

Battery State of Charge (SOC) Estimation

Coulomb Counting Method

Problem:

A 12V battery capacity of 500Ah with SOC of 100% supplies a load of DC Machine (5HP, 240V, 1750 RPM, Field = 300V). Find the state of charge of the battery after 3 Hours.

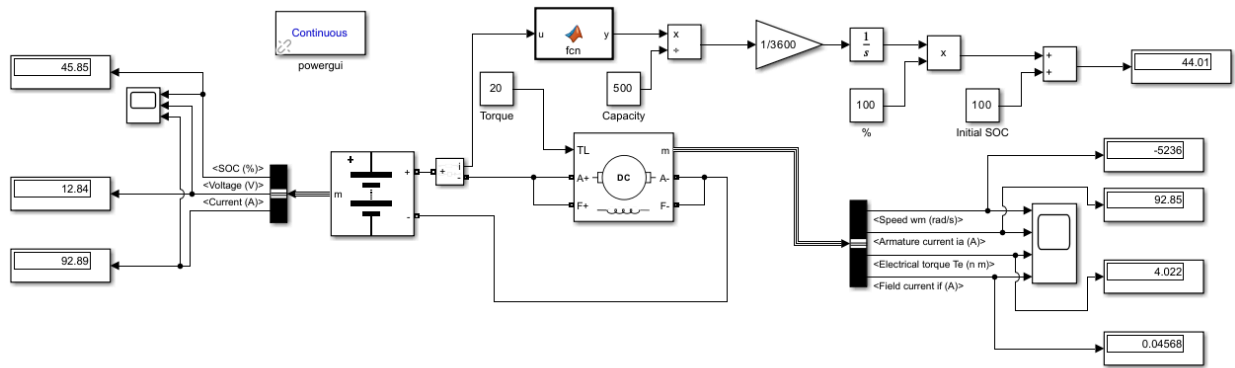
$$SOC(t) = SOC(t-1) + \int_0^t \frac{I}{C_{bat}} \cdot dt$$

Where:

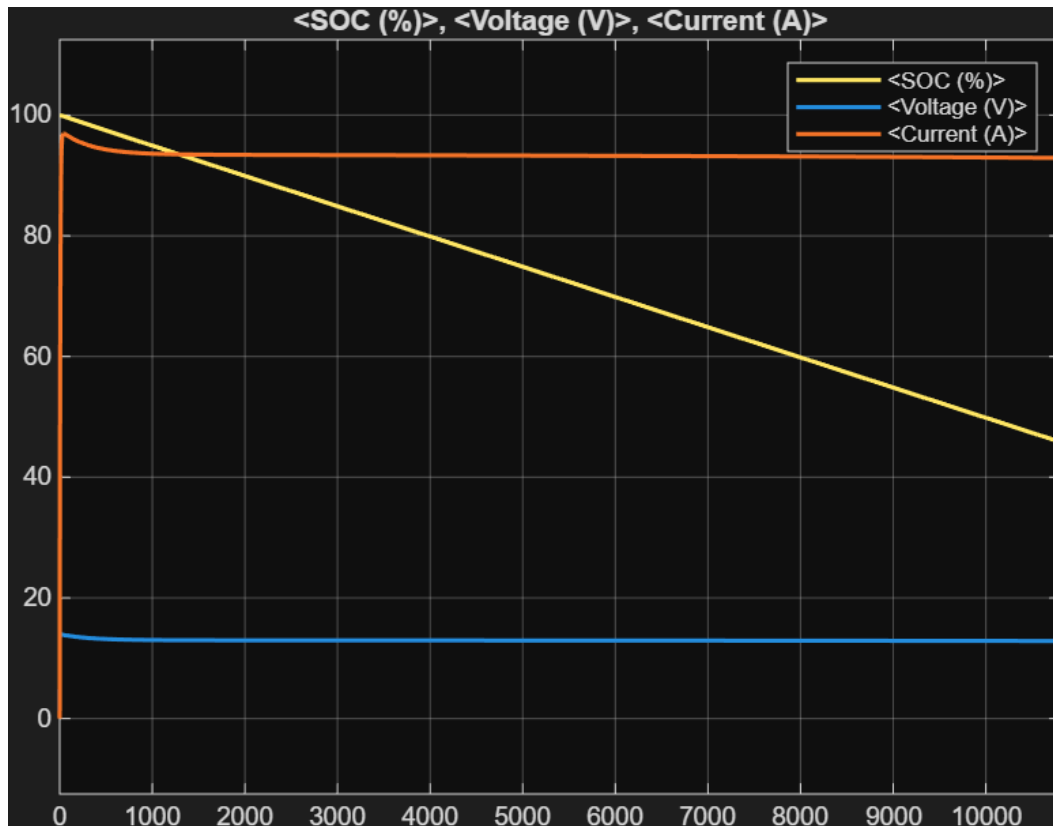
| | |
|--------------|---|
| $SOC(t)$ | Battery state-of-charge at time t [%] |
| $SOC(t-1)$: | Battery initial state-of-charge [%] |
| I | Charge/discharge current [A] |
| t | Time [h] |
| C_{bat} | Battery capacity [Ah] |

Charge => +I

Discharge => -I



Battery Scope



DC Machine Scope

