New Fourth Order Explicit Group Method in the Solution of the Helmholtz Equation

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Abstract : In this paper, the formulation of a new group explicit method with a fourth order accuracy is described in solving the two-dimensional Helmholtz equation. The formulation is based on the nine-point fourth-order compact finite difference approximation formula. The complexity analysis of the developed scheme is also presented. Several numerical experiments were conducted to test the feasibility of the developed scheme. Comparisons with other existing schemes will be reported and discussed. Preliminary results indicate that this method is a viable alternative high accuracy solver to the Helmholtz equation. **Keywords :** explicit group method, finite difference, Helmholtz equation, five-point formula, nine-point formula

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