Overall Conclusions of the Present Work

Following are the achievements of the present work:

i. Modification has been carried out in the technique of orthogonal collocation on finite elements by adding cubic Hermite basis functions. The $C^1$ continuity of Hermite polynomials ensures that the solution and its first derivative are automatically continuous at the boundary of the elements. This results in a significant saving of the computational effort.

ii. Different linear and nonlinear, ordinary / partial differential equations of previous investigators (Edoh, Russell and Sun, 2000; Dyksen and Lynch, 2000; Leao and Rodrigues, 2004) are solved using CHCM. The results of present study are found to be better results, as compared with the published work.

iii. The present study has mathematically verified, the experimental work of Crotogino, Poirier and Trinh (1987) that 100% removal of contaminants is not possible and leaching of solute can continue for a longer period after washing.

iv. In present study, theoretical convergence was given where as previously various researchers has given only numerical convergence.

v. The theoretical concept of Douglas and Dupont (1973), that convergence varies with the choice of collocation points was proved in this study. For a parabolic PDE the convergence is established of order 4 for shifted Legendre roots and of order 2 for Chebyshev roots. Numerical examples are used to verify the order of convergence as predicted by the theoretical analysis.

vi. Also stability of the present technique is shown.