Modified Szász-Mirakjan operators of integral form

RADU PĂLTĂNEA

ABSTRACT.

We deal with approximation by a modified family of Szász-Mirakjan operators, with parameters $\rho > 0$, $\alpha > 0$, which reproduce linear functions:

$$L_\alpha^\rho(f, x) = e^{-\alpha x}\left(f(0) + \sum_{k=1}^\infty \frac{(\alpha x)^k}{k!} \int_0^\infty \frac{\alpha \rho^{k\rho}}{\Gamma(k\rho)} \cdot e^{-\alpha\rho t}(\alpha t)^{k\rho-1} f(t)\, dt\right),$$

where $x \geq 0$ and $f : [0, \infty) \to \mathbb{R}$ is taken such that this formula is well defined.

REFERENCES

[1] Adell, J. A., De La Cal, J., *Bernstein-Durrmeyer operators*, Computers and Mathematics with Applications, **30** (1995), No. 3, 1–14

[2] Durrmeyer, J. L., *Une formule d'inversion de la transformée de Laplace: applications à la théorie des moments*, Thèse de 3ème cycle, Faculté des Sciences Université Paris, 1967

[3] Finta, Z., Gupta, V., *Direct and inverse estimates for Phillips type operators*, J. Math. Anal. Appl., **303** (2005), No. 2, 627–642

[4] Govil, N. K., Gupta, V., Noor, M. A., *Simultaneous approximation for the Phillips operators*, International Journal of Mathematics and Mathematical Sciences, **2006** (2006), Article ID 49094.

[5] Gonska, H. H., Kacsó, D., Raşa, I., *On genuine Bernstein-Durrmeyer operators*, Results in Mathematics, **50** (2007), 213–225

[6] Goodman, T. N.T., Sharma, A., A modified Bernstein-Schoenberg operator, in *Proceedings of the Conference on Constructive Theory of Functions*, Varna, Bulgaria, May 24-31, 1987 (Sendov, B. et al., Eds.), House of the Bulgarian Academy of Sciences, Sofia, 1988, 166–173

[7] Guo, Z-R., Zhou, D-X., *Approximation theorems for modified Szász operators*, Acta Sci. Math., **56** (1992), 311–321

[8] Gupta, V., Abel, U., *On the rate of convergence of Bezier variant of Szász-Durrmeyer operators*, Analysis in Thory and Applications, **19** (2003), No. 1, 81–88

[9] Gupta, V., Mohapatra, R., *On the rate of convergence for certain summation-integration type operators*, Mathematical Inequalities and Applications, **9** (2006), No. 3, 465–472

[10] Gupta, V., Pant, R. P., *Rate of convergence for the modified Szász-Mirakjan operators on functions of bounded variation*, J. Math. Anal. Appl., **233** (1999), No. 2, 476–483

[11] Gupta, V., Srivastava, G. S., *On the rate of convergence of Phillips operators for functions of bounded variation*, Annals Societatis Mathematicae Polonae, Seria I. Commentationes Mathematicae, **36** (1996), 123–130

[12] May, C. P., *On Phillips operators*, J. Approx. Theory, **20** (1977), No. 4, 315–332

[13] Mazhar, S. M., Totik, V., *Approximation by modified Szász operators*, Acta. Sci. Math., **49** (1985), 257–269

[14] Parvanov, P. E., Popov, B. D., *The limit case of Bernstein's operators with Jacobi weights*, Math. Balkanica, (N.S.), **8** (1994), 165–177

[15] Păltănea, R., *Approximation Theory using Positive Linear Operators*, Birkhäuser, Boston, 2004

[16] Păltănea, R., *A class of Durrmeyer type operators preserving linear functions*, Annals of the Tiberiu Popoviciu Seminar on Functional Equations, Approximation and Convexity (Cluj-Napoca), **5** (2007), 109–118

[17] Phillips, R. S., *An inversion formula for Laplace transforms and semi-groups of operators*, Annals of Mathematics, Second Series, **59** (1954), 325–356

[18] Sauer, T., *The genuine Bernstein-Durrmeyer operator on a simplex*, Results in mathematics, **26** (1994), 99–130

[19] Shunsheng, G., Cuixiang, L, Qiulan, Q., *Steckin-Marchard-type inequalities for some Durrmeyer operators*, Appl. Th. Appl., **17** (2001), No. 2, 28–31

[20] Szász, O., *Generalization of S. Bernstein's polynomials to the infinite interval*, J. Research, National Bureau of Standards, **45** (1950), 239–246

TRANSILVANIA UNIVERSITY
DEPARTMENT OF MATHEMATICS
EROILOR 29, 500 036, BRAŞOV, ROMANIA
E-mail address: radupaltanea@yahoo.com