Electronic Transactions on Numerical Analysis.
Volume 19, pp. 113-134, 2005.

ISSN 1068-9613.

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ORTHOGONAL LAURENT POLYNOMIALS AND QUADRATURES ON THE UNIT CIRCLE AND THE REAL HALF-LINE*

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Abstract. The purpose of this paper is the computation of quadrature formulas based on Laurent polynomials in two particular situations: the Real Half-Line and the Unit Circle. Comparative results and a connection with the split Levinson algorithm are established. Illustrative numerical examples are approximate integrals of the form

$$\int_{-1}^{1} \frac{f(x)}{(x+\lambda)^r}\omega(x)\,dx \quad , \quad r = 1, 2, 3, \ldots$$

with $f(x)$ a continuous function on $[-1, 1]$, $\omega(x) \geq 0$ a weight function on this interval and $\lambda \in \mathbb{R}$ such that $|\lambda| > 1$ is required. Here the classical Gaussian quadrature is an extremely slow procedure.

Key words. orthogonal Laurent polynomials, L-Gaussian quadrature, Szegö quadrature, three-term recurrence relations, split Levinson algorithm, numerical quadrature.

AMS subject classifications. 41A55, 33C45, 65D30.

*Received July 30, 2002. Accepted for publication May 10, 2003. Communicated by J. Arvesú.
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