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| **Abstract:** |  |
| To infer and predict the reliability of the remaining useful life of a lithium-ion (Li-ion) battery is very significant in the sectors associated with power source proficiency. As an energy source of electric vehicles (EV), Li-ion battery is getting attention due to its lighter weight and capability of storing higher energy. Problems with the reliability arises while li-ion batteries of higher voltages are required. As in this case several li-ion cells are connected in series and failure of one cell may cause the failure of the whole battery pack. In this paper, Firstly, the capacity degradation of li-ion cells after each cycle is observed and secondly with the help of MATLAB 2016 a mathematical model is developed using Weibull Probability Distribution and Exponential Distribution to find the reliability of different types of cell configurations of a non-redundant li-ion battery pack. The mathematical model shows that the parallel-series configuration of cells is more reliable than the series configuration of cells. The mathematical model also shows that if the discharge rate (C-rate) remains constant; there could be an optimum number for increasing the cells in the parallel module of a parallel-series onfiguration of cells of a non-redundant li-ion battery pack; after which only increasing the number of cells in parallel module doesn’t increase the reliability of the whole battery pack significantly. | |