# MODULARED SEQUENCE SPACES

By

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A collection $R$ of sequences of real numbers is called a *modulared sequence spaces*, if a *modular* is defined on $R$ so that $R$ becomes a *modulared semi-ordered linear space.*[1]

The case, when the modular is of unique spectra, was considered by W. ORLICZ,[2] H. NAKANO[3] and I. HALPERIN–H. NAKANO.[4] The purpose of this paper is to generalize some of their results.

§ 1. A *modulared sequence space* is generated by a sequence of non-decreasing convex functions of a real variable:

$$f_1, f_2, \cdots\cdots$$

which satisfies the following properties:

(1) $f_\nu(0) = 0$ ;

(2) $\lim\limits_{\xi \to \alpha - 0} f_\nu(\xi) = f_\nu(\alpha)$ ;

(3) $\lim\limits_{\xi \to \infty} f_\nu(\xi) = +\infty$ ;

(4) there exists a real number $\alpha > 0$ (depending on each $f_\nu$) such that $f_\nu(\alpha) < +\infty$ ,

for every $\nu = 1, 2, \cdots$. Namely, $f_\nu$ ($\nu = 1, 2, \cdots$) are modulars on the space of real numbers.

For this sequence:

$$f_1, f_2, \cdots\cdots ,$$

the set of such sequences of real numbers $(\xi_\nu)$ that

$$\sum_{\nu=1}^{\infty} f_\nu(\alpha \xi_\nu) < +\infty$$

for some $\alpha > 0$ is a modulared sequence space, putting its modular

1) H. NAKANO: Modulared semi-ordered linear spaces, Tokyo Mathematical Book Series, Vol. 1 (1950).

2) W. OSLICZ: Ueber konjugierten Exponentenfolgen, Studia Math., III (200-211).

3) H. NAKANO: Modulared sequence spaces, Proc. Japan Acad., 27 (1951), 508-512.

4) I. HALPERIN and H. NAKANO: Generalized $l^p$ spaces and the Schur property, Journal Math. Soc. Japan, 5 (1953), 50-58.