

A new spectral-homotopy analysis method for solving nonlinear second order boundary value problems

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We present a spectral modification of the homotopy analysis method (HAM) for solving nonlinear second-order boundary value problems (BVPs). The implementation of the new approach is demonstrated by solving the Darcy-Brinkman-Forchheimer equation for steady fully developed fluid flow in a horizontal channel filled with a porous medium. The model equation is solved concurrently using the standard HAM approach and numerically using a shooting method based on the fourth order Runge-Kutta scheme. The results demonstrate that the new spectral homotopy analysis method is more efficient and converges faster than the standard homotopy analysis method.