

Urysohn Tipi Operatörler ve Yaklaşım Özellikleri

Harun KARSLI

Bolu Abant İzzet Baysal Üniversitesi Fen-Edebiyat Fakültesi

Matematik Bölümü

E-Posta : karsli_h@ibu.edu.tr

ÖZET

1912 yılında Bernstein, Binom dağılımını kullanarak elde ettiği ve Bernstein polinomları adı verilen lineer bir yaklaşım operatörü tanımlamış ve Weierstrass'ın yaklaşım teoreminin basit bir ispatını vermiştir. Bernstein polinomlarının ve sonrasında çeşitli genelleşmelerinin tanımlanması; olasılık teorisi, dağılım teorisi, yaklaşımlar teorisi, diferensiyel denklemler, integral denklemler gibi farklı teorilerin arasında bağlantı oluşturan bir teorinin ortaya çıkmasını sağlamıştır. Lineer pozitif operatörlerin ve onların lineer olmayan formlarının özel birer integral operatör oluşu, özellikle son on yılda integral denklemler teorisi, örnekleme teorisi, biomedikal teorisi ile dijital görüntü işleme teorilerinde karşılaşılan problemlerin çözümlerinde etkin olarak kullanılmasını sağlamıştır [1]-[4].

Biz bu çalışmada, Green, Dirac ve Heaviside fonksiyonları arasındaki ilişkileri kullanarak, lineer pozitif operatörlerin Urysohn tipi lineer olmayan formlarını elde edeceğiz. Bu operatörler yardımıyla fonksiyonları yeniden inşa etme problemi fonksiyonellere ve operatörlere genişletilecektir [5]-[7].

Anahtar Kelimeler : Lineer pozitif operatör, integral operatör, Urysohn operatör.

ABSTRACT

In 1912, using the Binomial distribution, Bernstein defined a linear approximation process called Bernstein polynomials and gave a simple proof of Weierstrass's approximation theorem. After defining the Bernstein polynomials and their various generalizations, there arise a new theory between different theories, such as the theory of probability theory, distribution theory, approximation theory, differential equations, integral equations, etc... Since linear positive operators and their nonlinear counterparts are special kind of integral operators, especially in the last decade this type of operators have been used effectively to solve problems encountered in theory of integral, sampling theory, biomedical theory and digital image processing [1]-[4].

In this study , by using the relations between Green, Dirac and Heaviside functions, we will obtain Urysohn type nonlinear forms of positive linear operators. With the help of these operators, the reconstruction problem of functions will be extended to functionals and operators [5]-[7].

Key Words: Positive linear operators, integral operators, Urysohn operator.

KAYNAKLAR – REFERENCES

- [1] Bardaro, C., Vinti, G., Urysohn integral operators with homogeneous kernel: approximation properties in modular spaces. Comment. Math. (Prace Mat.) 42 (2002), no. 2, 145--182.
- [2] Bardaro, C., Musielak, J., Vinti, G., Nonlinear Integral Operators and Applications, De Gruyter Series in Nonlinear Analysis and Applications, Vol. 9, xii + 201 pp., 2003.
- [3] Bardaro, C., Karsli, H. and Vinti, G., Nonlinear integral operators with homogeneous kernels: pointwise approximation theorems, Applicable Analysis, Vol. 90, Nos. 3--4, March—April (2011), 463--474.

- [4] Costarelli D., Vinti G., Approximation by nonlinear multivariate sampling Kantorovich type operators and applications to image processing. *Numer. Funct. Anal. Optim.* 34 (2013), no. 8, 819--844.
- [5] Karsli, H., Approximation by Urysohn type Meyer-König and Zeller operators to Urysohn integral operators. *Results Math.* 72 (2017), no. 3, 1571--1583.
- [6] Karsli, H., Approximation Results for Urysohn Type Two Dimensional Nonlinear Bernstein Operators, *Const. Math. Anal.*, 1 (2018), No. 1, pp. 45-57.
- [7] Makarov, V. L. and Demkiv, I. I., (2012). Approximation of the Urysohn operator by operator polynomials of Stancu type, *Ukrainian Math Journal*, 64(3), 356 - 386.

ÖNERİLEN KAYNAKLAR – SUGGESTED REFERENCES

- [1] Altomare, F. and Campiti, M. (1994), *Korovkin-Type Approximation Theory and its Applications*, De Gruyter Studies in Mathematics, 17, Walter de Gruyter and Co., Berlin.
- [2] Bardaro, C., Karsli, H. and Vinti, G., On pointwise convergence of linear integral operators with homogeneous kernels , *Integral Transforms and Special Functions*, 19(6), (2008), 429-439.
- [3] Butzer, P. L. and Nessel, R. J., *Fourier Analysis and Approximation*, V.1, Academic Press, New York, London, 1971.
- [4] Karsli, H., Some convergence results for nonlinear singular integral operators, *Demonstratio. Math.*, Vol. XLVI No 4, 729-740 (2013).
- [5] Karsli H., Tiryaki, I. U.; Altin, H. E., On convergence of certain nonlinear Bernstein operators. *Filomat* 30 (2016), no. 1, 141--155.
- [6] Karsli, H., Approximation results for Urysohn type nonlinear Bernstein operators, *Advances in Summability and Approximation Theory*, Book Chapter, Springer-Verlag, (2018), accepted.
- [7] Karsli, H., Voronovskaya-type theorems for Urysohn type nonlinear Bernstein operators, *Mathematical Methods in the Applied Sciences*, (2018), accepted.
- [8] Lorentz G.G., *Bernstein Polynomials*, University of Toronto Press, Toronto (1953).