Electronic Transactions on Numerical Analysis.
Volume 24, pp. 1-6, 2006.

ISSN 1068-9613.

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ORTHOGONAL LEAST SQUARES SOLUTIONS FOR LINEAR OPERATORS[*]

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Abstract. This paper solves the problem of finding, in a least squares sense, the coefficients of a series expansion of a function in terms of a chosen orthogonal basis from the knowledge not of the function itself but from the action of a linear operator upon it. The coefficiens are evaluated by inner product with a set of functions related to the orthogonal basis through the adjoint operator of the linear operator. Examples for both differential operators and integral ones as well as related properties are given.

Key words. orthogonal polynomials, linear operators, gradient operator, Radon transform

AMS subject classifications. 33C90, 33C47,42C05,42C15, 47A05

[*]Received December 1, 2004. Accepted for publication May 15, 2005. Recommended by J. Arvesú.
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