Preconditioning by an extended matrix technique for convection-diffusion-reaction equations

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In this paper we consider a preconditioning technique for nonsymmetric elliptic boundary value problems. The rectangular preconditioning matrix is constructed via the transfer operators between successive discretisation levels of the initial problem. In this way we get an extended, square but no more invertible linear system which is solved by a conjugate gradient algorithm. Numerical experiments are presented for a 2D convection-diffusion-reaction problem.