Minimal topologies on semigroups of matrix units

Markiian Khylynskyi
(Faculty of Mathematics, National University of Lviv, Universytetska 1, Lviv, 79000, Ukraine)
E-mail: khymarkiyan@gmail.com

Pavlo Khylynskyi
(Faculty of Mathematics, National University of Lviv, Universytetska 1, Lviv, 79000, Ukraine)
E-mail: khypavlo@gmail.com

Let λ be a cardinal. The *semigroup of matrix units* is the set $B_\lambda = \lambda \times \lambda \sqcup \{0\}$ with the following semigroup operation:

$$(\alpha, \beta) \cdot (\gamma, \delta) = \begin{cases} (\alpha, \delta), & \text{if } \beta = \gamma; \\ 0, & \text{if } \beta \neq \gamma, \end{cases}$$

and $(\alpha, \beta) \cdot 0 = 0 \cdot (\alpha, \beta) = 0 \cdot 0 = 0$, for all $\alpha, \beta, \gamma, \delta \in \lambda$. If S is a semigroup and τ is a Hausdorff topology on the set S, then τ is called a *semigroup topology* if the multiplication function from $S \times S$ (with the product topology) to S is continuous. A semigroup together with a semigroup topology is referred to as a *topological semigroup*. The topologies on semigroup of matrix units were investigated in [1, 2]. In particular, in [1] Gutik and Pavlyk proved the existence of minimal semigroup topologies on semigroup of matrix units. In this talk, we describe all minimal topologies in some class of semigroup topologies on semigroup of matrix units.

References

[1] O. Gutik, and K. Pavlyk. On topological semigroups of matrix units. *Semigroup Forum* 71 (2005), no. 3, 389-400.
[2] O. Gutik, K. Pavlyk, and A. Reiter. Topological semigroups of matrix units and countably compact Brandt λ^0-extensions, *Mat. Stud.* 32 (2009), no. 2, 115-131.