This paper is supported by a major industrial chain project of Sichuan provincial science and Technology Department of pure electric city logistics vehicle industry chain key technology research and operation demonstration. Due to the chemical reaction of iron phosphate-lithium power battery in the electric logistics vehicles is very complex and highly nonlinear and has derivative changes, The state of charge of the lithium battery is estimated to be uncontrollable and error and has its own difficulty and complexity.There are urgent requirements for the lithium battery state of charge estimation that the safety of pure electric logistics vehicles and economy of the lithium battery recycling and mileage information etc. So the lithium battery state of charge estimation is the key of a pure electric vehicle.To improve the lithium iron phosphate battery state of charge estimation accuracy is worthy of further research.

According to the pure electric logistics vehicle lithium battery state of charge, the purpose of the research is in order to improve the accuracy of estimation algorithm. So the construction of the lithium battery model and vehicle model charge state estimation algorithm is designed. At first there is the in-depth study of the lithium iron phosphate battery on the electrochemical reaction. The lithium battery electrochemical reaction is with the electrochemical polarization and concentration polarization phenomenon. The lithium iron phosphate battery capacity, internal resistance, open circuit voltage and temperature characteristics leads to characterize the battery equivalent circuit model, and according to the requirements of computing ability and the actual accuracy index, determine the equivalent circuit model complexity and model order selection support. Secondly according to the fractional characteristics of Li cell electrochemical reaction, the equivalent circuit model is extended to fractional. And this paper solves discrete filter approximation and solution of fractional order differential equivalent circuit model and estimates parameters of fractional differential equivalent circuit model on the basis of identification idea of recursive least squares identification. Furthermore kalman filter algorithm which is used to charge the theory of state estimation is studied. Based on the fractional lithium battery equivalent circuit model,this paper compares the extended kalman filter to the unscented kalman filter on the different characteristics of the nonlinear system. Based on the idea of UT transform, this paper proposes an algorithm of the unscented kalman filtering based on fractional order differential model, so as to avoid the error due to the extended kalman filter Taylor series expansion and the introduction of higher order terms are neglected. This algorithm in the general state of charge estimation algorithm based memory characteristics of fractional calculus to achieve fusion to improve the estimation precision of the algorithm, and the two kinds of SOC estimation algorithms are compared and analyzed.The experimental results are used to characterize the superiority and accuracy of the estimation algorithm.

Finally, pure electric logistics vehicle model is built in the ADVIDOR vehicle simulation platform, the model is based on the pure electric van truck CDW5070XXYH1PEV as the prototype that is producted by Chengdu WangPai Motor Co., Ltd. , and this model is in typical road conditions on the running process of the vehicle for simulation analysis. The results show that the lithium iron phosphate battery charged state estimation algorithm is accurate and effective.