A QUADRATICALLY CONVERGENT BERNOULLI-LIKE ALGORITHM FOR SOLVING MATRIX POLYNOMIAL EQUATIONS IN MARKOV CHAINS[*]

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Abstract. A quadratically convergent algorithm is developed for solving matrix polynomial equations arising in M/G/1 and G/M/1 type Markov chains. The algorithm is based on the computation of generalized block eigenvalues/vectors of a suitable pair of matrices by means of a Bernoulli-like method. The use of the displacement structure allows one to reduce the computational cost per step. A shifting technique speeds up the rate of convergence.

Key words. polynomial matrix equations, Markov chains, generalized eigenvalues/eigenvectors, displacement structure.

AMS subject classifications. 15A24, 60J22, 65F15.