



ISSN: 1889-3066

© 2015 Universidad de Jaén

Web site: jja.ujaen.es

Jaen J. Approx. 7(1) (2015), 97–122

Jaen Journal
on Approximation

Grüss and Grüss-Voronovskaya-type estimates for some Bernstein-type polynomials of real and complex variables

Sorin G. Gal and Heiner Gonska

Abstract

The first aim of this paper is to prove a Grüss-Voronovskaya estimate for Bernstein and for a class of Bernstein-Durrmeyer polynomials on $[0, 1]$. Then, Grüss and Grüss-Voronovskaya estimates for their corresponding operators of complex variable on compact disks are obtained. Finally, the results are extended to Bernstein-Faber polynomials attached to compact sets in the complex plane.

Keywords: Bernstein polynomials of real and complex variables, Bernstein-Durrmeyer-type polynomials of real and complex variables, Faber polynomials, Bernstein-Faber polynomials, Grüss-type estimate, Grüss-Voronovskaya-type estimate, analytic functions.

MSC: 41A10, 41A25, 30E10.

§1. Introduction

For $f : [0, 1] \rightarrow \mathbb{C}$, the complex Bernstein polynomials are defined by

$$B_n(f)(z) = \sum_{k=0}^n \binom{n}{k} z^k (1-z)^{n-k} f(k/n), \quad z \in \mathbb{C}, \quad n \in \mathbb{N}.$$

Communicated by
M. Jiménez-Pozo

Received
March 7, 2014
Accepted
May 19, 2014