DESIGN AND ANALYSIS OF LITHIUM POLYMER BATTERY CHARGER USING CONSTANT CURRENT CONSTANT VOLTAGE METHOD

UNDERGRADUATE THESIS

Submitted as one of the requirements to obtain

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TURNITIN RESULT

DESIGN AND ANALYSIS OF LITHIUM POLYMER BATTERY CHARGER USING CONSTANT CURRENT CONSTANT VOLTAGE METHOD

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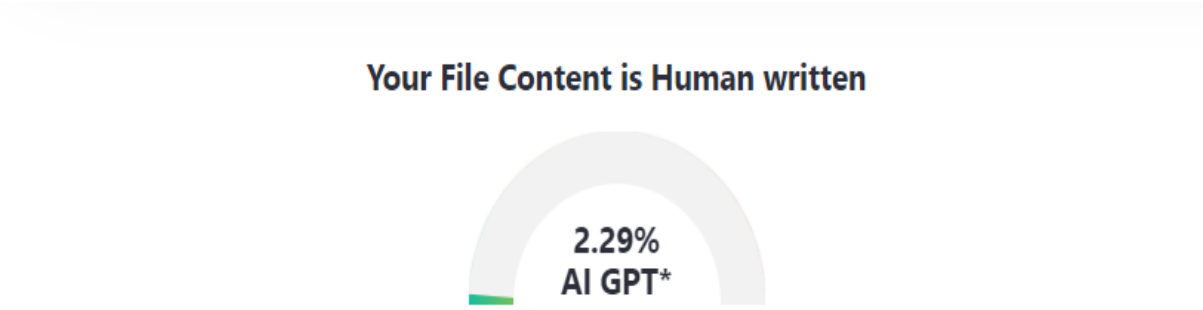

ABSTRACT

The global demand for batteries continues to increase, considering that batteries have a role as clean energy transitions and energy storage systems. Research on batteries will continue to produce better batteries in the future. Society depends on reliable electricity supplies that are used anytime, anywhere. One of these electricity supplies is lithium batteries because they have high energy density and are rechar geable. Over time, the battery's cycle life will decrease due to the battery material and char ging method. One of the optimal charging methods to use is constant current constant voltage. The design of constant current constant voltage charger is done by analyzing the decrease in buck converter formula and with a closed -loop system. The beginning of battery charging uses a constant current mode of 2 A until the state of charge of the batter y is filled with 85% after which the mode changes to constant voltage 9 V. Closed - loop system produces a small error in constant current which is 0.05% and consta nt voltage 0.02% and reduces the overshoot value to 0.591% and rise time to 12.066 ms . Temperature in the battery can affect the charging output, especially the current, which is smaller than the battery that does not have a temperature effect .

Keywords: lithium battery , buck converter , controller , duty cycle.

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All praise and thanks be to Allah SWT for His grace and mercy, I can complete this thesis

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The global demand for batteries continues to increase, considering that batteries have a role as clean energy transitions and energy storage systems. Research on batteries will continue to produce better batteries in the future. Society depends on reliable electricity supplies that are used anytime, anywhere. One of these electricity supplies is lithium batteries because they have high energy density and are rechargeable. Over time, the battery's cycle life will decrease due to the battery material and charging method. One of the optimal charging methods to use is constant current constant voltage. The design of constant current constant voltage charger is done by analyzing the decrease in buck converter formula and with a closed-loop system. The beginning of battery charging uses a constant current mode of 2 A until the state of charge of the battery is filled with 85% after which the mode changes to constant voltage 9 V. Closed-loop system produces a small error in constant current which is 0.05% and constant voltage 0.02% and reduces the overshoot value to 0.591% and rise time to 12.066 ms. Temperature in the battery can affect the charging output, especially the current, which is smaller than the battery that does not have a temperature effect.

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