

# List of Symbols

*Throughout the Thesis we have used the following notations.*

| Symbol                  | Description  |
|-------------------------|--|
| $\mathbb{N}$            | The set of positive integers                                   |
| $\mathbb{R}$            | The set of real numbers  |
| $\mathbb{R}_0^+$        | The set of positive real numbers                               |
| $A \subset B$           | $A$ is contained in $B$  |
| $A \cap B$              | Intersection of the sets $A$ and $B$                           |
| $A \cup B$              | Union of the sets $A$ and $B$                                  |
| $A^c$                   | Complement of the set  |
| $\mathcal{P}(X)$        | The power set of any set $X$                                   |
| $\in$                   | Belongs to   |
| $\notin$                | Does not belong to   |
| $\ \cdot\ $             | The norm of a normed linear space                              |
| $X^*$                   | The continuous dual of $X$                                     |
| $\mathfrak{D}$          | Set of all distribution functions on $\mathbb{R}$              |
| $\mathfrak{D}^+$        | Set of all distance distribution functions on $\mathbb{R}_0^+$ |
| $\chi_A$                | Characteristic function of the set $A$                         |
| $\delta(A)$             | Natural density or asymptotic density of the set $A$           |
| $\bar{\delta}(A)$       | Upper asymptotic density of the set $A$                        |
| $\underline{\delta}(A)$ | Lower asymptotic density of the set $A$                        |
| $\delta_\theta(A)$      | $\theta$ -density of the set $A$                               |

| Symbol                         | Description  |
|--------------------------------|--|
| $\delta_\alpha(A)$             | $\alpha$ -density of the set $A$   |
| $\delta_\lambda(A)$            | $\lambda$ - density of the set $A$   |
| $\delta_A(K)$                  | $A$ - density of the set $K$   |
| $\delta_2(A)$                  | Double natural density of the set $A$  |
| $\delta_{\lambda,\mu}(A)$      | $(\lambda, \mu)$ - density of the set $A$  |
| $\delta_2^{\tilde{\alpha}}(A)$ | $\tilde{\alpha}$ - double natural density of the set $A$                                 |
| $ \sigma_1 $                   | Set of strongly Cesàro summable sequences  |
| $w_p$                          | Set of strongly $p$ - Cesàro summable sequences  |
| $w$                            | Linear space of all scalar valued sequences  |
| $l_\infty$                     | Normed linear space of all bounded sequences of real numbers                             |
| $l_\infty^2$                   | Set of all real bounded double sequences   |
| $N_\theta$                     | Set of all $N_\theta$ - summable sequences   |
| $[V, \lambda]$                 | Set of all $(V, \lambda)$ - summable sequences   |
| $(C, 1, 1)(x)$                 | Set of all Cesàro summable double sequences  |
| $(V, \lambda, \mu)(x)$         | Set of all $(V, \lambda, \mu)$ - summable double sequences of scalars                    |
| $S$                            | Set of all statistically convergent sequences of scalars                                 |
| $S_\theta$                     | Set of all lacunary statistically convergent sequences of scalars                        |
| $S_\lambda$                    | Set of all $\lambda$ - statistically convergent sequences of scalars;                    |
| $S(\mathcal{I})$               | Set of all $\mathcal{I}$ - statistically convergent sequences of scalars                 |
| $S_\lambda(\mathcal{I})$       | Set of all $\mathcal{I} - \lambda$ - statistically convergent sequences of scalars       |
| $S_\theta(\mathcal{I})$        | Set of all $\mathcal{I}$ - lacunary statistically convergent sequences of scalars        |
| $S_\lambda^\alpha(x)$          | Set of all $\lambda$ - statistically convergent sequences of order $\alpha$              |
| $S^\alpha(\mathcal{I})$        | Set of all $\mathcal{I}$ - statistically convergent sequences of order $\alpha$          |
| $S_\theta^\alpha(\mathcal{I})$ | Set of all $\mathcal{I}$ - lacunary statistically convergent sequences of order $\alpha$ |
| $S_2(x)$                       | Set of all statistically convergent double sequences                                     |
| $S_{(\lambda,\mu)}(x)$         | Set of all $(\lambda, \mu)$ - statistically convergent sequences of scalars              |
| $S_2^{\tilde{\alpha}}(x)$      | Set of all statistically convergent double sequences of order $\tilde{\alpha}$           |

| <b>Symbol</b>                            | <b>Description</b>   |
|--|--|
| $S_{(\lambda, \mu)}^{\tilde{\alpha}}(x)$ | Set of all $(\lambda, \mu)$ – statistically convergent double sequences of order $\tilde{\alpha}$                          |
| $[w_p^2]_{\tilde{\alpha}}(x)$            | Set of all strongly $(V, \lambda, \mu)$ – summable double sequences of order $\tilde{\alpha}$                              |
| $S_2^{\tilde{\alpha}}(\mathcal{I})$      | Set of all $\mathcal{I}$ –statistically convergent double sequences of order $\tilde{\alpha}$                              |
| $S^{R2N}$                                | Set of all statistically convergent sequences in random 2-normed space $(X, \mathcal{F}, *)$                               |
| $S_{\Lambda}^{R2N}$                      | Set of all $\Lambda$ –statistically convergent sequences in random 2-normed space $(X, \mathcal{F}, *)$                    |
| $S^{R2N}(\alpha)$                        | Set of all statistically convergent sequences of order $\alpha$ in random 2-normed space $(X, \mathcal{F}, *)$             |
| $S_{\Lambda}^{R2N}(\alpha)$              | Set of all $\Lambda$ – statistically convergent sequences of order $\alpha$ in random 2-normed space $(X, \mathcal{F}, *)$ |
| $\Lambda_x$                              | Set of all statistical limit points of the number sequence $x = (x_k)$   |
| $\Gamma_x$                               | Set of all statistical cluster points of the number sequence $x = (x_k)$   |
| $\Lambda_x(\mathcal{I})$                 | Set of all $\mathcal{I}$ – limit points of the sequence $x = (x_k)$  |
| $\Gamma_x(\mathcal{I})$                  | Set of all $\mathcal{I}$ – cluster points of the sequence $x = (x_k)$  |
| $WL(x)$                                  | Set of all weak limit points of the sequence $x = (x_k)$   |
| $WS(X)$                                  | Set of all weak statistically convergent sequences in $X$  |
| $WS_{\theta}(X)$                         | Set of all weak lacunary statistically convergent sequences in $X$   |
| $WN_{\theta}(X)$                         | Set of all weakly $N_{\theta}$ – summable sequences in $X$   |
| $WS_{\lambda}(X)$                        | Set of all weakly $\lambda$ – statistically convergent sequences in $X$  |
| $W(V, \lambda)(X)$                       | Set of all weakly $(V, \lambda)$ – summable sequences in $X$   |
| $WS(\mathcal{I}, X)$                     | Set of all weakly $\mathcal{I}$ – statistically convergent sequences   |
| $WS_{\lambda}(\mathcal{I}, X)$           | Set of all weakly $\mathcal{I} - \lambda$ –statistically convergent sequences  |
| $W(V, \lambda)(\mathcal{I}, X)$          | Set of all weakly $\mathcal{I} - (V, \lambda)$ – summable sequences  |
| $WS_{\theta}(\mathcal{I}, X)$            | Set of all weakly $\mathcal{I}$ – lacunary statistically convergent sequences  |
| $\Lambda(WS_{\theta}, x)$                | Set of all weak lacunary statistical limit points of the sequence $x = (x_k)$  |

| <b>Symbol</b>                | <b>Description</b>   |
|------------------------------|--|
| $\Gamma(W S_\theta, x)$      | Set of all weak lacunary statistical cluster points of the sequence $x = (x_k)$  |
| $S^F$                        | Set of all statistically convergent sequences in probabilistic normed space $(X, F, *)$                                    |
| $L^F(x)$                     | Set of all limit points of the sequence $x = (x_k)$ in probabilistic normed space $(X, F, *)$                              |
| $\Lambda^F(S, x)$            | Set of all statistical limit points of the sequence $x = (x_k)$ in probabilistic normed space $(X, F, *)$                  |
| $\Gamma^F(S, x)$             | Set of all statistical cluster points of the sequence $x = (x_k)$ in probabilistic normed space $(X, F, *)$                |
| $S^\vartheta$                | Set of all strong statistically convergent sequences in probabilistic normed space $(V, \vartheta, \tau, \tau^*)$          |
| $S_\theta^\vartheta$         | Set of all strong lacunary statistically convergent sequences in probabilistic normed space $(V, \vartheta, \tau, \tau^*)$ |
| $\Lambda^\vartheta(S, p)$    | Set of all strong statistical limit points of the sequence $p = (p_k)$ in $(V, \vartheta, \tau, \tau^*)$                   |
| $\Gamma^\vartheta(S, p)$     | Set of all strong statistical cluster points of the sequence $p = (p_k)$ in $(V, \vartheta, \tau, \tau^*)$                 |
| $\Lambda^F(S_\theta, x)$     | Set of all lacunary statistical limit points of the sequence $x = (x_k)$ in probabilistic normed space $(X, F, *)$         |
| $\Gamma^F(S_\theta, x)$      | Set of all lacunary statistical cluster points of the sequence $x = (x_k)$ in probabilistic normed space $(X, F, *)$       |
| $\Lambda^{R2N}(S_\theta, x)$ | Set of all lacunary statistical limit points of the sequence $x = (x_k)$ in random 2-normed space $(X, F, *)$              |
| $\Gamma^{R2N}(S_\theta, x)$  | Set of all lacunary statistical cluster points of the sequence $x = (x_k)$ in random 2-normed space $(X, F, *)$            |