

Analytical solution of the Blaszak-Marciniak lattice

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Abstract: We combined the Homotopy perturbation method (HPM) and Padé techniques to solve the well-known Blaszak-Marciniak lattice. Blaszak-Marciniak lattice has rich mathematical structures and many important applications in physics, engineering and mathematics. Generally, the truncated series solution of HPM is adequate only in a small region when the exact solution is not reached. We overcame this limitation by using the Padé techniques, which have the advantage in turning the polynomials approximation into a rational function, are applied to the series solution to improve the accuracy and enlarge the convergence domain. Using this combined technique, the soliton solutions of the Blaszak-Marciniak lattice are constructed with better accuracy and better convergence than by using the HPM alone.

Key words: Padé techniques, Blaszak-Marciniak lattice, Homotopy perturbation method.
