International Workshop on Dynamical Systems and Applications (IWDSA 2019)
In Memory of Prof. Dr. Aydın Tiryaki
Gazi University, Ankara, Turkey, 3-4 May 2019

On the construction a topology on a monoid and a group using prefilters

G. Efeoglu[1], C. Vural[2]

[1] *Gazi University, Ankara, Turkey, efeoglugokce1@gmail.com*
[2] *Gazi University, Ankara, Turkey, cvural@gazi.edu.tr*

Abstract

A map f of the product $X \times Y$ of topological spaces X and Y into a topological space Z is said to be separetely continuous if, for each (x_0, y_0) in $X \times Y$, the maps $g : X \to Z$; $g(x) = f(x, y_0)$ and $h : Y \to Z$; $h(y) = f(x_0, y)$ are continuous. When f is continuos at (x_0, y_0) relative to the product topology, we say that f is jointly continuos at (x_0, y_0).

A semigroup (monoid, group, respectively) $(S, \cdot)$ equipped with a topology τ is called a topologized semigroup (monoid, group respectively). A topologized group $(G, \cdot, \tau)$ is semitopological group (paratopological group respectively) if the group operation $(x, y) \to x \cdot y$ from $G \times G \to G$ is separetely (resp., jointly) continuous mapping. A paratopological group G in which the mapping $x \to x^{-1}$ from G to G is continuos called a topological group.

In this talk, we will present a way of constructing a topology on a monoid M using prefilter, with this topology, M becomes right topological monoid and all right translations are open. Essentially using the construction we can make semitopologize or paratopologize many Abelian groups. However, to make a group into a topological group is much more complicated matter. We also present some conditions on mentioned prefilters to guarantee that the topology, defined in this construction, on an infinite absract group will turn G into a Hausdorff topological group.

Key Words: Monoid, Semi-topological group, Paratopological group, Prefilter.

References

[1] A. Arhangel'skii, M. Tkachenko, Topological Groups and Related Structures, Atlantis Press, World Scientific, Amsterdam-Paris, 2008.

[2] W.B. Moors, Some Baire semitopological groups that are topological groups, Topology and Its Applications, 230 (2017), 381-392.