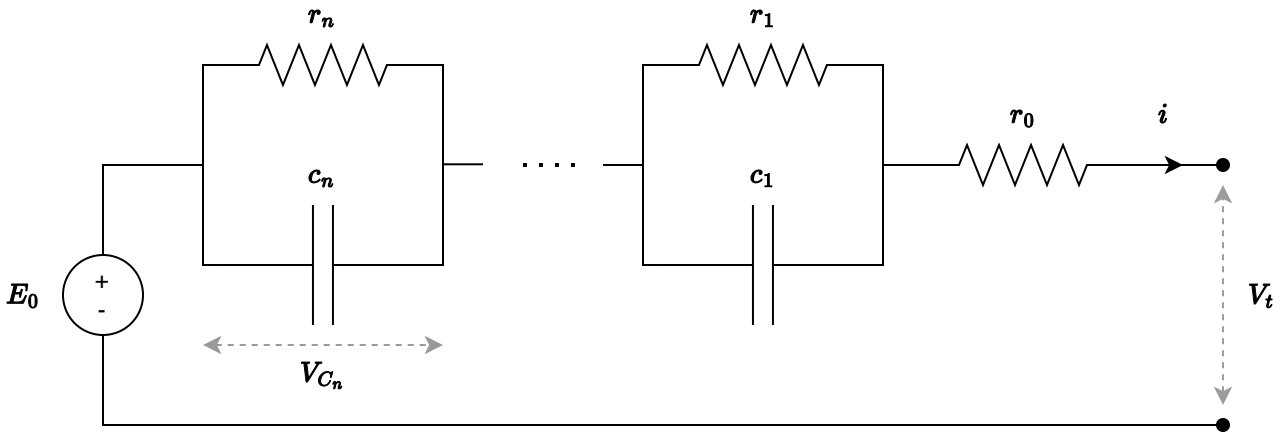
ECM model

Schematic



$E_0 \rightarrow open\ circuit\ voltage\ (V)$
$V_t \rightarrow terminal\ voltage\ (V) \leftarrow output\ of\ the\ model$
$i \rightarrow current\ draw\ (A) \leftarrow input\ to\ the\ model$
$r_n, c_n \rightarrow resistance\ and\ capacitances\ (\Omega, F)$

Equations

Model equations

$$V_t = E_0 - \sum_{1 \rightarrow n} V_{c_n} - ir_0$$

$$\frac{dV_{c_n}}{dt} = \frac{i}{c_n} - \frac{V_{c_n}}{r_n c_n}$$

$$\frac{soc}{dt} = \frac{-i}{Q_{Ah} \times 3600}$$

Post-processing equations

$$P_{heat} = i^2 r_0 + \sum_{1 \rightarrow n} \frac{V_{c_n}^2}{r_n}$$