Electronic Transactions on Numerical Analysis.
Volume 32, pp. 63-75, 2008.

ISSN 1068-9613.

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A COMPARISON OF FOUR- AND FIVE-POINT DIFFERENCE APPROXIMATIONS FOR STABILIZING THE ONE-DIMENSIONAL STATIONARY CONVECTION-DIFFUSION EQUATION*

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Abstract. Some recently developed finite element stabilizations of convection-diffusion problems generate in 1D five-point difference schemes. Because there are only few results on four- and five-point schemes in the literature (in contrast to three-point schemes), we discuss some properties of such schemes with special emphasis on the choice of free parameters for a singularly perturbed problem to avoid oscillations.

Key words. convection-diffusion, difference scheme, stabilized finite element method

AMS subject classifications. 65L10, 65L12, 65L60

*Received November 7, 2007. Accepted for publication May 9, 2008. Published online on December 19, 2008. Recommended by M. Jung.

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