ABSTRACT

Electrical energy is one type of energy that plays an important role in the advancement of human civilization. So far, the supply of electrical energy has generally been supported by fossil fuel sources. However, with the emergence of the oil crisis, many parties are interested in finding alternative sources of electrical energy, especially those from renewable sources. To support the provision of this energy, reliable energy storage is needed for a relatively long period of time, one of which is a battery. A battery is an electrochemical device used to drive the engine starter system, ignition system, lights, and other electrical components.

This study aims to estimate the State of Health (SOH) of a LiFe-PO4 battery using the linear regression method. The method applied involves the system design and battery testing stages, which consist of testing the voltage and current from the discharge results. The test data is used to calculate the battery capacity, which is then used to estimate the battery SOH using the capacity formula. The software used to search for regression is Google Colab. The results of the study show that the applied linear regression model successfully provides accurate SOH predictions. The regression equation obtained is $\hat{Y} = 99.0653 + (-0.05895X)$, which shows that every one unit increase in cycle (X) is associated with a decrease of about 0.05895-units of battery SOH (Y). This model shows a Mean Absolute Percentage Error (MAPE) value of 0.36%, which indicates that the average error between the predicted value and the actual value is about 0.36%. So it can be said that the linear regression results have excellent forecasting model capabilities.

***Keywords** : Battery Lithium Iron Phosphate (LiFe-PO4), Linear Regression, State Of Health (SOH), Mean Absolute Percentage Error (MAPE)*