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

with the following:

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

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

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

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

"Using assumption (vii) it follows that

$$\begin{aligned} \left|\left(\frac{\lambda_j - 1}{\lambda_j - \theta_j}\right) x_j\right| &= \left|\left(\frac{\lambda_j - 1}{-\omega_j \alpha_j \beta_j}\right) x_j\right| \\ &= \frac{\left|\lambda_j - 1\right|}{\left|\alpha_j\right| \left|\omega_j\right|^{1/2}} \left\|x_j \widehat{e}_j\right\| \\ &\leq \frac{\max(1, \widehat{M})}{m_\alpha} \cdot \left\|x_j \widehat{e}_j\right\|. \end{aligned}$$

Now $|x_0| = \lim_{j\to\infty} |(\frac{\lambda_j - 1}{\lambda_j - \theta_j}) x_j| = 0$, as $\lim_{j\to\infty} \|x_j \widehat{e}_j\| = 0$."

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 $j \geq 1$,

$$\begin{aligned}
\left|\left(\frac{\lambda_j - 1}{\lambda_j - \theta_j}\right) x_j\right| &= \left|\left(\frac{\lambda_j - 1}{-\omega_j \alpha_j \beta_j}\right) x_j\right| \\
&= \frac{|\lambda_j - 1|}{|\alpha_j|\,|\omega_j|^{1/2}}\, \|x_j \widehat{e}_j\| \\
&= \frac{|\beta_j|\,|\lambda_j - 1|}{|\omega_j|^{1/2}}\, \|x_j \widehat{e}_j\| \\
&= \frac{|\lambda_j - 1|\,|\beta_j|\,|\omega_j|^{1/2}}{|\omega_j|}\, \|x_j \widehat{e}_j\| \\
&\leq \max\left(1, \widehat{M}\right) \frac{|\beta_j|\,|\omega_j|^{1/2}}{|\omega_j|} \cdot \|x_j \widehat{e}_j\| \\
&< \max\left(1, \widehat{M}\right) |\beta_j|\,|\omega_j|^{1/2} \cdot \|x_j \widehat{e}_j\|.
\end{aligned}$$

Now $|x_0| = \lim_{j\to\infty} |(\frac{\lambda_j - 1}{\lambda_j - \theta_j}) x_j| = 0$, as $\lim_{j\to\infty} |\beta_j\, |\omega_j|^{1/2} = 0$, and $\lim_{j\to\infty} \|x_j \widehat{e}_j\| = 0$."

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References

[1] Diagana T., McNeal G.D., *Spectral analysis for rank one perturbations of diagonal operators in non-archimedean Hilbert space*, Comment. Math. Univ. Carolin. **50** (2009), no. 3, 385–400.

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