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Corrigendum to “Spectral analysis for rank one perturbations of diagonal operators in non-archimedean Hilbert space”

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Corrigendum
to “Spectral analysis for rank one perturbations of diagonal operators in non-archimedean Hilbert space"

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Keywords: non-archimedean Hilbert space, fractional non-archimedean Hilbert space, bounded operator, operator adjoint, succession operator

Classification: 47S10, 46S10

In the paper [Spectral analysis for rank one perturbations of diagonal operators in non-archimedean Hilbert space, Comment. Math. Univ. Carolin. 50 (2009), no. 3, 385–400] by T. Diagana and G.D. Mc Neal, one needs to replace assumption (vi) [in Section 4, Spectral Analysis], that is: Replace:

“(vi) $0 < m_\alpha := \inf_{j \in \mathbb{N}} |\alpha_j| |\omega_j|^{1/2} \leq \|X - \alpha_0 e_0\| = \sup_{j \geq 1} |\alpha_j| |\omega_j|^{1/2} < \hat{m}$, where $\hat{m}$ is the constant appearing in (v).”

with the following:

“(vi) $\|X - \alpha_0 e_0\| = \sup_{j \geq 1} |\alpha_j| |\omega_j|^{1/2} < \hat{m}$, where $\hat{m}$ is the constant appearing in (v).”

Indeed, since $X \in c_0(\mathbb{N}, \omega, \mathbb{K})$, it does make sense to suppose that

$$\inf_{j \in \mathbb{N}} |\alpha_j| |\omega_j|^{1/2} = m_\alpha > 0.$$  

Consequently, the proof of Proposition 4.3(ii) needs to be slightly modified as follows: Replace:

“Using assumption (vii) it follows that

$$\left| \left( \frac{\lambda_j - 1}{\lambda_j - \theta_j} \right) x_j \right| = \left| \left( \frac{\lambda_j - 1}{-\omega_j \alpha_j \beta_j} \right) x_j \right|$$

$$= \frac{|\lambda_j - 1|}{|\alpha_j| |\omega_j|^{1/2}} \|x_j \hat{e}_j\|$$

$$\leq \frac{\max(1, \hat{M})}{m_\alpha} \cdot \|x_j \hat{e}_j\|.$$  

Now $|x_0| = \lim_{j \to \infty} |(\frac{\lambda_j - 1}{\lambda_j - \theta_j}) x_j| = 0$, as $\lim_{j \to \infty} \|x_j \hat{e}_j\| = 0.$”
with the following:

“Using assumption facts \(|\omega_j| > 1\) for all \(j \geq 1\) and \(|\alpha_j\beta_j| = 1\) for all \(j \in \mathbb{N}\) [see assumption (vii) and Remark 4.1(1)] it follows that for all \(j \geq 1\),

\[
\left| \frac{\lambda_j - 1}{\lambda_j - \theta_j} \right| x_j = \left| \frac{\lambda_j - 1}{\omega_j \alpha_j \beta_j} \right| x_j \\
= \left| \frac{\lambda_j - 1}{\alpha_j \omega_j} \right|^{1/2} \| x_j \hat{e}_j \| \\
= \left| \frac{\beta_j}{\omega_j} \right| \left( \frac{\lambda_j - 1}{\omega_j} \right)^{1/2} \| x_j \hat{e}_j \| \\
\leq \max \left( 1, \frac{M}{\beta_j} \right) \left( \frac{\beta_j}{\omega_j} \right) \left( \frac{\lambda_j - 1}{\omega_j} \right)^{1/2} \| x_j \hat{e}_j \| \\
< \max \left( 1, \frac{M}{\beta_j} \right) \left( \frac{\lambda_j - 1}{\omega_j} \right)^{1/2} \| x_j \hat{e}_j \| .
\]

Now \(|x_0| = \lim_{j \to \infty} \left| \frac{\lambda_j - 1}{\lambda_j - \theta_j} \right| x_j | = 0\), as \(\lim_{j \to \infty} \left| \frac{\lambda_j - 1}{\omega_j} \right|^{1/2} = 0\), and \(\lim_{j \to \infty} \| x_j \hat{e}_j \| = 0\).”

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**References**


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