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ERROR CONTROLLED REGULARIZATION BY PROJECTION*

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

Abstract. The paper is concerned with regularization concepts for the inversion of diffusion processes. The application of the involved evolution operators is based on Dunford integral representations combined with the adaptive application of resolvents using recent wavelet methods. In particular, this allows us to develop and realize numerically, to our knowledge for the first time in this context, an SVD projection method which is compared to several versions of Tikhonov-type schemes. The theoretical findings are complemented by numerical tests shedding some light on the quantitative performance of the schemes.

Key words. inverse problems, Dunford integrals, quadrature, Tikhonov method, projection methods, truncated SVD expansion, adaptive wavelet methods

AMS subject classifications. 47A52, 65J20, 65J22

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