**DC Drive with chopper control for EV**

**Name : Ajit Dadasaheb Hukkie**

**Unique ID: 2005065**

Contents

[Circuit Diagram 2](#_Toc59192946)

[Circuit Specification 2](#_Toc59192947)

[Differential Equations 3](#_Toc59192948)

[Working Operation 3](#_Toc59192949)

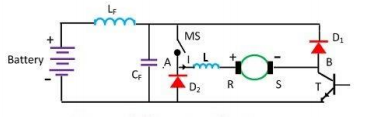
[Motoring operation 3](#_Toc59192950)

[Regenerative braking operation 3](#_Toc59192951)

[Simulink Model 4](#_Toc59192952)

[Output 5](#_Toc59192953)

# Circuit Diagram

****

# Circuit Specification

V: applied voltage (V)

Ia : motor current (A)

Iin : Load current (A)

i : Supply current (A)

Vc : Capacitor Voltage (V)

La : Armature Inductor (H)

L : Series Inductor (H)

Lf : Source Inductor (H)

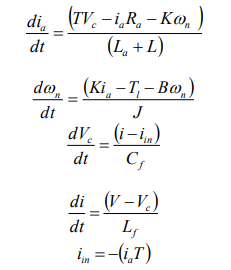
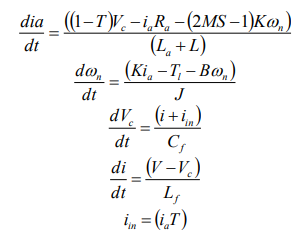
Cf : Capacitor voltage (F)

Ra : Armature Resistance (Ω)

ωn : Motor output speed (rps)

# Differential Equations

Motoring Operation Regenerative Breaking

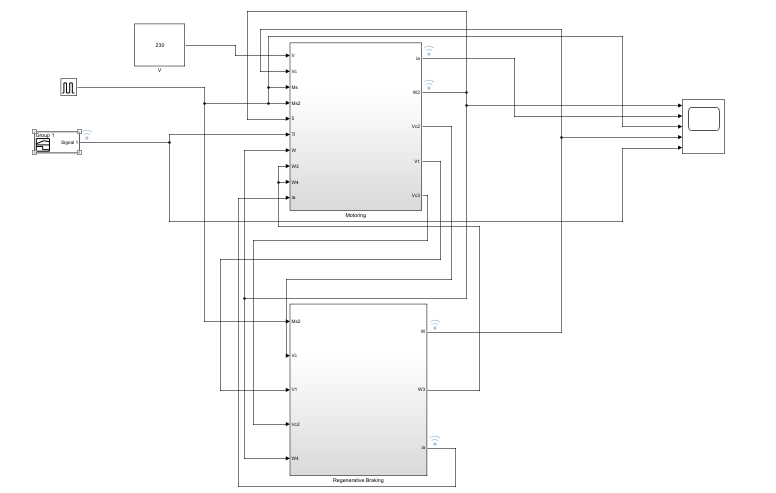
** **

# Working Operation

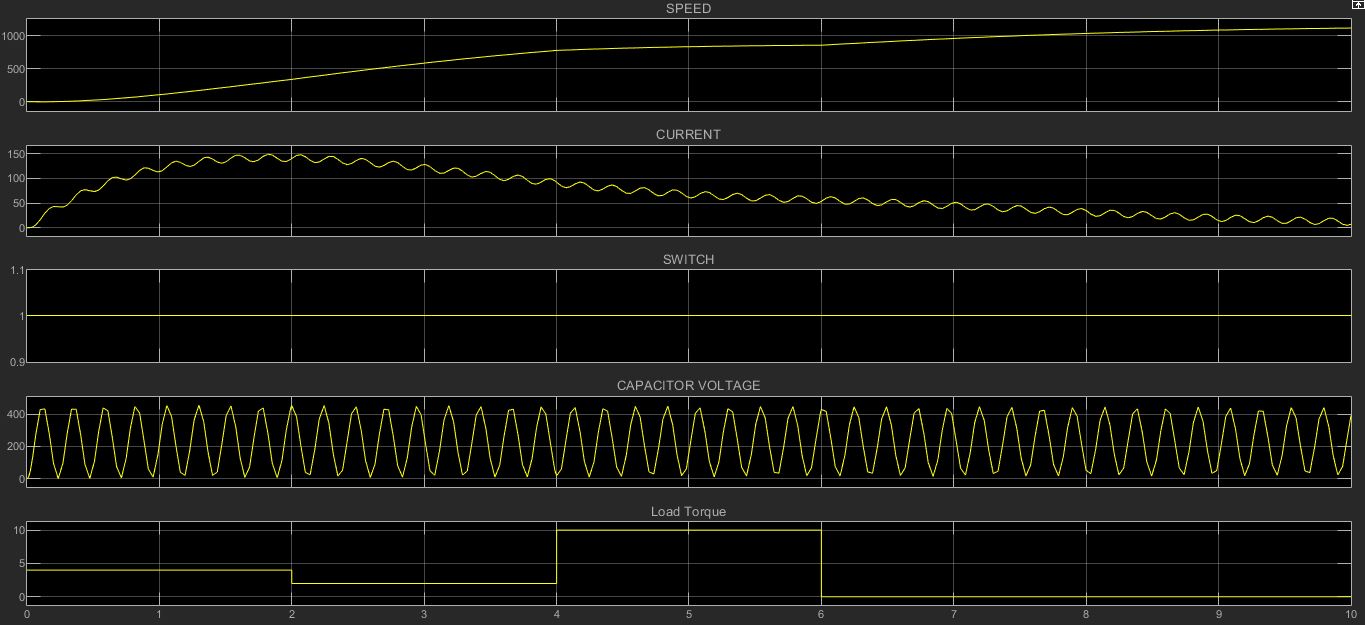
Motoring operation**:-** In motoring mode, the machine works as a motor and converts the electrical energy into mechanical energy, supporting its motion. For motoring operation MS is kept closed[6]. Transistors switch T is operated at a constant frequency with variable on time to obtain variable dc voltage for starting and speed control. When T is on, the current flows through the source, Lf , MS, L, R, armature, S and T. when T is off, the armature current freewheels through S, D1, MS, L and R

Regenerative braking operation**:** for regenerative braking operation MS is kept open and motor armature is reversed with the help of the reversing switch RS making B positive with respect to A. when T is on, the armature current builds up through the path consisting of T, D2 and L. when T is off, the armature current flows against the battery voltage through the path consisting of D1, Lf , battery, D2 and L and the energy feedback is utilized to charge the battery

# Simulink Model

****

# Output

****