EHRLICH-LIKE METHODS WITH JARRATT'S CORRECTION FOR THE SIMULTANEOUS APPROXIMATION OF POLYNOMIAL ZEROS

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ABSTRACT

Due to the importance of polynomials in science and engineering, there is a great interest in the development of new and efficient numerical methods for determining the zeros of polynomials. In this paper, we present and analyse a family of iterative numerical methods for simultaneously approximating all the zeros of a polynomial with complex coefficients. These iterative methods are based on the well-known third order Ehrlich–Aberth iteration [1, 2], combined with an iterative correction term based on the Jarratt's family of optimal fourth order multipoint iterative methods [3] for solving nonlinear equations. Using Jarratt's correction, the order of convergence of the basic simultaneous method is increased from 3 to 6. Some numerical examples are given to illustrate the convergence and computational efficiency of the combined iterative methods for the simultaneous approximation of polynomial zeros.

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