# PERANCANGAN ALGORITMA SISTEM PENGONTROLAN *STATE OF CHARGE* DAN TEMPERATUR BATERAI LITHIUM ION SERTA MEMPROTEKSINYA TERHADAP KONDISI *OVERCHARGE* DAN *OVERHEAT* SELAMA PROSES PENGISIAN

**TUGAS AKHIR**

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Disusun Oleh

Mochk Yogi Widagdo
NIM.1610951021

Dosen Pembimbing :

Muhammad Imran Hamid, M.T, Ph.D
NIP. 197103281999031002

Program Studi Teknik Elektro
Fakultas Teknik
Universitas Andalas


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| Judul | Perancangan Algoritma Sistem Pengontrolan State Of Charge Dan Temperatur Baterai Lithium Ion Serta Memproteksinya Terhadap Kondisi Overcharge Dan Overheat Selama Proses Pengisian | Mochk Yogi Widagdo |
| Program Studi | Teknik Elektro | 1610951021 |
| Fakultas Teknik<br>Universitas Andalas | | |


Abstrak

Baterai Lithium Ion (Li-Ion) adalah jenis baterai baterai isi ulang yang banyak digunakan pada kendaraan listrik saat ini. Protokol pengisian baterai Li-Ion menggunakan metode *Constant Current* (CCCV). *Battery Charger* Li-ion dengan metode CCCV dan teknik *fast charging* dapat mengakibatkan kondisi *overheat* dan *overcharge*. Pada penelitian ini, dirancanglah algoritma sistem pengontrolan pada rangkaian *battery charger* Li-Ion yang dapat mempertahankan temperatur baterai agar tidak lebih dari 45°C dan memutuskan arus pengisian ketika nilai SoC telah 100%. Hasil pengujian simulasi menunjukkan performa rangkaian CCCV dengan sistem pengontrolan dapat mengatasi kondisi *overcharge* dan *overhe*at, selain itu penambahan algoritma sistem pengontrolan berdampak pada waktu pengisian baterai Li-Ion. Selisih waktu rangkaian *battery charger* tanpa dan dengan sistem pengontrolan selama 52 menit.



Kata Kunci : CCCV, *fast charging*, *battery charger*, temperatur baterai, *overcharge*, *overheat*

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| Title | Algorithm Design of Lithium Ion Battery State of Charge and Temperature Control System and Protect it Against Overcharge and Overheat Conditions during the Charging Process | Mochk Yogi Widagdo |
| Major | Electrical Engineering | 1610951021 |

Faculty of Engineering
Universitas Andalas

Abstract

*Lithium Ion (Li-Ion) batteries are a type of rechargeable battery that is widely used in electric vehicles today. The Li-Ion battery charging protocol uses the Constant Current (CCCV) method. Li-ion battery charger with CCCV method and fast charging technique can cause overheating and overcharge conditions. In this study, a control system algorithm was designed in a series of Li-Ion battery chargers that can maintain the battery temperature at no more than 45 ° C and cut off the charging current when the SoC value is 100%. The simulation test results show the performance of the CCCV circuit with the control system can overcome overcharge and overheat conditions, besides the addition of the control system algorithm has an impact on the charging time of the Li-Ion battery. Time difference between the battery charger circuit without and with the control system for 52 minutes.*

*Keywords: CCCV, fast charging, battery charger, battery temperature, overcharge, overheat*