Experiment No. 09

9.1 Experiment Name

Simulation on bi-directional hysteresis control of grid connected H- bridge and battery with controlled DC linked voltage

9.2 Objectives

- To develop and study a H bridge inverter using Simulink
- To get familiarize with the Simulink platform and Simulink library
- To use the Simulink platform to construct and analyze a bi-directional hysteresis control of grid connected H bridge inverter

9.3 Apparatus

- Simulink

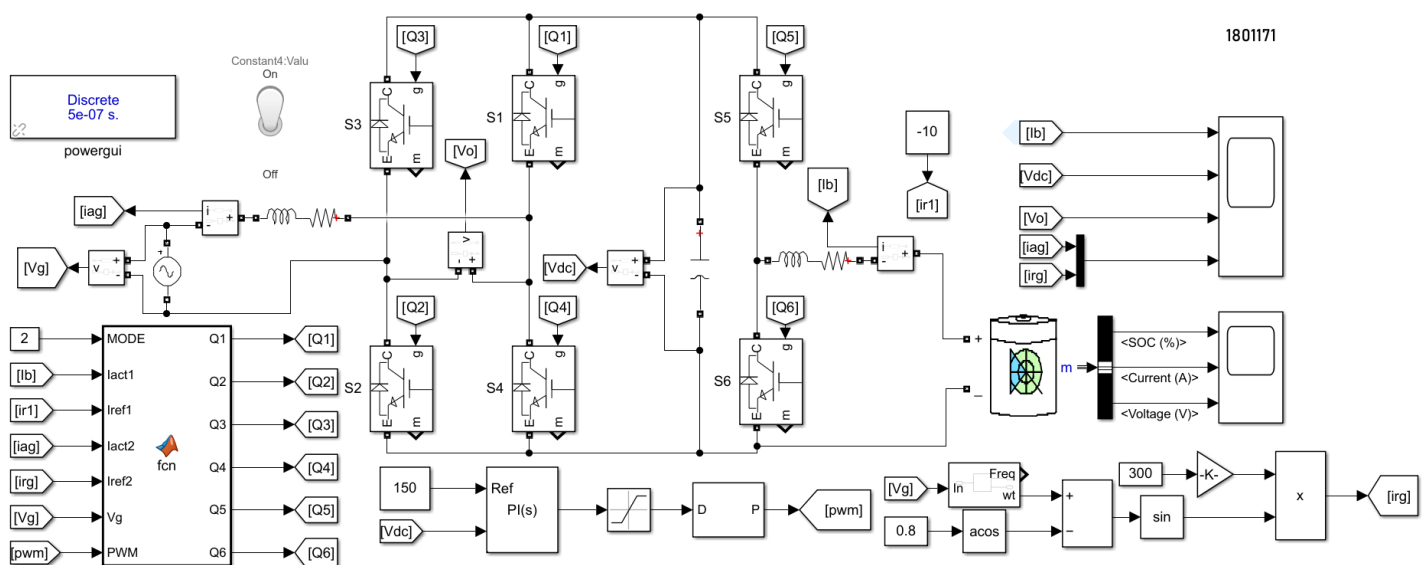### 9.4 Simulink Block Diagram & Waveform

Fig.9.1: Block diagram of bi-directional hysteresis control of grid connected H- bridge and battery with controlled DC linked voltage
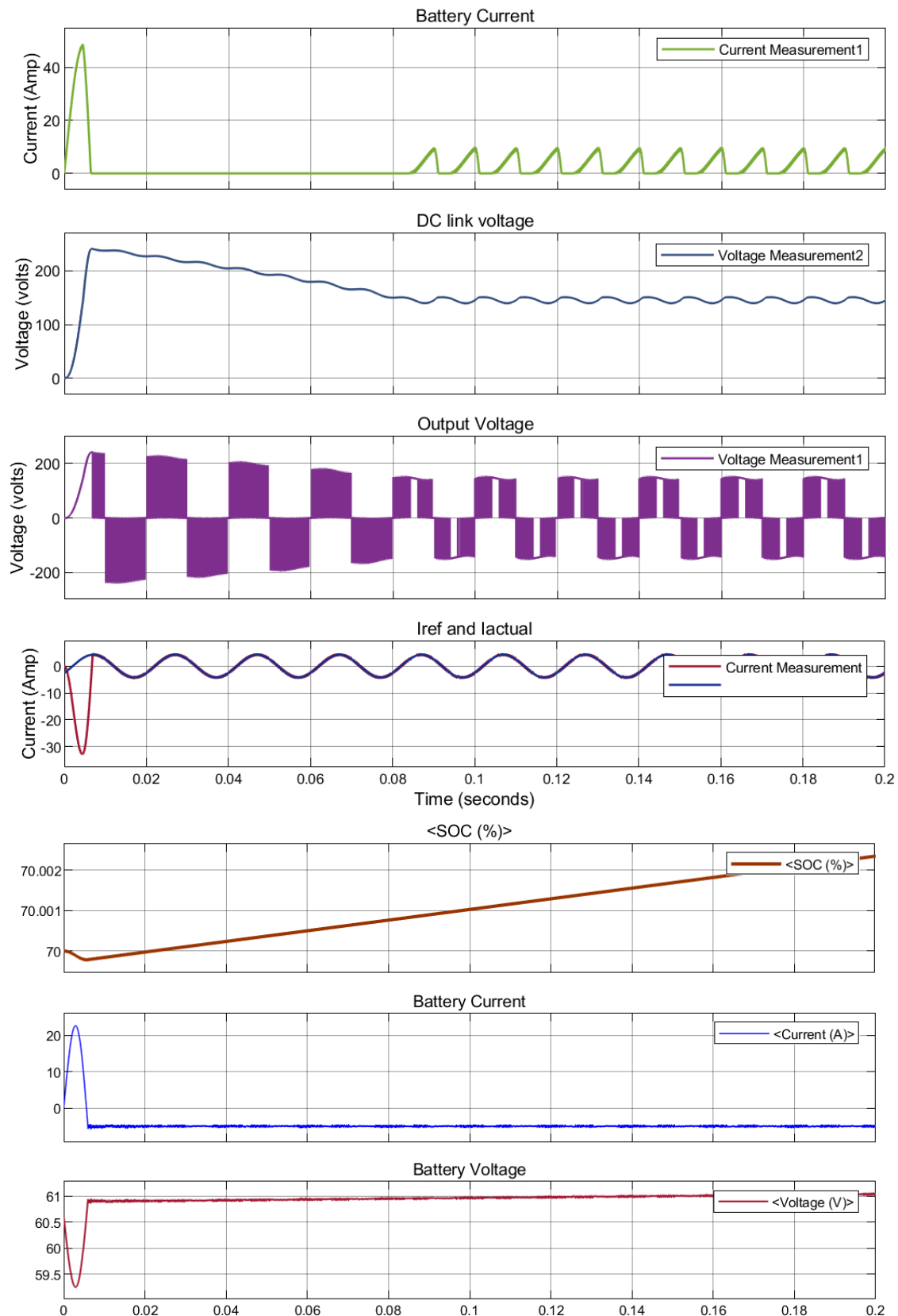
Fig.9.2: Waveform of bi-directional hysteresis control of grid connected H- bridge and battery with controlled DC linked voltage

MATLAB Code

```
function [Q1,Q2,Q3,Q4,Q5,Q6] = fcn(MODE,Iact1,Iref1,Iact2,Iref2,Vg,PWM)
```

```
persistent S1; if isempty(S1);S1=0;end
persistent S2; if isempty(S2);S2=0;end
persistent S3; if isempty(S3);S3=0;end
persistent S4; if isempty(S4);S4=0;end
persistent S5; if isempty(S5);S5=1;end
persistent S6; if isempty(S6);S6=0;end
if MODE==1
    S1=0;S2=0;S3=0;S4=0;S6=0;
    e1=Iact1-Iref1;
    d1=0.5;
    if e1>=d1
        S5=1;
    elseif e1<=-d1
        S5=0;
    else S5=S5;
    end
else MODE==2
    d2=0.5;
    S6=PWM;
    S5=0;
    e2=Iact2-Iref2;
    if Vg>=0
        if e2<=-d2
            S1=1;S2=1;S3=0;S4=0;
        elseif e2>=d2
            S1=1;S2=0;S3=1;S4=0;
        else
            S1 = S1;S2=S2;S3=S3;S4=S4;
        end
    else
        if e2<=-d2
            S1=0;S2=1;S3=0;S4=1;
        elseif e2>=d2
            S1=0;S2=0;S3=1;S4=1;
        else
            S1 = S1;S2=S2;S3=S3;S4=S4;
        end
    end
end
Q1=S1; Q2=S2; Q3=S3; Q4=S4;Q5=S5;Q6=S6;
end
```

9.5 Discussion & Conclusion

This experiment thoroughly investigated hysteresis control of grid connected H bridge system and battery with controlled DC linked voltage. For this system, we utilized connection and value of parameter according to our preference. Similarly, for Hysteresis control inverter, we used necessary tool according to our requirements. Thus, desired output was observed and the simulation was a success.