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CORRECTION TO: "WELL-BEHAVED DERIVATIONS ON $C[0, 1]$"

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ERRATA
CORRECTION TO
WELL-BEHAVED DERIVATIONS ON $C(0,1)$

RALPH DELAUBENFELS

Volume **115** (1984), 73–80

We would like to thank Professor C. J. K. Batty for pointing out some errors. The theorems, as currently stated, are correct, but there are some mistakes in the proofs of Theorems 2 and 3. To correct the proofs, we need to make the following changes. Corrected proofs of Theorems 2 and 3 (as currently stated) will appear in a paper by Professor Batty.

#1. Definition 9, on p. 75, line 1, should be changed as follows

9. The derivation pD, on $C[0,1]$, is defined by

$$(pD)f(x) \equiv \begin{cases} p(x)f'(x) & \text{if } p(x) \neq 0 \\ 0 & \text{if } p(x) = 0 \end{cases}$$

with $D(pD) \equiv \{f \in C[0,1] \mid f'(x) \text{ exists, when } p(x) \neq 0,\ (pD)f \in C[0,1]\}$.

Batty [**1**] showed that, when A is closed and well-behaved, A is equivalent to a restriction of pD, for some real-valued p in $C_0[0,1]$. More generally, Batty characterized closed quasi well-behaved derivations (see [**1**], Theorem 3.7—our operator pD is the operator "D_{p0}" in [**1**]).

Since pD is now a closed operator, "$\overline{pD}$" may be replaced by "pD", in the remainder of the paper.

#2. To finish the second half of the proof of Theorem 2, we need the following lemma placed between Theorems 1 and 2.

LEMMA 1a. *Suppose $f_1(x) \equiv x$ is in $D(A)$, and A is a generator. Then, for all f in $D(A)$, $f'(x)$ exists whenever $p(x) \equiv (Af_1)(x) \neq 0$, and $(Af)(x) = p(x)f'(x)$.* (Proof below.)

Then p. 76, line (-1), should be "Let A be the generator of T_t. By Lemma 1a, when f is in $D(A)$, $f'(x)$ exists, whenever $p(x) \neq 0$. When $p(x) = 0$, then $(T_tf)(x) = f(x)$, for all t, so that $(Af)(x) = 0$. Thus $A \subseteq pD$; since A is a generator, and pD is well-behaved, $A = pD$."

#3. p. 77, line 7, should be " ... that A is equivalent to a restriction of pD. Since A is a generator and pD is well-behaved, A is equivalent to pD. By Theorem 2 ... "

#4. The example on p. 77 fails to be m-accretive, because, since $p(1) < 0$, (pD) is not accretive.

Proof of Lemma 1a. Let T_t be the group of $*$-automorphisms generated by A. There exists a group of homeomorphisms of $[0,1]$, $h(x,t)$, such that

$$(T_t f)(x) = f(h(x,t)),$$

for f in $C[0,1]$, x in $[0,1]$ t real.

Suppose f is in $D(A)$. Let $f_x(t) \equiv (T_t f)(x)$, $h_x(t) \equiv h(x,t)$. Note that

$$(*) \qquad f_x = f \circ h_x.$$

Since f is in $D(A)$, $f_x'(t)$ exists, and equals $(-Af)(h(x,t))$, for all x, t. Also $h_x'(t) = -p(h(x,t))$, since

$$p(h(x,t)) = T_t A f_1(x) = -\frac{\partial}{\partial t} T_t f_1(x) = -\frac{\partial}{\partial t} h(x,t).$$

If $p(x) \neq 0$, then by the inverse function theorem, h_x^{-1} exists, and is differentiable, in a neighborhood of $h_x(0)$. Thus $f = f_x \circ h_x^{-1}$ is differentiable, in a neighborhood of $h_x(0)$. Differentiating both sides of $(*)$ at $t = 0$, gives $(Af)(h(x,0)) = f'(h(x,0))p(h(x,0))$ or $(Af)(x) = p(x)f'(x)$, as desired.

ERRATA
CORRECTION TO PLANE CURVES AND REMOVABLE SETS

R. KAUFMAN

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In Theorem 2, p. 409,
$\limsup \omega(h)/\psi(h)$ should be $\liminf \omega(h)/\psi(h)$.

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