RESEARCH PROBLEM

3. Albert Wilansky: *An elementary inequality.*

Given $\sum |b_k| < \infty$, must there exist a constant M such that whenever $\{x_n\}$ is a convergent sequence satisfying $\left| \sum_{k=1}^{n-1} b_k x_k + x_{n-1} + x_n \right| < 1$ for all n, then $|\lim x_n| < M$?

Remarks. This asks, of course whether lim is continuous in a certain topology. The result is true if the term x_{n-1} is omitted (Mazur, see [**1**]), it is also true if all $b_n = 0$ [since $\lim x_n = (1/2) \lim(x_{n-1} + x_n)$].

The given transform is $Bx + 2Ax$ where $A_n(x) = (1/2)(x_{n-1} + x_n)$, $B_n(x) = \sum_{k=1}^{n-1} b_k x_k$, B is in the radical of the Banach Algebra of triangular conservative matrices, A is regular. See [**1**; **3**].

If the answer to the question is no, this will provide a second example (the first is due to Zeller, see [**2**]), of a coregular matrix with no equivalent regular matrix.

References

1. E. K. Dorff and A. Wilansky, *Remarks on summability*, especially Remark 3, J. London Math. Soc. vol. 35 (1960) p. 235.

2. A. Wilansky, *Summability; the inset, the basis in summability space*, Duke Math. J. vol. 19 (1952) especially p. 657.

3. A. Wilansky and K. Zeller, *Banach algebra and summability*, Illinois J. Math. vol. 2 (1958) pp. 378–385.

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