# Separately Excited DC Motor Modeling

Repo link: https://github.com/mohamed1yousef/Model-Based-Development/tree/projects/DC_Motor_Modeling

## Motor modeling and simulation.

Different physical effects need to be represented by the motor simulation model.

System engineers analyze motors within a larger system and need more abstract motor models that simulate fast and provide information such as torque and power.

Motor control engineers need motor models that capture the effects of changes in voltage and current.

## DC machine.

The same DC machine can be used as a motor or generator. Construction of a DC motor is same as that of a DC generator; however, the former converts electrical energy into mechanical energy.

DC motors are usually classified of the basis of their excitation configuration, as follows .

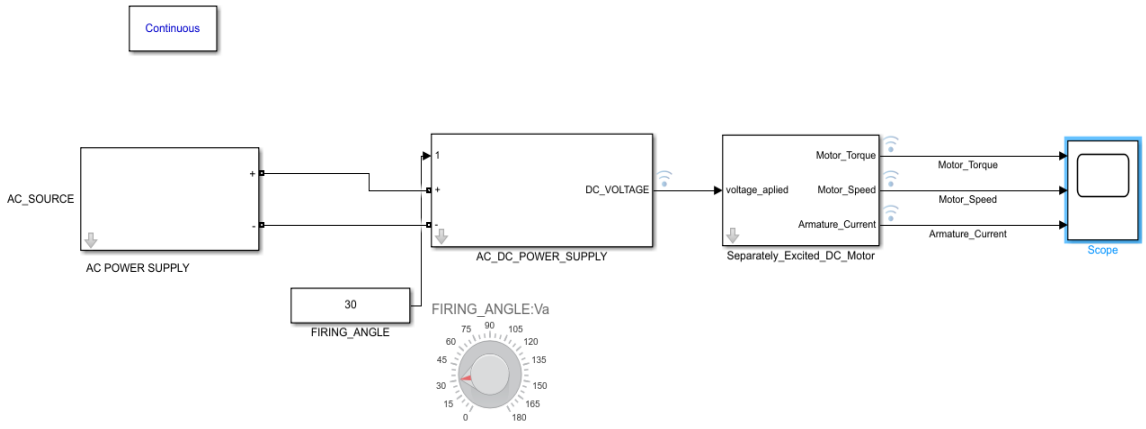
•Separately excited (field winding is fed by external source)

•Self excited

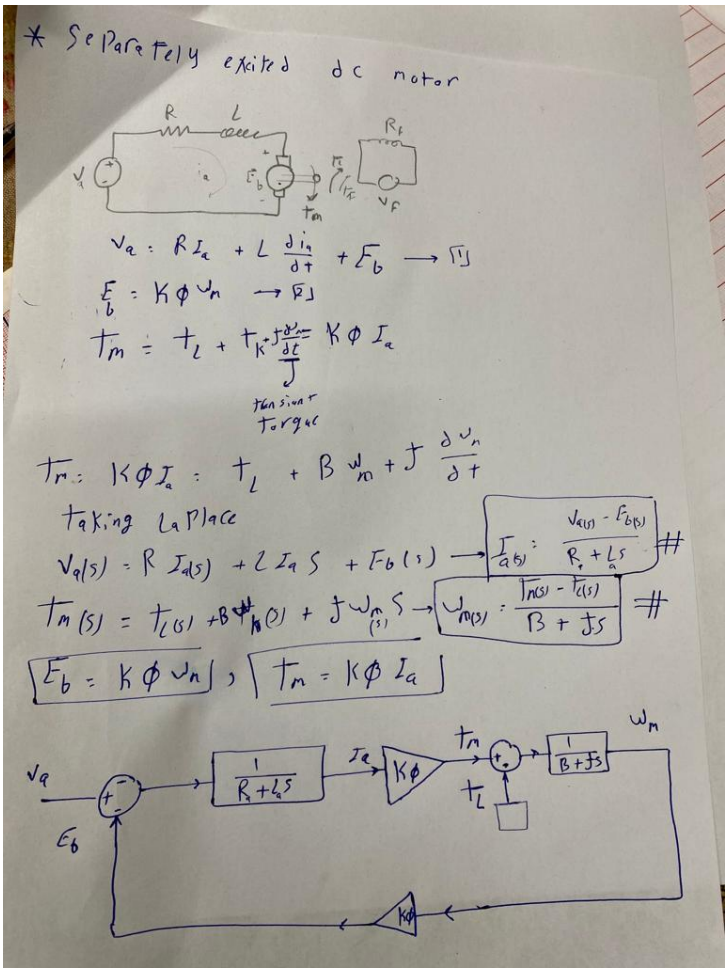
• Series wound (field winding is connected in series with the armature)

• Shunt wound (field winding is connected in parallel with the armature)

## Our system based on Separately excited DC motor.

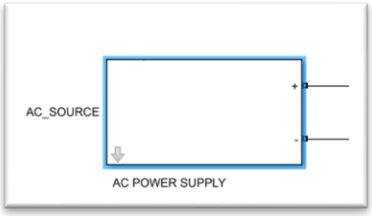


The project kicked off with handwritten analysis, delving into the intricacies of motor dynamics.

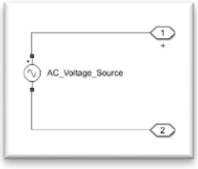



*AC Power Supply.

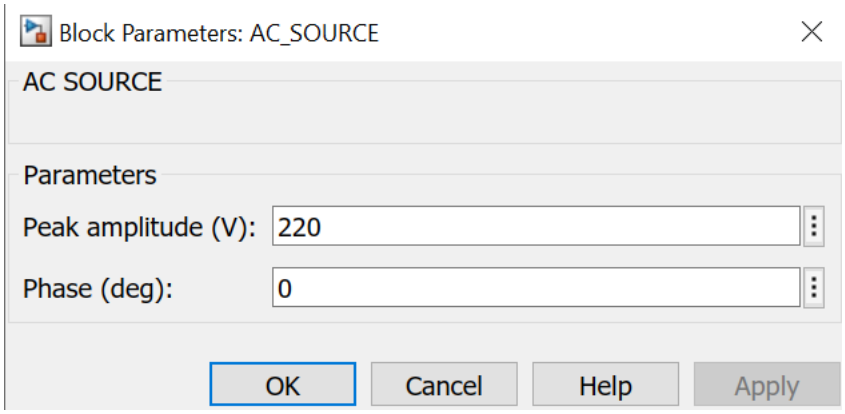
Subsystem block.



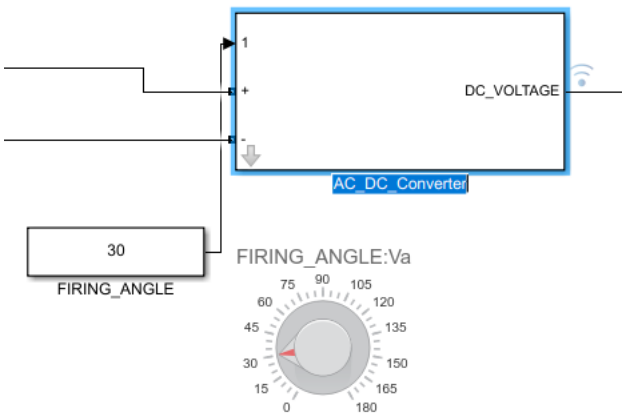

The implementation.



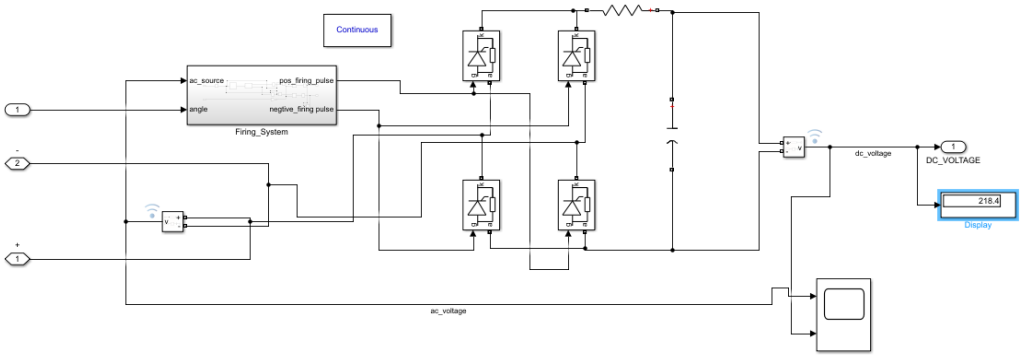
The Configrtion.



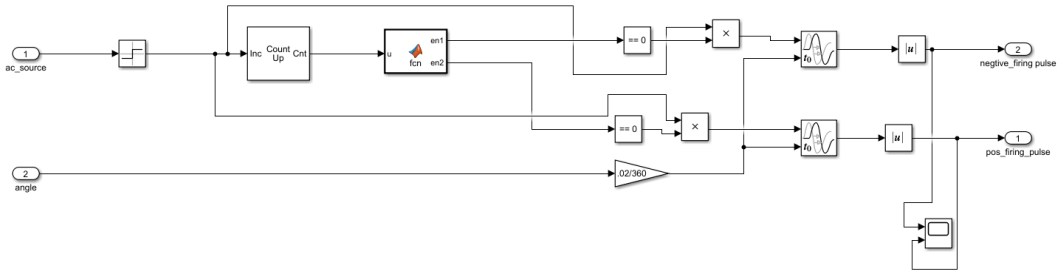

* AC/DC Converter.




The implementation.

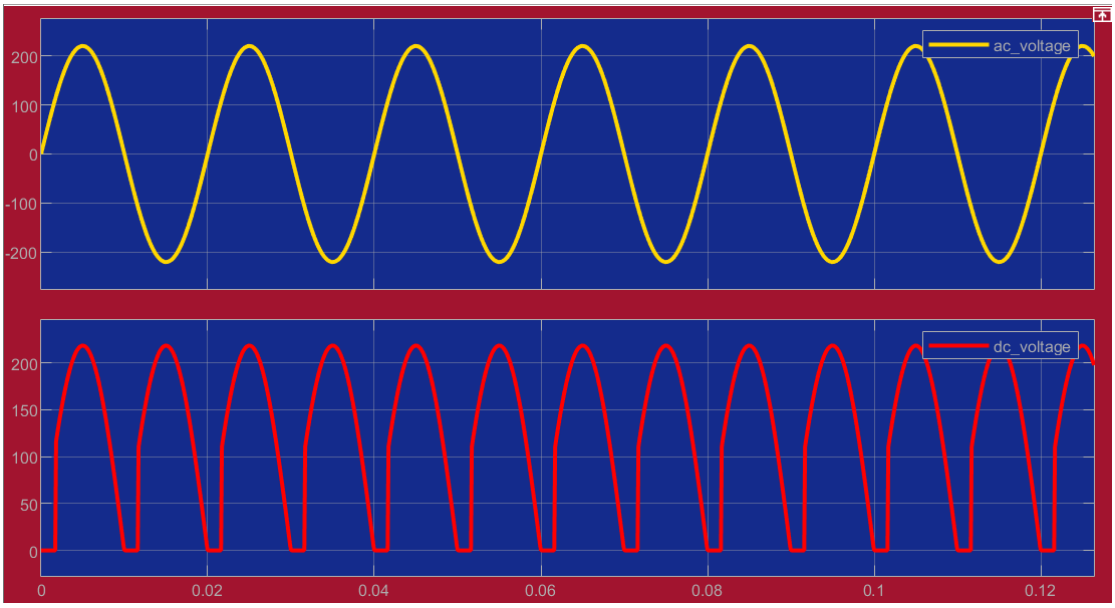


Firing subsystem implementation.




outputs.

At ac voltge =220v and firing angle =30 deg without capactior parallel with load



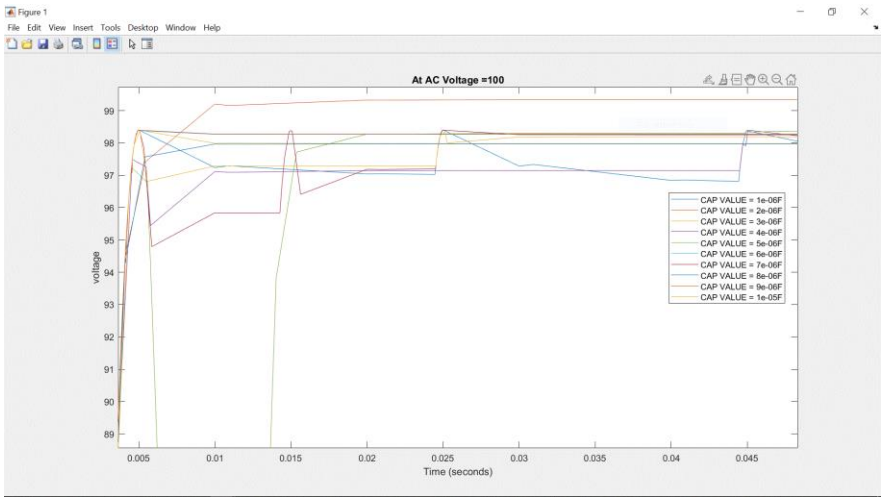

putting the capacitor in parallel with the load to prevent pulsating current and the pulsating torque to get the best value of the cap I used matlab sqript to get it.

cap_vlaue.m

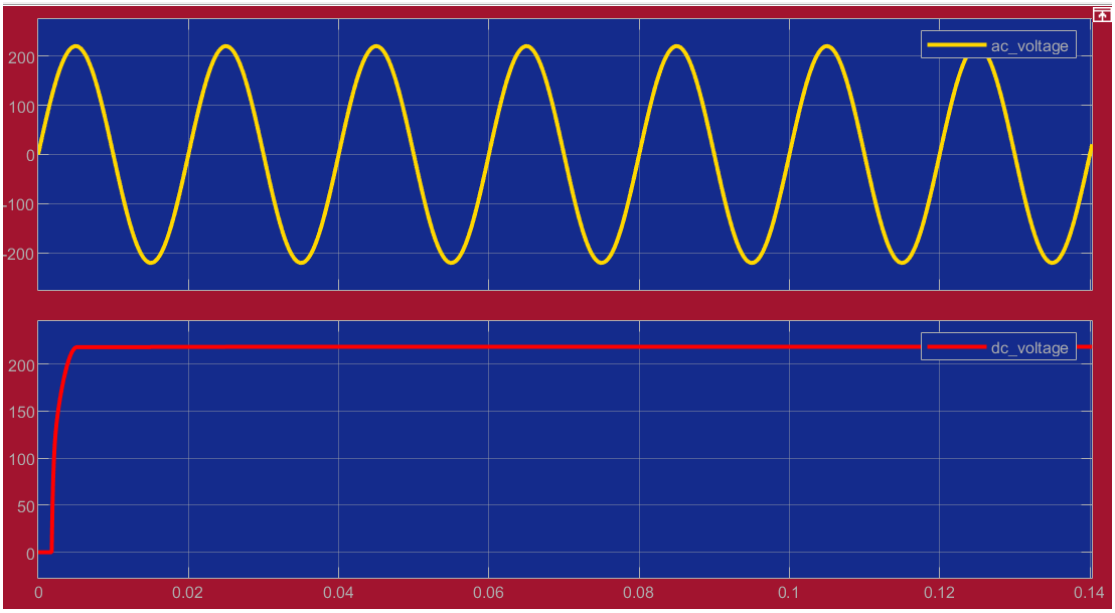
```
values = 1e-6:1e-6:10e-6;
name_of_model = gcs;

for i=1:length(values)
    CAP = values(i);
    res = sim(name_of_model);
   plot(res.logsout{1}.Values)
   hold on
name_of_legend(i)= "CAP VALUE = " + num2str(CAP)+"F";
end
legend(name_of_legend);
ylabel('voltage');
title('At AC Voltage =100');
```

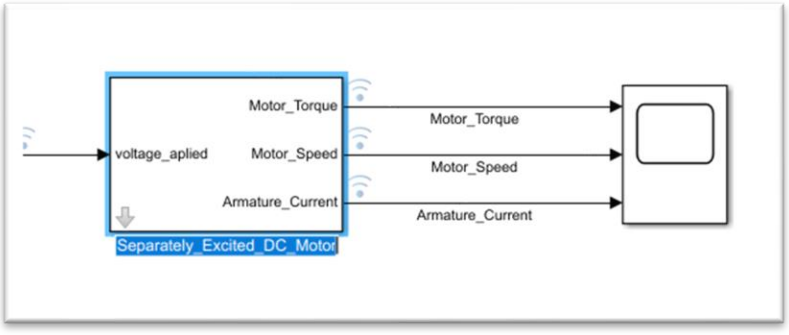
The plot :-



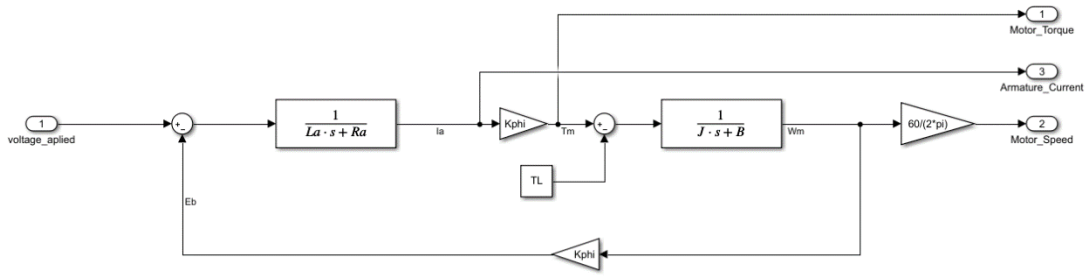

The out dc voltage using the suitable value of cap the cap :-



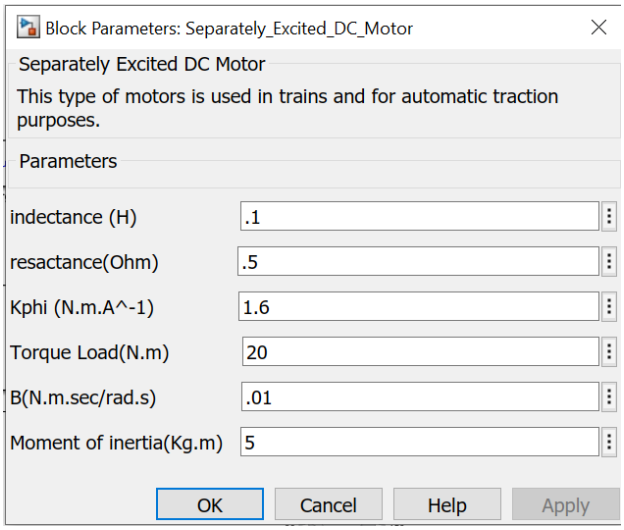

*Separately Excited DC Motor Subsystem.



The implementation.



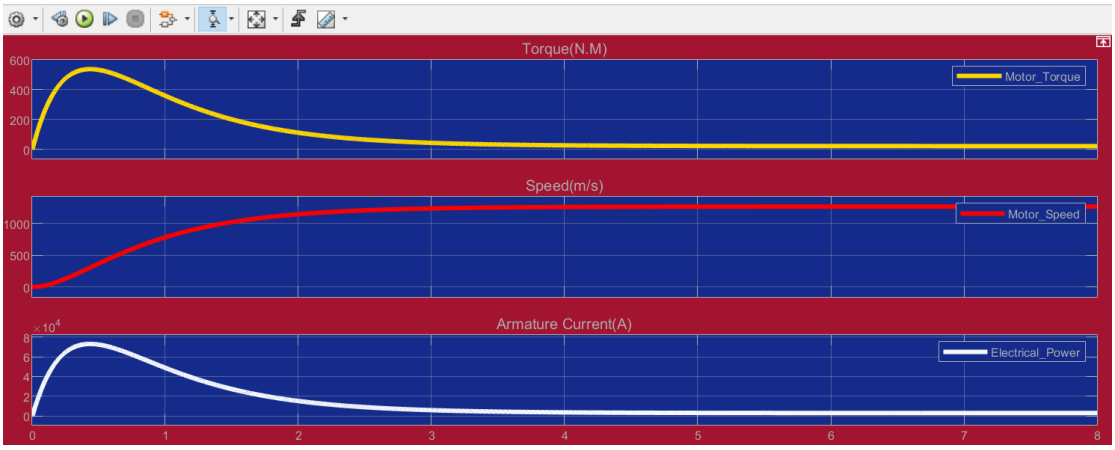

The Configrtion.




The outputs of the all system:-

At ac applied voltage =220v

Firing angle =30 deg




The greater the applied voltage, the greater the torque and speed