1096-34-2169      **Omar Abed Elkareem Abu Arqub\*** (`o.abuarqub@bau.edu.jo`), Department of Mathematics, Al-Balqa Applied University, Salt 19117, Jordan, amman, 00962, Jordan. *An iterative method for solving boundary value problems of fourth-order and second-order differential equation systems.* Preliminary report.

In this paper, reproducing kernel Hilbert space method is introduced as an efficient solver for boundary value problems of fourth-order and second-order differential equation systems where two reproducing kernel functions are used throughout the evolution of the algorithm to obtain the required nodal values of the unknown variables. The solution methodology is based on generating the orthogonal basis from the obtained kernel function in the space $W_2^5[a, b]$. After that, the orthonormal basis is constructing in order to formulate and utilize the solutions in the same space. In addition to that, an error estimation and bound based on the use of reproducing kernel theory has been carried out. Two numerical test problems including linear and nonlinear systems were analyzed to illustrate the procedure and confirm the performance of the proposed method. The numerical results show that the proposed algorithm is a robust and accurate procedure for solving such types of systems. (Received September 17, 2013)