Electronic Transactions on Numerical Analysis.
Volume 25, pp. 467-479, 2006.

ISSN 1068-9613.

ETNA
Kent State University
etna@mcs.kent.edu

ON CONVERGENCE OF ORTHONORMAL EXPANSIONS FOR EXPONENTIAL WEIGHTS*

H. P. MASHELE†

Dedicated to Ed Saff on the occasion of his 60th birthday

Abstract. Let $I = (-d, d)$ be a real interval, finite or infinite, and let $W : I \to (0, \infty)$. Assume that W^2 is a weight, so that we may define orthonormal polynomials corresponding to W^2. For $f : I \to \mathbb{R}$, let $s_m[f]$ denote the mth partial sum of the orthonormal expansion of f with respect to these polynomials. We show that if $f'W \in L_\infty(I) \cap L_2(I)$, then $\|(s_m[f] - f)W\|_{L_\infty(I)} \to 0$ as $m \to \infty$. The class of weights considered includes even exponential weights.

Key words. orthonormal polynomials, de la Vallée Poussin means

AMS subject classifications. 65N12, 65F35, 65J20, 65N55

*Received April 21, 2005. Accepted for publication April 3, 2006. Recommended by D. Lubinsky.

†Department of Mathematical Sciences, The University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa (pmashele@metropolitan.co.za).