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Aequationes Mathematicae

Correction to: One-sided invertibility of discrete operators with bounded coefficients

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6. Addendum

By the sufficiency in Theorem 3.12, the left (resp., right) invertibility of the operators $A \in \{A_E, \widetilde{A}_E, A_{E_m}, \widetilde{A}_{E_m}\}$ on the spaces l^p $(1 < p < \infty)$ follows from the invertibility of the operator $A^\diamond A$ (resp., $AA^\diamond$). The Fredholmness of such operators A is not necessary for their one-sided invertibility (for example, the right invertible operator $A_{E_m} = E_m$ is not Fredholm for $|m| > 1$). On the other hand, the invertibility criterion for the operators $B \in \{A^\diamond A, AA^\diamond\}$ presented in Theorem 3.15 is also valid if $B \in \mathcal{W}_p$ and $A \notin \mathcal{W}_p$.

As a result, Theorems 4.4, 4.5, 5.4, 5.5 can be essentially reinforced by excluding the Fredholm condition for the operators $A_E, \widetilde{A}_E, A_{E_m}, \widetilde{A}_{E_m}$, respectively, and applying the invertibility criterion from Theorem 3.15.

The modified theorems have the following form.

Theorem 6.1. *The operator A_E given by* (4.2) *and satisfying* (4.3) *is left invertible on the space l^p for $p \in (1, \infty)$ if for $B = A_E^\diamond A_E$ and all sufficiently large $n \in \mathbb{N}$ the operators $B_n^\pm = P_n^\pm B P_n^\pm$ are invertible on the spaces $P_n^\pm l^p$, respectively, and the $(2n-1) \times (2n-1)$ matrix $B_{n,0}$ defined for $B = A_E^\diamond A_E$ by* (3.33) *is invertible. The operator A_E given by* (4.2) *and satisfying* (4.3) *and condition* (A) *is right invertible on the space l^p for $p \in (1, \infty)$ if for $B = A_E A_E^\diamond$ and all sufficiently large $n \in \mathbb{N}$ the operators $B_n^\pm = P_n^\pm B P_n^\pm$ are invertible on the spaces $P_n^\pm l^p$, respectively, and the $(2n-1) \times (2n-1)$ matrix $B_{n,0}$ defined*

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for $B = A_E A_E^\diamond$ *by* (3.33) *is invertible. Under these conditions, one of the left (resp., right) inverses of the operator* A_E *is given by* $A_E^L = (A_E^\diamond A_E)^{-1} A_E^\diamond$ *(resp., by* $A_E^R = A_E^\diamond (A_E A_E^\diamond)^{-1}$*).*

Theorem 6.2. *The operator* $\widetilde{A}_E$ *given by* (4.2) *and satisfying* (4.3) *is left invertible on the space* l^p *for* $p \in (1, \infty)$ *if for* $B = \widetilde{A}_E^\diamond \widetilde{A}_E$ *and all sufficiently large* $n \in \mathbb{N}$ *the operators* $B_n^\pm = P_n^\pm B P_n^\pm$ *are invertible on the spaces* $P_n^\pm l^p$*, respectively, and the* $(2n-1) \times (2n-1)$ *matrix* $B_{n,0}$ *defined for* $B = \widetilde{A}_E^\diamond \widetilde{A}_E$ *by* (3.33) *is invertible. The operator* $\widetilde{A}_E$ *given by* (4.2) *and satisfying* (4.3) *and condition* (B) *is right invertible on the space* l^p *for* $p \in (1, \infty)$ *if* E *is a permutation operator and for* $B = \widetilde{A}_E \widetilde{A}_E^\diamond$ *and for all sufficiently large* $n \in \mathbb{N}$ *the operators* $B_n^\pm = P_n^\pm B P_n^\pm$ *are invertible on the spaces* $P_n^\pm l^p$*, respectively, and the* $(2n-1) \times (2n-1)$ *matrix* $B_{n,0}$ *defined for* $B = \widetilde{A}_E \widetilde{A}_E^\diamond$ *by* (3.33) *is invertible. Under these conditions, one of the left (resp., right) inverses of the operator* $\widetilde{A}_E$ *is given by* $\widetilde{A}_E^L = (\widetilde{A}_E^\diamond \widetilde{A}_E)^{-1} \widetilde{A}_E^\diamond$ *(resp., by* $\widetilde{A}_E^R = \widetilde{A}_E^\diamond (\widetilde{A}_E \widetilde{A}_E^\diamond)^{-1}$*).*

Theorem 6.3. *Let* $p \in (1, \infty)$ *and* $m \in \mathbb{Z} \setminus \{0\}$*. Then the slant-dominated discrete Wiener-type operator* A_{E_m} *is left (resp., right) invertible on the space* l^p *if for* $B = A_{E_m}^\diamond A_{E_m}$ *(resp., for* $B = A_{E_m} A_{E_m}^\diamond$*) and for all sufficiently large* $n \in \mathbb{N}$ *the operators* $B_n^\pm = P_n^\pm B P_n^\pm$ *are invertible on the spaces* $P_n^\pm l^p$*, respectively, and the* $(2n-1) \times (2n-1)$ *matrix* $B_{n,0}$ *given by* (3.33) *for* $B = A_{E_m}^\diamond A_{E_m}$ *(resp., for* $B = A_{E_m} A_{E_m}^\diamond$*) is invertible. Under these conditions, one of the left (resp., right) inverses of the operator* A_{E_m} *is given by* $A_{E_m}^L = (A_{E_m}^\diamond A_{E_m})^{-1} A_{E_m}^\diamond$ *(resp., by* $A_{E_m}^R = A_{E_m}^\diamond (A_{E_m} A_{E_m}^\diamond)^{-1}$*).*

Theorem 6.4. *Let* $p \in (1, \infty)$ *and* $m \in \mathbb{Z} \setminus \{0\}$*. Then the slant-dominated discrete Wiener-type operator* $\widetilde{A}_{E_m}$ *is left (resp., right) invertible on the space* l^p *if for* $B = \widetilde{A}_{E_m}^\diamond \widetilde{A}_{E_m}$ *(resp., for* $B = \widetilde{A}_{E_m} \widetilde{A}_{E_m}^\diamond$*) and for all sufficiently large* $n \in \mathbb{N}$ *the operators* $B_n^\pm = P_n^\pm B P_n^\pm$ *are invertible on the spaces* $P_n^\pm l^p$*, respectively, and the* $(2n-1) \times (2n-1)$ *matrix* $B_{n,0}$ *given by* (3.33) *for* $B = \widetilde{A}_{E_m}^\diamond \widetilde{A}_{E_m}$ *(resp., for* $B = \widetilde{A}_{E_m} \widetilde{A}_{E_m}^\diamond$*) is invertible, where* $|m| = 1$ *in the case of right invertibility. Under these conditions, one of the left (resp., right) inverses of the operator* $\widetilde{A}_{E_m}$ *is given by* $\widetilde{A}_{E_m}^L = (\widetilde{A}_{E_m}^\diamond \widetilde{A}_{E_m})^{-1} \widetilde{A}_{E_m}^\diamond$ *(resp., by* $\widetilde{A}_{E_m}^R = \widetilde{A}_{E_m}^\diamond (\widetilde{A}_{E_m} \widetilde{A}_{E_m}^\diamond)^{-1}$*).*

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