Additions, Changes, and Corrections

for

Functions of One Complex Variable

(Second edition, fourth printing)

by

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This is a list of additions, changes, and corrections for my book Functions of One Complex Variable (Second Edition,Fourth Printing). These corrections also apply to the fifth and sixth printing. The book is currently in the seveth printing of the second edition and almost all of these corrections have been executed there.

I have a separate list of additions and changes that will appear in the next edition. This is also available from my WWW page.

The following mathematicians have helped me to compile this list. Joel Anderson, Jonathan Arazy, Rajendra Bhatia, H P Boas, G D Bruechert, R B Burckel, Paul Chernoff, Norma Elias, George Gaspar, Paul Halmos, Xun-Cheng Huang, M D Humphries, René Mata-Guarneros, Oisin McGuinness, David Minda, Jeff Nichols, Billy Rhoades, Stephen Rowe, William Salkin, Glenn Schober, Karl Stromberg, Thad Tarpey, Shelden Trimble, David Ullrich.

I would appreciate any further corrections or comments you wish to make.

Page	Line	From	To
xii	23	Mondromy	Monodromy
1	7	supermum	supremum
5	-10	in an nth	is an nth
5	-3	$\frac{1}{\sqrt{2}}(-1+i\sqrt{3})$	$\frac{1}{2}(-1+i\sqrt{3})$
5	-3	$\frac{1}{\sqrt{2}}(-1-i\sqrt{3})$	$\frac{1}{2}(-1-i\sqrt{3})$
10	11	its projection	its stereographic projection
15	14	one point	one end point
17	18	R	$\mathbb{R}$
17	20	R	$\mathbb{R}$
25	-4	Let $A \subseteq X$;	Let A be a non-empty subset of X;
25	-2	Let $A \subseteq X$;	Let A be a non-empty subset of X;
27	13	If K is a compact	If K is a non-empty compact
27	-4	are subsets	are non-empty subsets
28	6	are disjoint sets	are non-empty disjoint sets
29	-4	(Ω, p)	(Ω, ρ)
35	23	that f be	that g be
41	-14	Any function	Any real-valued function
42	16	$\frac{\phi(s,t)+\psi(x,t)}{s+it}$	$\frac{\phi(s,t)+i\psi(s,t)}{s+it}$
62	-9	denoted it by	denoted by
64	-4	$\mathbb{C}$	$\mathbb{R}$
75	-2	$(-1)^n\binom{2n}{n}$	$(-1)^{n-1}\binom{2n}{n}$
80	-2	$e^{2\pi int}$.	$e^{2\pi int}, 0 \le t \le 1$.
83	15	$z \ge R$	$\|z\| \ge R$
85	1	By Lemma 5.1 . . . on $\mathbb{C}$;	By Lemma 5.1 g is analytic on H and by an analogue of Leibniz's rule (for example, see Exercise 2.2) g is analytic on G;
85	-14	Define $g(z,w)$	Define $\phi(z,w)$
87	10	$B(\pm 1; \frac{1}{2})$	$\bar{B}(\pm 1; \frac{1}{2})$
99	-12	each $z \in \Omega$	each $z \in G$
100	16	then	*then*
100	-6	triangle	triangular
101	-13	(II.3.6)	(II.3.7)
107	-8	$\|z-a\| > r_1$	$\|z-a\| > R_1$
117	-5	This can more easily be obtained by using the substitution $x \to 1/x$.	
122	8	decrease the spaces between $\cos^2$ and x and between $\sinh^2$ and y	
122	9	decrease the spaces between $\sin^2$ and x and between $\sinh^2$ and y	
130	-13	Re f(z)	*Re* $f(z)$
131	17	D onto	D into
131	22	$= \partial D$.	$= \partial D$, and, from the preceding material,$\phi(D) = D$.
138	4,6	Circle	Circles
140	-11	$\exp(\|z)^a$	$\exp(\|z\|^a$
141	-10	δ	ϵ
141	-9	$\lim_{r\to 0}$	$\lim_{r\to\infty}$
141	-9	$\exp(-\epsilon/r$	$\exp(-\epsilon/r)$
141	-12	$\bigcup_{n=1}^{\infty} K_n$	The ∞ is not clear
146	-6	Theorem II. 4.9 $\mathcal{F}$	Theorem II.4.9, $\mathcal{F}$ `(also correct spacing)`
147	-2	as $k \to \infty$	as $j \to \infty$
149	-5	be compact	be a compact

150	-2	is equicontinuous.	is equicontinuous at each point of G.
153	-11	Ascoli-Arzela	Arzela-Ascoli
153	-4	$\|f(a) - f(z)\| \leq$	$\|f(a) - f(z)\| =$
154	-1	Show that	If G is a region, show that
156	17	put $M = \|f(a)\|$	put $M = \|f(a)\| + 1$.
160	18	is analytic	is an analytic
167	-10	theorem	lemma
176	13	situation).	situation?)
186	8	$(\cos\theta)^{2u-1}(\sin\theta)2^{v-1}$	$(\cos\theta)^{2u-1}(\sin\theta)^{2v-1}$
188	14	$\delta > \beta > \alpha$	$\delta > \beta > \alpha > 0$
195	2	Theorem	theorem
206	3	$k \leq 1$	$k \geq 1$
206	-12	sequences of distinct points in G	sequences of distinct points in G without limit points in G
209	-13	a free ideal	a proper free ideal
209	-5	k_n	$k_n + 1$
209	-4	k_n	$k_n + 1$
211	19	$\int_T f$	$\int_T g$
211	19	$\int_P f$	$\int_P g$
213	-13	x in $G_0 f(x)$	x in $G_0, f(x)$
213	-12	$G+$	G_+
214	-9,-8	$f_s(z) = f_t(z), z \in D_s \cap D_t$ whenever $\|s - t\| < \delta$	$f_s(z) = f_t(z)$, whenever $\|s - t\| < \delta$ and z belongs to the component of $D_s \cap D_t$ that contains $\gamma(s)$.
215	22	But since	Let H be a connected subset of $D_t \cap B_t$ which contains $\gamma(s)$ and $\gamma(t)$. But since
215	22	z in $D_t \cap B_t$.	z in H.
215	27	$\|s - t\| < \delta$; so $G = D_t \cap B_t \cap Ds \cap Bs$ contains $\gamma(s)$ and, therefore, is a non-empty open set.	$\|s - t\| < \delta$. Let G be a region such that $\gamma((t - \delta, t + \delta)) \subseteq G \subseteq D_t \cap B_t$; in particular, $\gamma(s) \in G$.
228	6	for all z in $B \cap D$	for all z in the component of $B \cap D$ that contains a
235	5	$(\mu \circ h^{-1})$	$(\mu \circ h^{-1})^{-1}$
235	-1	as in 6.3(c)	as in 6.3(b)
238	13	$\psi(f(x)) \in F$	$\phi(x) \in F$
238	-15	let $(V, \phi) \in \Phi$ such that	let $(V, \phi) \in \Phi$ with a in V such that
238	-12	not constant.	not constant on any component of $\phi(W)$.
239	4	6.3(c)	6.3(b)
239	24	There $\mathcal{F}$ consists	Then $\mathcal{F}$ consists
241	16	continuation along γ	continuation along γ with each D_t a disk
247	10	off [0, 1]	of [0, 1]
248	20	$\{(g_t, A_t,)\}$	$\{(g_t, A_t)\}$
248	-17	the component	a component
249	-2	$2\pi i[1 - t)$	$2\pi i[(1 - t)$
253	-2	then,	then
254	-9	$a\delta$	a δ
260	-9	$\frac{R^2 - r^2}{\|Re^{it} - re^{i\theta}\|^2}$	$\frac{R^2 - r^2}{\|R - re^{i\theta}\|^2}$
261	-10	Eliminate the material from "If $\rho < R$ then ..." to "for some constant C." on line -5. Substitute for this the following.	

"If $\rho < R$, then, for $m \leq n$, Harnack's Inequality applied to the positive harmonic function $u_n - u_m$ implies there is a constant C depending only on ρ and R such that $0 \leq u_n(z) - u_m(z) \leq C[u_n(a) - u_m(a)]$ for $|z - a| \leq \rho$."

268	10	$\lvert v(z) \rvert \leq 1$	$v(z) \leq 1$
271	12	$\mathbb{C}_\infty$ such that	$\mathbb{C}_\infty - G$ such that
271	18	Theorem VIII.3.2(c)	Theorem VIII.2.2(c)
272	9	barrier at a.	barrier at 0.
272	13	$(y - t/x)^2$	$(y - t)^2/x^2$
274	18	$\bigcup_{n=1}^{\infty} \{\gamma_m\}$	$\bigcup_{n=1}^{\infty} \{\gamma_n\}$
274	-8	to a harmonic function	to a harmonic function h
276	-9	$f(z_{n_k}) \to w$	$f(z_{n_k}) \to \omega$
284	-6	$< \frac{\alpha}{2}\lvert z \rvert^{\mu+1}$	$\leq \frac{\alpha}{2}\lvert z \rvert^{\mu+1}$
284	-3	$< \frac{1}{2}\alpha\lvert z \rvert^{\mu+1}.$	$< \frac{1}{2}\alpha\lvert z \rvert^{\mu+1} for \lvert z \rvert > r_3.$
286	-5	$\sum_{n-1}^{\infty}$	$\sum_{n=1}^{\infty}$
287	14	for some $\epsilon > 0$.	for some $\epsilon > 0$
287	-5	$f(0) = 1,$	$f(0) \neq 0$
288	-12	$\log 2n(r) \leq \log M(r)$	$(\log 2)n(r) \leq \log M(2r)$

288 -10 **Change the inequalities here from**

$$\begin{aligned} \log 2n(r)r^{-(p+1)} &\leq \log\,[M(r)]r^{-(p+1)} \\ &\leq r^{(\lambda+\epsilon)-(p+1)} \end{aligned}$$

to

$$\begin{aligned} (\log 2)n(r)r^{-(p+1)} &\leq \log\,[M(2r)]r^{-(p+1)} \\ &\leq r^{(\lambda+\epsilon)-(p+1)}2^{\lambda+\epsilon} \end{aligned}$$

289	-5	$\leq \log M(r)$. Since f has order λ, $\log M(r) \leq r^{\lambda+\frac{1}{2}\epsilon}$	$\leq \log M(2r)$. Since f has order λ, $\log M(2r) \leq (2r)^{\lambda+\frac{1}{2}\epsilon}$
289	-1	$k^{-(p+1/\lambda+\epsilon)}$	$k^{-(p+1)/(\lambda+\epsilon)}$
291	-4	Use Exercise 2.9	Use Exercise 2.8
291	-1	with zeros $\{\log 2, \log 3, ...\}$	with zeros $\{\log 2, \log 3, ...\}$ and no other zeros.
295	-5	$= \{a$	$= \{z$
296	-2	a branch of g of	a branch g of
297	6	$\sqrt{n-1}^{\pm 2}$	$\sqrt{n-1}^{\mp 2}$
300	4	Montel-Caratheodory	Montel-Carathéodory
301	25	value is possible)	value is possible
301	-19	Corollary XI.3.8).	Corollary XI.3.8.
301	-17	with one exception	with one possible exception
308	-10	conformed	conformal

317 **Add the following entry to the List of Symbols.**

$\partial_\infty G$ 129