IDEAL STATISTICALLY LIMIT POINTS AND IDEAL STATISTICALLY CLUSTER POINTS OF TRIPLE SEQUENCES OF FUZZY NUMBERS

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Abstract. In this paper we extend the notions of ideal statistical limit points and ideal statistical cluster points for a sequence of fuzzy numbers. We introduce the notions ideal statistical limit points and ideal statistical cluster points of a triple sequence of fuzzy numbers, and give some correlation theorem.

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REFERENCES

[1] B. ALTAY AND F. BAŞAR, *Some new spaces of double sequences*, J. Math. Anal. Appl., **309**, 1 (2005), 70–90.
[2] F. BAŞAR, *Summability Theory and its Applications*, Bentham Science Publishers, Istanbul, 2012.
[3] N. L. BRAHA, H. M. SRIVASTAVA AND M. ET, *Some weighted statistical convergence and associated Korovkin and Voronovskaya type theorems*, J. Appl. Math. Comput., **65**, 1 (2021), 429–450.
[4] P. DAS, P. KOSTYRKO, W. WILCZYŃSKI AND P. MALIK, $\mathscr{I}$ *and* $\mathscr{I}^*$ *-convergence of double sequences*, Math. Slovaca, **58**, 5 (2008), 605–620.
[5] P. DAS, P. MALIK AND E. SAVAŞ, *On statistical limit points of double sequences*, Appl. Math. Comput., **215**, 3 (2009), 1030–1034.
[6] S. DEBNATH AND J. DEBNATH, *Some generalized statistical convergent sequence spaces of fuzzy numbers via ideal*, Math. Sci. Lett., **2**, (2013), 151–154.
[7] I. A. DEMIRCI AND M. GÜRDAL, *On lacunary generalized statistical convergent complex uncertain triple sequence*, J. Intell. Fuzzy Syst., **41**, 1 (2021), 1021–1029.
[8] H. FAST, *Sur la convergence statistique*, Colloq. Math., **2**, 3–4 (1951), 241–244.
[9] J. A. FRIDY, *On statistical limit points*, Proc. Amer. Math. Soc., **4**, (1993), 1187–1192.
[10] J. A. FRIDY, *On statistical convergence*, Analysis (Munich), **5**, (1985), 301–313.
[11] M. GÜRDAL AND M. B. HUBAN, *On* $\mathscr{I}$ *-convergence of double sequences in the topology induced by random 2 -norms*, Mat. Vesnik, **66**, 1 (2014), 73–83.
[12] M. GÜRDAL AND A. ŞAHINER, *Extremal* $\mathscr{I}$ *-limit points of double sequences*, Appl. Math. E-Notes, **8**, (2008), 131–137.
[13] M. B. HUBAN AND M. GÜRDAL, *Wijsman lacunary invariant statistical convergence for triple sequences via Orlicz function*, J. Class. Anal., **17**, 2 (2021), 119–128.
[14] M. B. HUBAN, M. GÜRDAL AND H. BAYTÜRK, *On asymptotically lacunary statistical equivalent triple sequences via ideals and Orlicz function*, Honam Math. J., **43**, 2 (2021), 343–357.
[15] M. B. HUBAN, M. GÜRDAL AND E. SAVAŞ, $\mathscr{I}$ *-statistical limit superior and* $\mathscr{I}$ *-statistical limit inferior of triple sequences*, 7th International Conference on Recent Advances in Pure and Applied Mathematics (ICRAPAM2020), Proceeding Book of ICRAPAM (2020), 42–49.
[16] U. KADAK AND F. BAŞAR, *Power series with real or fuzzy coefficients*, Filomat, **25**, 3 (2012), 519–528.
[17] U. KADAK AND F. BAŞAR, *Alternating and binomial series of fuzzy numbers with the level sets*, Contemp. Anal. Appl. Math., **3**, 2 (2015), 310–328.
[18] P. KOSTYRKO AND M. MACAJ, T. ŠALÁT AND M. SLEZIAK, $\mathscr{I}$ *-convergence and extremal* $\mathscr{I}$ *-limit points*, Math. Slovaca, **55**, (2005), 443–464.

[19] P. Kostyrko, T. Šalát and W. Wilczyski, $\mathscr{I}$-convergence, Real Anal. Exchange, **26**, 2 (2000), 669–686.

[20] V. Kumar and K. Kumar, *On the ideal convergence of sequences of fuzzy numbers*, Inform. Sci., **178**, (2008), 4670–4678.

[21] V. Kumar, A. Sharma, K. Kumar and N. Singh, *On $\mathscr{I}$-limit points and $\mathscr{I}$-cluster points of sequences of fuzzy numbers*, Internat. Math. Forum, **2**, (2007), 2815–2822.

[22] M. Matloka, *Sequences of fuzzy numbers*, Busefal, **28**, (1986), 28–37.

[23] M. Mursaleen and F. Başar, *Sequence Spaces: Topics in Modern Summability Theory*, CRC Press, Taylor & Francis Group, Series: Mathematics and Its Applications, Boca Raton, London, New York, 2020.

[24] M. Mursaleen and O. H. H. Edely, *Statistical convergence of double sequences*, J. Math. Anal. Appl., **288**, (2003), 223–231.

[25] F. Nuray and W. H. Ruckle, *Generalized statistical convergence and convergence free spaces*, J. Math. Anal. Appl., **245**, (2000), 513–527.

[26] F. Nuray and E. Savaş, *Statistical convergence of sequences of fuzzy numbers*, Math. Slovaca, **45**, 3 (1995), 269–273.

[27] M. L. Puri and D. A. Ralescu, *Differential of fuzzy numbers*, J. Math. Anal. Appl., **91**, (1983), 552–558.

[28] T. Šalát, *On statistically convergent sequences of real numbers*, Math. Slovaca, **30**, (1980), 139–150.

[29] E. Savaş and P. Das, *A generalized statistical convergence via ideals*, Appl. Math. Lett., **24**, (2011), 826–830.

[30] A. Şahiner, M. Gürdal and F. K. Düden, *Triple sequences and their statistical convergence*, Selçuk J. Appl. Math., **8**, 2 (2007), 49–55.

[31] A. Şahiner and B. C. Tripathy, *Some $\mathscr{I}$-related properties of triple sequences*, Selçuk J. Appl. Math., **9**, 2 (2008), 9–18.

[32] Ö. Talo and F. Başar, *On the space $bv_p(F)$ of sequences of p-bounded variation of fuzzy numbers*, Acta Math. Sin. Eng. Ser., **24**, 7 (2008), 1205–1212.

[33] Ö. Talo and F. Başar, *Certain spaces of sequences of fuzzy numbers defined by a modulus function*, Demonstratio Math., **43**, 1 (2010), 139–149.

[34] Ö. Talo and F. Başar, *Quasilinearity of the classical sets of sequences of fuzzy numbers and some related results*, Taiwanese J. Math., **14**, 5 (2010), 1799–1819.

[35] Ö. Talo and F. Başar, *On the slowly decreasing sequences of fuzzy numbers*, Abstr. Appl. Anal., (2013), Article ID 891986, 7 pages.

[36] F. Temizsu and M. Et, *Some results on generalizations of statistical boundedness*, Math. Methods Appl. Sci., **44**, 9 (2021), 7471–7478.

[37] B. C. Tripathy, S. Debnath and D. Rakshit, *On $\mathscr{I}$-statistically limit points and $\mathscr{I}$-statistically cluster poins of sequences of fuzzy numbers*, Mathematica, **63**, 86-1 (2021), 140–147.

[38] L. A. Zadeh, *Fuzzy sets*, Inform. and Control, **8**, 3 (1965), 338–353.

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