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Erratum to the paper "On the Kaczmarz algorithm of approximation in infinite-dimensional spaces"

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by

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There is an error in the proof of Proposition 2 in the above mentioned paper. The arguments on page 83, lines 13–10 from the bottom, which show that $\sum_{n=0}^{\infty}|c_n|<\infty$ leads to a contradiction, are false. However, this fact is true and it can be justified as follows:

Since the function $1/F(z)=\sum_{k=0}^{\infty}c_k z^k$ is continuous on $\mathbb{D}\cup\mathbb{T}$, not identically zero, and the sequence (z_0^k) is dense in $\mathbb{T}$, there exists an integer l such that

$$\lim_{r\to 1-}(1-r)F(rz_0^l)=\lim_{r\to 1-}(1-r)\sum_{k=0}^{\infty}h(z_0^k)z_0^{kl}r^k=0.$$

For each continuous function f on $\mathbb{T}$ we have

$$\lim_{r\to 1-}(1-r)\sum_{k=0}^{\infty}f(z_0^k)r^k=\int_{\mathbb{T}}f(z)\,dz.$$

Indeed, this equality holds true for each function $f(z)\equiv z^m$ where m is an integer, the family of such functions is linearly dense in $C(\mathbb{T})$, and we have $|(1-r)\sum_{k=0}^{\infty}f(z_0^k)r^k|\le\|f\|$ for each $0<r<1$. As a result we find that $\int_{\mathbb{T}}h(z)z^l\,dz=\widehat{h}(-l)=0$. This contradicts the assumption that $\widehat{h}(m)=|\widehat{b}(m)|^2\neq 0$ for each integer m.

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