

Application of MSOR iteration with newton scheme for solutions of 1D nonlinear porous medium equations

ABSTRACT

This paper considers Newton-MSOR iterative method for solving 1D nonlinear porous medium equation (PME). The basic concept of proposed iterative method is derived from a combination of one step nonlinear iterative method which known as Newton method with Modified Successive Over Relaxation (MSOR) method. The reliability of Newton-MSOR to obtain approximate solution for several PME problems is compared with Newton-Gauss-Seidel (Newton-GS) and Newton-Successive Over Relaxation (Newton-SOR). In this paper, the formulation and implementation of these three iterative methods have also been presented. From four examples of PME problems, numerical results showed that Newton- MSOR method requires lesser number of iterations and computational time as compared with Newton-GS and Newton- SOR methods.