1116-65-1470 **Harish P. Bhatt*** (hpb2e@mtmail.mtsu.edu), 2850 Middle TN. Blvd. Apt# D12, Murfreesboro, TN 37130, and **Abdul Q. M. Khaliq**. *A compact fourth-order L-stable scheme for reaction-diffusion systems with nonsmooth data.*

We introduce a novel compact fourth-order L-stable scheme for direct integration of reaction-diffusion problems with nonsmooth data. For an efficient implementation of the algorithm a partial fraction splitting technique is utilized, in which it is required to solve several backward Euler-type linear systems at each time step. Moreover, the design of the algorithm offers parallel implementation on two processor computer so, we implement the proposed algorithm in parallel on two processor utilizing MatlabMPI and obtain that the parallel version is computationally more efficient than the existing schemes considered in this paper. We investigate an amplification factor of the scheme and plot its boundaries of stability regions, which give an indication of the stability of the scheme. Calculation of the local truncation error and an empirical convergence analysis demonstrate the fourth-order accuracy of the proposed scheme. Accuracy, computational efficiency, and reliability of the new scheme are demonstrated with numerical examples and comparing them with existing schemes. (Received September 20, 2015)