Two New Numerical Methods for Solving Semi-linear Elliptic Equations

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A so-called accelerated search extension method is proposed for solving semi-linear elliptic equations with multiple solutions. For semi-linear elliptic equations with unique solution, based on a series of new extrapolation expressions, a new extrapolation cascadic multigrid method is suggested. The numerical experiments verify the efficiency of our approaches.

Speaker Biography

Prof. Xie received her B.S in Mathematics and M.S in Computational Mathematics from Xiangtan University, China in 1987 and 1990. She received her PhD in Applied Mathematics from the Chinese Academy of Sciences in 1996. She was a guest researcher at Fibre Sciences and Communication Network, Mid Sweden University in 2001. In 2003 -2008, she was a visiting professor at Peking University, Wayne State University and Hongkong Baptist University. As the associate director of the Computational Mathematics Society of Hunan Province, she is also a member of the Chinese Computational Mathematics Society and the Society for Industrial and Applied Mathematics. Her research interests include computational theory and methods for multiple solutions of PDES, discontinuous galerkin methods for singularly perturbed problems, mathematical theory in semi-linear elliptic equations and inverse problems in engineering.

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