TRANSACTIONS OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 216, 2976

ERRATUM TO A "CONSTRUCTIVE ERGODIC THEOREM"

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Reinhard Lang has kindly pointed out to me that the inequality at the top of p. 129 of [1] is incorrect. The argument, beginning at the bottom of p. 128, should therefore be amended to read:

Let $\epsilon > 0$. By the preceding, there is an increasing sequence of integers $\{n(i): i = 1, 2, 3, \ldots\}$ such that, for each positive integer i, the set

$$A_{n(i),m} = \{x: \max[|f^k(x) - f^j(x)|: n(i) \leqslant k, j \leqslant m] > \epsilon \cdot 2^{-i}\}$$

has measure less than $\epsilon \cdot 2^{-i}$ for all integers $m \geqslant n(i)$. As a consequence, the series $\Sigma_{i=1}^{\infty} \mu(A_{n(i),n(i+1)})$ converges so that the set

$$A(\epsilon) = \bigcup_{i=1}^{\infty} A_{n(i),n(i+1)}$$

is integrable and has measure less than ϵ.

Now if $x \epsilon - A(\epsilon)$, then $|f^k(x) - f^j(x)| \leqslant \epsilon \cdot 2^{-i}$ for $n(i) \leqslant j, k \leqslant n(i + 1)$ and for each positive integer i. So far any positive intgers k, j, p, q satisfying $n(p + 1) \geqslant k \geqslant n(p) \geqslant n(q + 1) \geqslant j \geqslant n(q)$ and for each x in $-A(\epsilon)$, we have the estimate

$$|f^k(x) - f^j(x)| \leqslant |f^k(x) - f^{(p)}(x)| + \sum_{i=q+1}^{p-1} |f^{n(i+1)}(x) - f^n(x)| + |f^{n(q+1)}(x) f^j(x)|$$

where the right-hand side is dominated by

$$\sum_{i=q}^{p} \epsilon \cdot 2^{-i} < \epsilon \cdot 2^{-q+1}.$$

This estimate implies that the sequence $\{f^n\}$ is uniformly Cauchy on $-A(\epsilon)$. Since $\epsilon > 0$ was arbitrary, we can conclude, in particular, that the sequence $\{f^n\}$ is Cauchy almost everywhere.

REFERENCE

1. J. A. Nuber, *A constructive ergodic theorem*, Trans. Amer. Math. Soc. **64** (1972), 115–137. MR 45 #504.

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