

Abstract

SOME FURTHER STUDIES ON GENERALIZED CONVERGENCE AND RELATED CONTINUITY IN (L)-GROUPS AND RIESZ SPACES

Sagar Chakraborty

[Index No.: 36/19/Maths/26]

The subject of our research is to study different type of Convergence of Sequences and Nets in (l)-groups and Riesz spaces. The tool, we used in our discussions is Summability theory, which is one of the milestones of Real analysis and Topology during the last century.

We can define convergence of sequence (or, Nets) in terms continuous functions. This usual convergence notion was further generalized in several ways by using asymptotic density (statistical convergence), ideal (ideal convergence), modulus function (f-statistical convergence), weighted density function (d_g -statistical convergence), Rough convergence in different spaces.

Our thesis contains six chapters. First two chapter's deals with basic idea related to content. Also, at the end of the thesis, we added one section containing the list of publications and bibliography.

In chapter 3, we consider the notion of generalized density, namely, the natural density of weight g recently introduced and primarily study some sufficient and almost converse necessary conditions for the generalized statistically convergent sequence under which the subsequence is also generalized statistically convergent. Also we consider similar types of results for the case of generalized statistically bounded sequence. Some results are further obtained in a more general form by using the notion of ideals. The entire investigation is performed in the setting of Riesz spaces.

In chapter 4, we introduce the notions of order quasi-Cauchy sequences, downward and upward order quasi-Cauchy sequences, order half Cauchy sequences. Next we consider an associated idea of continuity namely, ward order continuous functions and investigate certain interesting results. The entire investigation is performed in (l)-group setting to extend the recent results in this direction, observed by many authors.

In chapter 5, we introduce the notion of generalized relative order convergence in (l)-groups by using generalized density. We prove some results including a Cauchy type criterion. Furthermore we present an idea of ideal order convergence of sequences and study some of its properties by using the mathematical tools of the theory of (l)-group.

In chapter 6, we study the concept of statistical order convergence and some generalized statistical convergence in (l)-group by using weighted density and modulus function. We study some sufficient and almost converse necessary conditions for the generalized statistically convergent sequences under which the subsequence is also generalized statistically convergent. Also we consider similar type of results for the case of generalized statistically bounded sequences. The entire investigation is performed in the setting of (l)-group extending the recent results.

In chapter 7, we introduce the ideas of rough convergence and rough ideal convergence of nets in a locally solid Riesz space endowed with a topology τ and investigate some of its consequences. Almost all the results have already been published in the form of research papers in different journals of international repute.

Sagar Chakraborty 28/03/2024
(Full signature of the candidate)

P. Das Professor
DEPARTMENT OF MATHEMATICS
University
Kolkata - 700 032, West Bengal
Signature of the Supervisor with Seal
Date: 28/03/2024

Sudip Kumar Pal
Signature of the Co-Supervisor with Seal
Date: 28/03/2024
DR. SUDIP KUMAR PAL
Assistant Professor
Department of Mathematics
Diamond Harbour Women's University