Some New Results About Generalized Difference Triple Sequence Spaces Defined by a Double Orlicz-Functions

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Abstract: *In this study we introduced some new results about generalized difference triple sequence spaces by using a double Orlicz-functions and we will examine some new properties of these spaces.*

Keywords: Triple sequence; Difference sequence; Double Orlicz functions.

1. Introduction

A triple sequence(complex or real) can be defined as a function $f: N \times N \times N \to R(C)$ where N, R and C denote the sets of natural numbers ,real numbers and complex numbers respectively[2][9] . Some new results of triple sequences spaces would studied by Orlicz function using a function F where

$F = (F_1(r), F_2(u))$.

Let $(x, y) = (x_{r,u,\square}, y_{r,u,\square})$ be a triple infinite array of elements $(x_{r,u,\square}, y_{r,u,\square})$ and Ω^3 denotes the family of all triple sequences of real or complex numbers.

Let $3l_\infty, 3c_0$ be the linear spaces of bounded ,null,and convergent sequences with complex terms ,respectively, normed by :

$$\|(x, y)\| = sup_{r,u,\square}\{|x_{r,u,\square}|, |y_{r,u,\square}|\}$$

$$\|x\| = sup_{r,u,\square}|x_{r,u,\square}|$$

$$\|y\| = sup_{r,u,\square}|y_{r,u,\square}|$$

where r, u and $j \in \mathbb{N}$ the set of positive integers.

In this study we define the triple sequence spaces $3c_0(\Delta_u^v, F_{r,u}, p, \varphi)$, $3c(\Delta_u^v, F_{r,u}, p, \varphi)$, and $3l_\infty(\Delta_u^v, F_{r,u}, p, \varphi)$.

2. Definitions and Preliminaries:

Definition.2.1[7]

The double Orlicz-functions is afunction

$F: [0, \infty) \times [0, \infty) \to: [0, \infty) \times [0, \infty)$ *such that* $F(u, v) = (F_1(u), F_2(v))$

$F_1: [0, \infty) \to [0, \infty)$ *and*: $F_2\ [0, \infty) \to [0, \infty)$,

such that F_1, F_2 are Orlicz functions which are even,convex ,continuous,non-decreasing and satisfies three conditions :

$i)\ F_1(0) = 0, F_2(0) = 0 \to F(0,0) = (F_1(0), F_2(0))$

$ii)\ F_1(u) > 0, F_2(v) > 0 \to F(u, v) = (F_1(u), (F_2(v)) > (0,0) for\ u > 0,$

$v > 0, we\ mean\ that\ by\ F(u, v) > (0,0)\ that\ F_1(u) > 0, F_2(v) > 0$

$iii)\ F_1(u) \to \infty, F_2(v) \to \infty\ as\ u, v \to \infty\ then$

$F(u, v) = (F_1(u), F_2(v)) \to (\infty, \infty)\ as\ (u, v) \to (\infty, \infty) we\ mean\ by$

$F(u, v) \to (\infty, \infty), that\ F_1(u) \to \infty\ F_2(v) \to \infty$

Definition.2.2[2][4]

A triple sequences $(x, y) = (x_{r,u,j}, y_{r,u,j})$ is called convergent to M in pringsheim's sense for every$\epsilon > o$,there exists $N(\epsilon) \in \mathbb{N}$ such that $|x_{r,u,j} - M| < \epsilon$, $whenever\ r \geq N, u \geq N, j \geq N$ and we write

$lim_{r,u,j\to\infty} x_{r,u,j} = M$

Definition.2.3[3][4]

A triple sequence($x_{r,u,j}$) called Cauchy sequence if $\forall\epsilon > o, \exists N(\epsilon) \epsilon \mathbb{N}$ such that

$|x_{r,u,j} - x_{m,b,l}| < \epsilon$ whenever ,r$\geq m \geq N$, u$\geq b \geq N, j \geq l \geq N$.

Definition.2.4[3]

A triple sequence($x_{r,u,j}$) called bounded if $\exists\mu > 0$such that

$|x_{r,u,j}| < \mu\ for\ all\ r, u\ and\ j \epsilon N$.

Note.2.1[3] A triple sequence($x_{r,u,j}$)is convergent in pringsheim's sense may not be bounded.

Definition.2.5[4]

A triple sequence($x_{r,u,j}$)is called convergent regularly if it is convergent in pringshim's sense, and satisfy the following limit :

$\lim_{j\to\infty} x_{ruj} = \alpha_{r,u}$

$\lim_{u\to\infty} x_{ruj} = \alpha_{r,j}$

$\lim_{r,\to\infty} x_{ruj} = \alpha_{u,j}$

Let Ω^3 dented the family of all triple sequence spaces of complex or real numbers .Then the class of triple sequence$3c_0$,$3c$,$3l_\infty$clearly these classes are linear spaces, then $3c_0 \subset 3c \subset 3l_\infty$

Theorem.2.1[3]

The spaces $3c_0$,$3c$, $3l_\infty$ with the normed $\|x\| = sup_{r,u,j} |x_{r,u,j}| < \infty$ and

$\|y\| = sup_{r,u,j} |y_{r,u,j}| < \infty$ are complete normed linear spaces.

proof. Simple.

By Kizmaz [6] we can introduced difference of single sequence spaces as following:

$\Omega(\Delta) = \{ (x_r)) \in: (\Delta x_r) \in \Omega\} for\ \Omega = c, c_0, l_\infty$ where $\Delta x_r = x_r - x_{r+1}$ for all $r \in \mathbb{N}$.

For the differences of a double sequences $(\Delta x, \Delta y)$ is defined by

$(\Delta x, \Delta y)=(\Delta x_{r,u}, \Delta y_{r,u})_{r,u=1}^{\infty}$.

Let $\Omega^2(\Delta_{ruj})$ be denote the difference triple sequence space ,and a triple sequence space is defined as :

$\Delta_{r,u,j}= x_{r,u,j} - x_{r,u+1,j} - x_{r,u,j+1} + x_{r,u+1,j+1} - x_{r+1,u,j+1} - x_{r+1,u+1,j} + x_{r+1,u,j+1} - x_{r+1,u,j+1} + x_{r+1,u+1,j+1}$

Now ,we introduced the p^{th}order difference triple Sequence the space as follows :

$3c_0\ (\Delta^p) = \{(x_{r,u,j}) \in \Omega^3 : (\Delta^p x_{r,u,j})\ is\ regularly\ null\}$.

$3c\ (\Delta^p) = \{(x_{r,u,j}) \in \Omega^3 : (\Delta^p x_{r,u,j})\ is\ convergent\ in\ pringsheim's\ sense\ \}$

$3l_\infty(\Delta^p) = \{(x_{r,u,j})\ \in \Omega^3 : (\Delta^p x_{r,u,j})\ is\ bounded\ \}$.

By above forms of($\Delta^p x_{r,u,}$)the binomial explanation of generaliz difference triple sequence has the following mode:

$\Delta^p x_{r,u,j} = \sum_{r=1}^{p} \sum_{u=1}^{p} \sum_{j=1}^{p} (-1)^{\acute{s}+\acute{k}+\acute{r}} \binom{p}{r}\binom{p}{u}\binom{p}{j} x_{ru+uj+rj}$,For all r , u and $j \in N$ [3].

When Δ^p is replaced by Δ ,the above spaces becomes $3c_0(\Delta)$, $3c(\Delta)$, $3l_\infty(\Delta)$.

So, we can define the triple sequence spaces by using Kizmaz [6] as follows:

$3l_\infty(\Delta)=\{(x,\ y) \in \Omega^3 : (\Delta x\ , \Delta y) \in 3l_\infty\}$

$3c_0\ (\Delta) = \{(x\ , y) \in \Omega^3 : (\Delta x\ , \Delta y) \in 3c_0\}$

$3c(\Delta) = \{(x,\ y) \in \Omega^3 : (\Delta x\ , \Delta y) \in 3c\}$

Let U be the set of all triple sequence $\wedge = (\wedge_{r,u,j})$.

By Malkowsky[5] we can define difference triple sequence $3c$, $3c_0$, $3l_\infty$ as following forms

$3l_\infty(\wedge, \Delta) = \{(x, y) \in \Omega^3 : (\Delta x, \Delta y) \in 3l_\infty\}$

$3c(\wedge, \Delta) = \{(x, y) \in \Omega^3 : (\Delta x, \Delta y) \in 3c\}$, and

$3c_0(\wedge, \Delta) = \{(x, y) \in \Omega^3 : (\Delta x, \Delta y) \in 3c\}$

Also, we can defined these spaces $3c$, $3c_0$, $3l_\infty$ of difference triple sequence in Asma[1] as following :

$3l_\infty(\wedge, \Delta, F\ ) = \{\ (x, y\ ) \in \Omega^3 : sup_{r,u,} \ [(F_1(\frac{|\wedge_{r,u,}\Delta x_{r,u,}|}{\rho})) \vee (F_2(\frac{|\wedge_{r,u,}\Delta y_{r,u,}|}{\rho})\ )\ ] < \infty$

$For\ some\ \rho\ > 0\ \}$.

$3c\ (\wedge, \Delta, F)\ = \{\ (x, y\ ) \in \Omega^3 : p - lim_{r,u,j\to\infty}\ [(F_1(\frac{|\wedge_{r,u,}\Delta x_{r,u,} - l_1|}{\rho})) \vee (F_2(\frac{|\wedge_{r,u,}\Delta y_{r,u,} - l_2|}{\rho}))] = 0\ , for\ some\ \rho\ > 0\ , l_1, l_2 \in C\ \}$

$3c_0\ (\wedge\ , \Delta, F\ ) = \{\ (x, y\ ) \in \Omega^3 : p - \lim_{r,u,j\to\infty}\ [(F_1(\frac{|\wedge_{r,u,}\Delta x_{r,u,}|}{\rho})) \vee\ (F_2\ (\frac{|\wedge_{r,u,}\Delta y_{r,u,}|}{\rho})\ )] = 0\ for\ some\ p > 0\ \}$

Now , from idea of Orlicz sequence in Lindenstrauss and Tzafriri [10] we can construct a double Orlicz-functions as following:

$3l_F = \{(x, y) \in \Omega^3 :\ \sum_{r=1}^{\infty} \sum_{u=1}^{\infty} \sum_{j=1}^{\infty} \left[\ (F_1\ (\frac{|x_{r,u,}|}{\rho}) \vee F_2(\frac{|y_{r,u,}|}{\rho}))\ \right] < \infty\ , for\ all\ \rho > 0\}$

$l_{F_1} = \{\ x \in \Omega^3 : \sum_{r=1}^{\infty} \sum_{u=1}^{\infty} \sum_{j=1}^{\infty}\ F_1\ (\frac{|x_{r,u,}|}{\rho}) < \infty\ , for\ all\ \rho > 0\}$

And
$l_{F_2} = \{y \in \Omega^3 : \sum_{r=1}^{\infty} \sum_{u=1}^{\infty} \sum_{j=1}^{\infty}\ F_2(\frac{|y_{r,u,}|}{\rho})\ < \infty\ \ for\ all\ \rho > 0\}$

which is aBanach space with the norm :

$\|(x, y\ )\ \|_F = inf\left\{\ \rho > 0 : \sum_{r=1}^{\infty} \sum_{u=1}^{\infty} \sum_{j=1}^{\infty}\ \left[\ \left(\ F_1(\frac{|x_{r,u,}|}{\rho}) \vee (F_2\ (\frac{|x_{r,u,}|}{\rho})\right)\ \right] \le 1\ \right\}$

where

$\| x \|_{F_1} = inf\left\{\rho > 0 : \sum_{r=1}^{\infty} \sum_{u=1}^{\infty} \sum_{j=1}^{\infty} F_1\left(\frac{x_{r,u,j}}{\rho}\right) \leq 1\right\}$

$\| y \|_{F_2} = inf\left\{\rho > 0 : \sum_{r=1}^{\infty} \sum_{u=1}^{\infty} \sum_{j=1}^{\infty} F_2\left(\frac{y_{r,u,j}}{\rho}\right) \leq 1\right\}$

Bu Mursuleen [8] we define difference sequence spaces by a double Orlicz-functions as following:

$$3l_\infty(\Delta, F) = \left\{ (x, y) \in \Omega^3 : sup_{r,u,j}\left[\left(F_1\left(\frac{|\Delta x_{r,u,j}|}{\rho}\right)\right) \vee \left(F_2\left(\frac{|\Delta y_{r,u,j}|}{\rho}\right)\right)\right] < \infty, for\ some\ \rho > 0\right\},$$

$$3c_0(\Delta, F) = \left\{ (x, y) \in \Omega^3 : sup_{r,u,j}\left[\left(F_1\left(\frac{|\Delta x_{r,u,j}|}{\rho}\right)\right) \vee \left(F_2\left(\frac{|\Delta y_{r,u,j}|}{\rho}\right)\right)\right] < \infty, for\ some\ \rho > 0\right\},$$

$$3C(\Delta, F) = \left\{ (x, y) \in \Omega^3 : p - lim_{r,u,j\to\infty}\left[\left(F_1\left(\frac{|\Delta x_{r,u,j} - l_1|}{\rho}\right)\right) \vee \left(F_2\left(\frac{|\Delta y_{r,u,j} - l_2|}{\rho}\right)\right)\right] = 0\ for\ some\ \rho > 0, l_\infty, l_\infty \in C\right\},$$

where $F = (F_1(x), F_2(y))$ is a double Orlicz-functions, these spaces are aBanach spaces with the norm:

$$\|(x, y)\|_\Delta = inf\left\{\rho > 0 : sup_{r,u,j}\left[\left(F_1\left(\frac{|\Delta x_{r,u,j}|}{\rho}\right) \vee \left(F_2\left(\frac{|\Delta y_{r,u,j}|}{\rho}\right)\right)\right)\right] \leq 1\right\}$$

$$\|x\|_\Delta = inf\left\{\rho > 0 : sup_{r,u,j} F_1\left(\frac{|\Delta x_{r,u,j}|}{\rho}\right) \leq 1\right\}$$

$$\|y\|_\Delta = inf\left\{\rho > 0 : sup_{r,u,j} F_1\left(\frac{|\Delta y_{r,u,j}|}{\rho}\right) \leq 1\right\}$$

Note.2.2. Throughout this study let $F_1 = F_{1_{r,u}}$, $F_2 = F_{2_{r,u}}$ and $(F_1, F_2) = F = F_{r,u} = (F_{1\,r,u}, F_{2\,r,u})$

Definition.2.6.

Let F, $F_1$and F_2be a double Orlicz-functions ,and v be a positive integer, we use the notation $(\Delta_u^v x_{r,u,j})$ for $(\Lambda_{r,u,j} \Delta^v x_{r,u,j})$, $(\Delta_u^v y_{r,u,j})$ for $(\Lambda_{r,u,j} \Delta^v y_{r,u,j})$ and $(\Delta_u^v x_{r,u,j}, \Delta_u^v y_{r,u,j})$ for $(\Lambda_{r,u,j} \Delta^v x_{r,u,j}, \Lambda_{r,u,j} \Delta^v y_{r,u,j})$ we define :

$$3l_\infty(\Delta_u^v, F_{r,u}, \varphi) = \left\{ (x, y) \in \Omega^3 : sup_{r,u,j}(ruj)^{-\varphi}\left[\left(F_{1_{r,u}}\left(\frac{|\Delta_u^v x_{r,u,j}|}{\rho}\right)\right) \vee \left(F_{2_{r,u}}\left(\frac{|\Delta_u^v y_{r,u,j}|}{\rho}\right)\right)\right] for\ some\ \rho > 0, \varphi \geq 0\right\}.$$

$3c_0(\Delta_u^v, F_{r,u}, \varphi) =$

$$\left\{ (x, y) \in \Omega^3 : p - \lim_{r,u,j\to\infty}(ruj)^{-\varphi}\left[\left(F_{1_{r,u}}\left(\frac{|\Delta_u^v x_{r,u,j}|}{\rho}\right)\right) \vee \left(F_{2_{r,u}}\left(\frac{|\Delta_u^v y_{r,u,j}|}{\rho}\right)\right)\right] = 0\ for\ some\ \rho > 0, \varphi \geq 0\right\}$$

And :

$$3c(\Delta_u^v, F_{r,u}, \varphi) = \left\{ (x, y) \in \Omega^3 : p - \lim_{r,u,j\to\infty}(ruj)^{-\varphi}\left[\left(F_{1_{r,u}}\left(\frac{|\Delta_u^v x_{r,u,j} - l_1|}{\rho}\right)\right) \vee \left(F_{2_{r,u}}\left(\frac{|\Delta_u^v y_{r,u,j} - l_2|}{\rho}\right)\right)\right] = 0, for\ some\ \rho > 0, l_1, l_2 \in C, \varphi \geq 0\right\}.$$

Main Results :

Theorem.2.2 $3l_\infty(\Delta_u^v, F_{r,u}, \varphi)$ is a Banach space with norm

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$\| (x,y)\|_{\Delta_u^v} = inf \left\{ \rho > 0 : sup_{r,u,j} (ruj)^{-\varphi} \left[\left(F_{1_{r,u}} \left(\frac{|\Delta_u^v x_{r,u,j}|}{\rho} \right) \right) \vee \left(F_{2_{r,u}} \left(\frac{|\Delta_u^v y_{r,u,j}|}{\rho} \right) \right) \right] \leq 1 \right\}$,

where

$\| (x)\|_{\Delta_u^v} = inf \left\{ \{ \rho > 0 : sup_{r,u,j} (ruj)^{-\varphi} F_{1_{r,u}} \left(\frac{|\Delta_u^v x_{r,u,j}|}{\rho} \right) \leq 1 \right\}$

$\| (y)\|_{\Delta_u^v} = inf \left\{ \rho > 0 : sup_{ruj} (ruj)^{-\varphi} F_{2_{r,u}} \left(\frac{|\Delta_u^v y_{r,u,j}|}{\rho} \right) \leq 1 \right\}$

Proof . Let (x^i , y^i) be any triple Cauchy sequence in $3l_\infty(\Delta_u^v, F_{r,u}, \varphi)$

Such that (x^i) and (y^i) be a Cauchy sequence in $3l_\infty (\Delta_u^v, F_{1_{r,u}}, \varphi)$,

$3l_\infty (\Delta_u^v, F_{2_{r,u}}, \varphi)$ respectively , where.

$(x^i, y^i) = (x^i_{r,u,j} , y^i_{r,u,j}) = ((x^i_{1,1,1}, y^i_{1,1,1}), (x^i_{2,2,2}, y^i_{2,2,2}) , \ldots) \in$

$3l_\infty (\Delta_u^v, {}_{r,u} , \varphi)$ for $all\ i \in N$

Let $m_1, m_2 > 0$ be fixed , then for all $\frac{\epsilon}{m_1 m_2} > 0$

There exists a positive integers N such that

$(\|x^i - x^t\|_{\Delta_u^v} , \| y^i - y^t \|_{\Delta_u^v}) < \frac{\epsilon}{m_1 m_2} , for\ all\ i , t \geq N$

Using the definition of norm , we have ,

$sup_{r,u,j} (ruj)^{-\varphi} \left[(F_{1_{r,u}} (\frac{|\Delta_u^v x^i_{r,u,j} - \Delta_u^v x^t_{r,u,j}|}{\|x^i - x^t\| \Delta_u^v})) \vee (F_{2_{r,u}} (\frac{|\Delta_u^v y^i_{r,u,j} - \Delta_u^v y^t_{r,u,j}|}{\|y^i - y^t\| \Delta_u^v})) \right]$

$\leq 1 , for\ all\ i , t \geq N$

Thus $(ruj)^{-\varphi} \left[(F_{1_{r,u}} (\frac{|\Delta_u^v x^i_{r,u,j} - \Delta_u^v x^t_{r,u,j}|}{\|x^i - x^t\| \Delta_u^v})) \vee F_{2_{r,u}} (\frac{|\Delta_u^v y^i_{r,u,j} - \Delta_u^v y^t_{r,u,j}|}{\|y^i - y^t\| \Delta_u^v})) \right] \leq 1$

$For\ all\ r, u, j \geq 0 , and\ for\ all\ i, t \geq N.$

Therefore one can find that exits $m_1, m_2 > 0$ with

$(ruj)^{-\varphi} \left[(F_{1_{r,u}} (\frac{m_1 m_2}{2})) \vee (F_{2_{r,u}} (\frac{m_1 m_2}{2})) \right] \geq 1$ such that

$(ruj)^{-\varphi} \left[(F_{1_{r,u}} (\frac{| \Delta_u^v x^i_{r,u,j} - \Delta_u^v x^t_{r,u,j}|}{\| x^i - x^t \|_{\Delta_u^v}})) \vee (F_{2_{r,u}} (\frac{|\Delta_u^v y^i_{r,u,j} - \Delta_u^v y^t_{r,u,j}|}{\|y^i - y^t \|_{\Delta_u^v}})) \right] \leq$

$(ruj)^{-\varphi} \left[(F_{1_{r,u}} (\frac{m_1 m_2}{2})) \vee (F_{2_{r,u}} (\frac{m_1 m_2}{2})) \right]$.

The implies that

$\left|(\Delta_u^v x^i_{r,u,j} - \Delta_u^v x^t_{r,u,j} , \Delta_u^v y^i_{r,u,j} - \Delta_u^v y^t_{r,u,j}) \right| \leq \frac{m_1 m_2}{2} \frac{\epsilon}{m_1 m_2} = \frac{\epsilon}{2}$ $since$ $\Lambda_{r,u,j} \neq 0$ for all r, u and j we get $|$ $\Delta^v x^i_{r,u,j} - \Delta^v x^t_{r,u,j} , \Delta_u^v y^i_{r,u,j} - \Delta_u^v y^t_{r,u,j} | \leq \frac{\epsilon}{2}$ $for\ all\ i , t \geq N$

Hence $(\Delta^v x^i_{r,u,j})$, $(\Delta^v y^i_{r,u,j})$ is a Cauchy sequence in R such that $(\Delta^v_u x^i_{r,u,j}, \Delta^v_u y^i_{r,u,j})$ are triple *Cauchy sequence* in R ×R × R.

Therefore each $0 < \epsilon < 1$),there exist a positive integer N such that

$$\left|(\Delta^v x^i_{r,u,j} - \Delta^v x_{r,u,j}, \Delta^v y^i_{r,u,j} - \Delta^v y_{r,u,j})\right| \leq \in for\ all\ i \geq N$$

Now ,using the continuity of $F_{1_{r,u}}, F_{2_{r,u}}$ for each r, u we get :

$$sup_{r,u,j\geq N}(ruj)^{-\varphi}\left[(F_{1_{r,u}}(\frac{\Delta^v_u x^i_{r,u,j} - \lim_{t\to\infty} \Delta^v_u x^i_{r,u,j}}{\rho}))\vee(F_{2_{r,u}}(\frac{\Delta^v_u y^i_{r,u,j} - \lim_{t\to\infty} \Delta^v_u y^j_{r,u,j}}{\rho}))\right] \leq 1$$

Thus , $sup_{r,u,j\geq N}(ruj)^{-\varphi} \left[(F_{1_{r,u}}(\frac{|\Delta^v_u x^i_{r,u,j} - \Delta^v_u x_{r,u,j}|}{\rho}))\vee(F_{2_{r,u}}(\frac{|\Delta^v_u y^i_{r,u,j} - \Delta^v_u y_{r,u,j}|}{\rho}))\right] \leq 1$

Taking infimum of $\rho^{,s}$ and we have

$$inf\left\{ \rho > 0 : sup_{r,u,j\geq N}(ruj)^{-\varphi} \left[(F_{1_{r,u}}(\frac{|\Delta^v_u x^i_{r,u,j} - \Delta^v_u x_{r,u,j}|}{\rho}))\vee(F_{2_{r,u}}(\frac{|\Delta^v_u y^i_{r,u,j} - \Delta^v_u y_{r,u,j}|}{\rho}))\right] \leq 1\} \leq \epsilon\ for\ all\ i \geq N \right\}.$$

Since $(x^i, y^i) \in 3l_\infty(\Delta^v_u, F_{r,u}, \varphi)$ and F_1, F_2 be a double Orlicz-functions , then

$F = (F_1, F_2)$ is a double Orlicz-functions for each r, u and there for continuous , we get that $(x, y) \in 3l_\infty(\Delta^v_u, F_{r,u}, \varphi)$

The rest of proof $3c$, $3c_0$ is like the previous case $3l_\infty$.■

Theorem.2.3. The classes of sequences $3l_\infty(\Delta^v_{u,} F_, \varphi)$, $3c(\Delta^v_{u,} F_, \varphi)$,$3c_0$ $(\Delta^v_{u,} F_, \varphi)$ are linear spaces.

Proof. Obvious.

Lemma 2.1. Let F_1 , F_2 and Fbe a Orlicz-functions .Then

$i)3\, l_\infty(\Delta^0_u, {}_{r,u}, \varphi) \subset 3l_\infty(\Delta^v_u, F_{r,u}, \varphi)$

$ii)3c\,(\Delta^0_u, F_{r,u}, \varphi) \subset 3c(\Delta^v_u, F_{r,u}, \varphi)$

$iii)3c_0\,(\Delta^0_u, F_{r,u}, \varphi) \subset 3c_0(\Delta^v_u, F_{r,u}, \varphi)$

Proof. it's clear.

REFERENCES

1. C. Asma , On some difference sequence space defined by Orlicz functions, Southeast Asian Bulletin of Mathematics , 28(2004),195-202.

2. A.J.Datta , A. Esi, B.C. Tripathy, "Statistically convergent triple sequence spaces defined by Orlicz function". J. Math. Anal.,4(2) (2013) 16-22.

3. Sh. Debnath et al., "On Some Newly Generalizes Difference Triple Sequence", J Apple Compatat Math 2016,5:4 an open access journal ISSN :2016 -9679.

4. Sh .Debnath et al .,"New Type Of Difference Triple Sequence spaces " . Palestine J. of Math .,Vol.4(2)(2015),284-290.

5. E.Malkowasky,"A note on the Kothe-toeplitz duals of generalized sets of bounded and convergent difference sequence ,Analysis 4(1996),9-81.

6. H. Kizmaz ," on certain sequence spaces" .Cand. Math . Bull ,(2), (1981), 169- 179.

7. Z. H. Hasan," Statistical Convergent of Generalized Difference Double Sequence Spaces which Defined by Orlicz Function". M.Sc. Thesis, University of Kufa ,(2017).

8. M. Mursaleen, M.A . Khan ,and Qamaruddin, Difference sequence spaces defined by Orlicz functions, Demonstratio Math.32(1) (1999).145-150.

9. E. Sava's and A. Esi, Statistical convergence of triple sequences on probabilistic normed space, Annals of the University of Craiova Mathematics and Computer and Science Series, 39(2) (2012), 226-236.

10. J. Lindenstrauss and L. Tzafriri, On Orlicz sequence spaces, Israel J. Math;101 (1971), 379-390.