

## LACUNARY $I_\sigma$ -CONVERGENCE

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**Abstract:** In this study, the concept of lacunary invariant uniform density of any subset A of the set  $\mathbb{N}$  of positive integers is defined. Associate with this, the concept of lacunary  $I$ -invariant convergence for real number sequences is given. Also, we examine relationships between this new type convergence concept and the concepts of lacunary invariant summability, strongly lacunary  $q$ -invariant convergence and lacunary invariant statistical convergence which are studied in this area before. Finally, introducing lacunary  $I^*$ -invariant convergence concept and lacunary  $I$ -invariant Cauchy sequence concepts, we give the relationships among these concepts and relationships with lacunary  $I$ -invariant convergence concept.

**Keywords:** Statistical convergence, lacunary sequence, invariant convergence,  $I$ -convergence,  $I$ -Cauchy sequence.

## EXISTENCE AND NONEXISTENCE FOR NONLINEAR PROBLEM

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**Abstract:** Let  $\phi \subset \mathbb{R}^n$  be a bounded regular domain of  $\mathbb{R}^n$ . We consider the following class of elliptic problem

$$\begin{cases} -\Delta u = \frac{u^q}{d^2} & \text{in } \Omega \\ u > 0 & \text{in } \Omega \\ u = 0 & \text{on } \partial\Omega \end{cases}$$

where  $0 < q \leq 2^* - 1$ . We investigate the question of existence and nonexistence of positive solutions depending on the range of the exponent  $q$ .

**Keywords:** Hardy inequality, Nonlinear elliptic problems, singular weight.