60 and 7.61	n	N
493	line 15	The Convolutional operation	The convolution operation
508	line 1	nonrecursive systematic codes	nonrecursive nonsystematic codes
508	line 9 from bottom	An (n, k) convolutional code	An $(n, 1)$ convolutional code
508	Eq. 8.1-37	$1 \leq i \leq k$	$1 \leq i \leq n$
511	Eq. 8.2-5	r_{jmc}	r_{jm}
514	Eq. 8.2-16	$(1-p)^{n-k}$	$(1-p)^{d-k}$
515	Eq. 8.2-17	$(1-p)^{n-k}$	$(1-p)^{d-k}$
527	Figure 8.5-1 (caption)	1996	1966
538	last two line	Change D to Z and N to Y	
560	line 2	... the each codeword ...	... each codeword ...
562	line 1	where $\boldsymbol{x}_m$	where each $\boldsymbol{x}_m$
562	line 10	of a M nodes	of M nodes
565	Fig. 8.10-9	Change μ_{x_1-g} to $\mu_{x_1\to g}$, μ_{x_n-g} to $\mu_{x_n\to g}$, and μ_{g-x_i} to $\mu_{g\to x_i}$	
593	line 5	$\sum_j \lvert\boldsymbol{r}_j - \boldsymbol{c}_j\rvert$	$\sum_j \lvert r_j - c_j\rvert$
593	line 6	Find an upper bound ...	Assuming $\mathscr{E}_c = 1$,
617	Eq. 9.2-66, second line	$\mathsf{P}[\ldots \lvert B = -2(M-2)d]$	$\mathsf{P}[\ldots \lvert B = -2(M-1)d]$
674	3rd line in Problem 9.1	$A(f)e^{j\theta(f)}$	$A(f)e^{-j\theta(f)}$
595	Prob. 8.23	Change to $\boldsymbol{r} = (0.3, 0.2, 1, -1.2, 1.2, 1.7, 0.3, -0.6)$	
832	line 7	Equation 14.1-1	Equation 13.1-1
885	line 9	where F_d	where f_m
889	in Fig. 13.6-3 (twice)	TF_d	Tf_m
896	line 10 from bottom	$r(t)$	$r_1(t)$
927	line 6 from bottom	If coding affects only ...	If fading affects only ...
947	Eq. 14.7-13	$p_b <$	$P_b <$
961	line 9	by ?)	by Tse and Viswanath (2004)

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Page	**Location**	**Incorrect**	**Correct**
964	line 2	$\sqrt{1-\alpha}$	$\sqrt{1-\alpha^2}$
964	Problem 14.13 line 2	PSK	FSK
964	line 3 from bottom	$\lvert x_i - \hat{x}_i \rvert^2$	$\sigma^2 \lvert x_i - \hat{x}_i \rvert^2$
987	Eq. 15.2-21	$\frac{(\pi/2)^{N(N-1)}}{[\Gamma_N(N)]^2} \exp \ldots$	$\frac{(\pi/2)^{N(N-1)}}{N! [\Gamma_N(N)]^2} \exp \ldots$
1009	line 18	(see Problem 15.15)	(see Problem 15.14)
1022	line 8	MIMO	SIMO
1022	line 16	C	$\bar{C}$
1023	line 17	$\boldsymbol{y}' = \boldsymbol{\Sigma s} + \boldsymbol{\eta}'$	$\boldsymbol{y}' = \boldsymbol{\Sigma s}' + \boldsymbol{\eta}'$
1023	line 19	... channel matrix $\boldsymbol{H}$	... channel matrix $\boldsymbol{H}$ and $\boldsymbol{s}' = \boldsymbol{V}^H \boldsymbol{s}$
1025	Problem 15.13	01101001110010	011010011100
1025	Problem 15.15	$\boldsymbol{C}$	$\boldsymbol{G}$
1091	Eq. B-6	$w = \frac{A\mu_{xx} + B\mu_{yy} + C\mu_{xy}^* + C^*\mu_{xy}}{....}$	$w = \frac{A\mu_{xx} + B\mu_{yy} + C^*\mu_{xy}^* + C\mu_{xy}}{....}$
1091	Eq. B-6	$\alpha_{2k} = \cdots + C\bar{X}_k^* \bar{Y}_k + C^* \bar{X}_k \bar{Y}_k^*$	$\alpha_{2k} = \cdots + C^*\bar{X}_k^* \bar{Y}_k + C \bar{X}_k \bar{Y}_k^*$
1118	Last reference	Remove this reference, instead refer to the second reference on page 1119.	

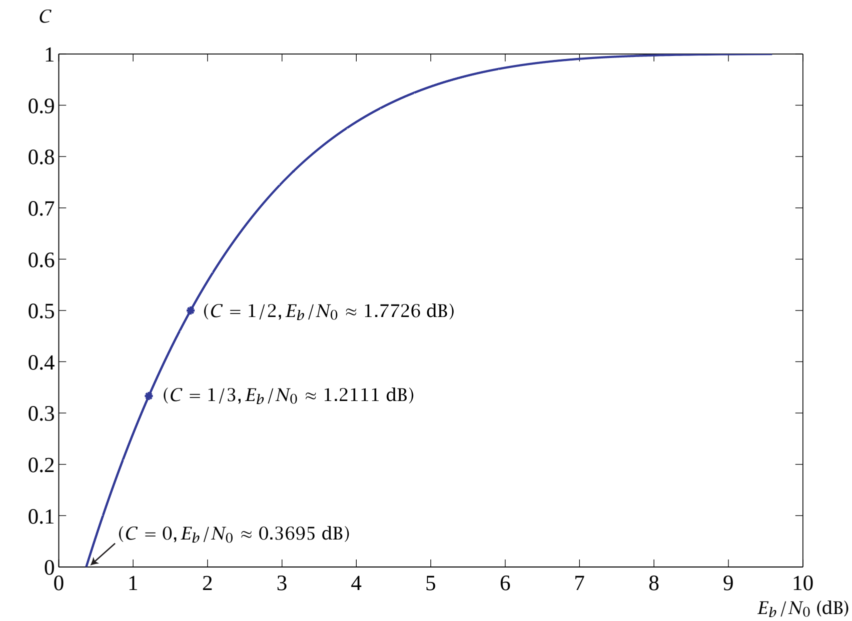

Figure 6.5-5: The capacity plot versus SNR per bit.

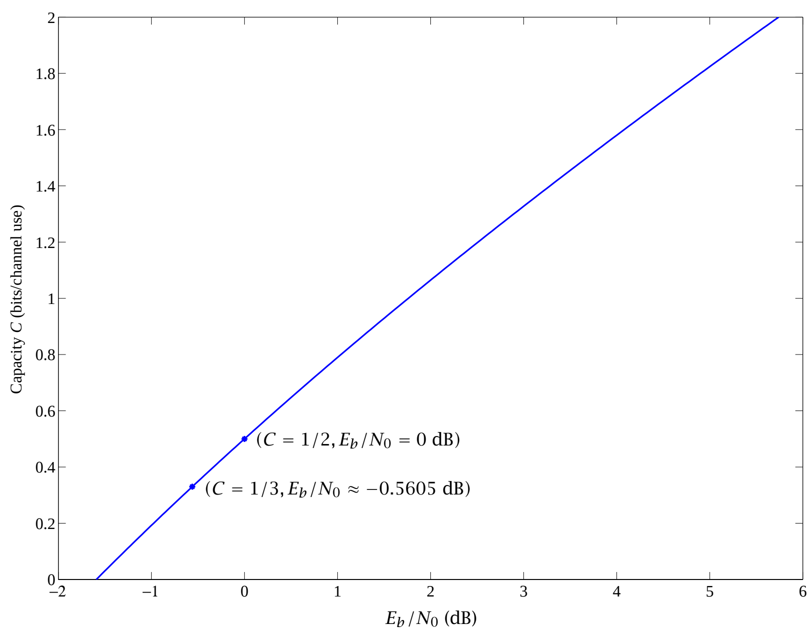

Figure 6.5-7: The capacity of a discrete-time AWGN channel.