

Semiregular matrices and associated ideals

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15-16 VI 2019

These results were obtained jointly with Pratulananda Das and Rafał Filipów.

A known result of Toeplitz is that an infinite matrix $A = (a_{i,k})$ with non-negative elements is regular if and only if $\lim_{i \rightarrow \infty} a_{i,k} = 0$ for every $k \in \mathbb{N}$ and $\lim_{i \rightarrow \infty} \sum_{k \in \mathbb{N}} a_{i,k} = 1$. We consider the new notion of semiregular matrix, where the latter condition is replaced with $\lim_{i \rightarrow \infty} \sum_{k \in \mathbb{N}} a_{i,k} = \infty$. This new concept is naturally divided into two subtypes depending on whether $\sum_{k \in \mathbb{N}} a_{i,k}$ is infinite for infinitely many $i \in \mathbb{N}$.

We investigate ideals associated with matrices, either regular or semiregular of some type. We will show examples of ideals belonging to these classes of ideals, examine their properties and present all the relationships between these classes.