

Experiment No. 10

10.1 Experiment Name

Simulation on Maximum Power Point Tracking (MPPT) algorithm of Photovoltaic system (solar)

10.2 Objectives

- To develop and study a Photovoltaic system (solar) using Simulink
- To get acquainted with Maximum Power Point Tracking (MPPT) algorithm
- To get familiarize with the Simulink platform and Simulink library
- To use the Simulink platform to construct and analyze the I-V and P-V characteristics curve of the system

10.3 Apparatus

- Simulink

10.4 Simulink Block Diagram & Waveform

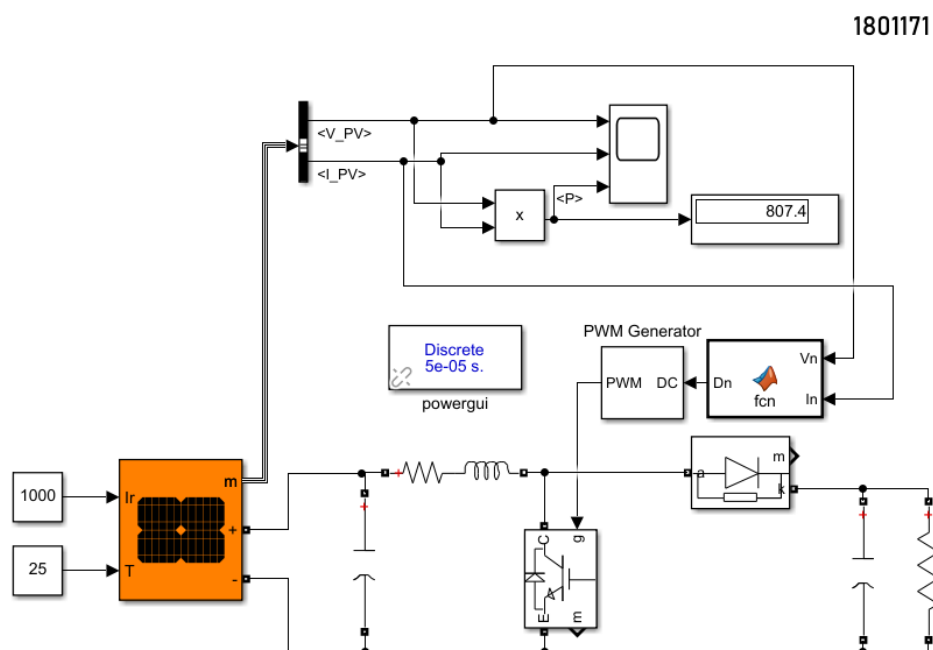


Fig.10.1: Block diagram of a Photovoltaic system (solar) for Maximum Power Point Tracking (MPPT)

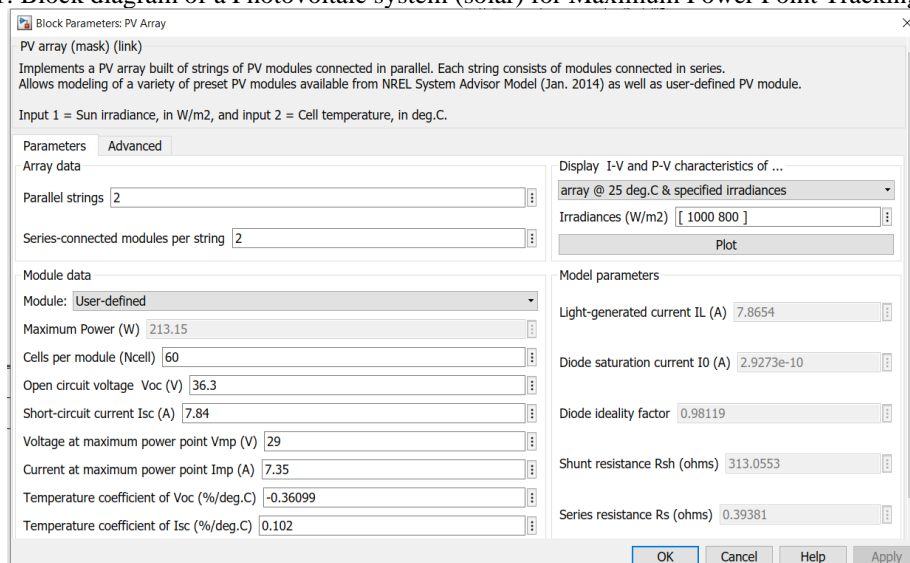


Fig.10.2: Block parameters of the PV array used in Photovoltaic system (solar)

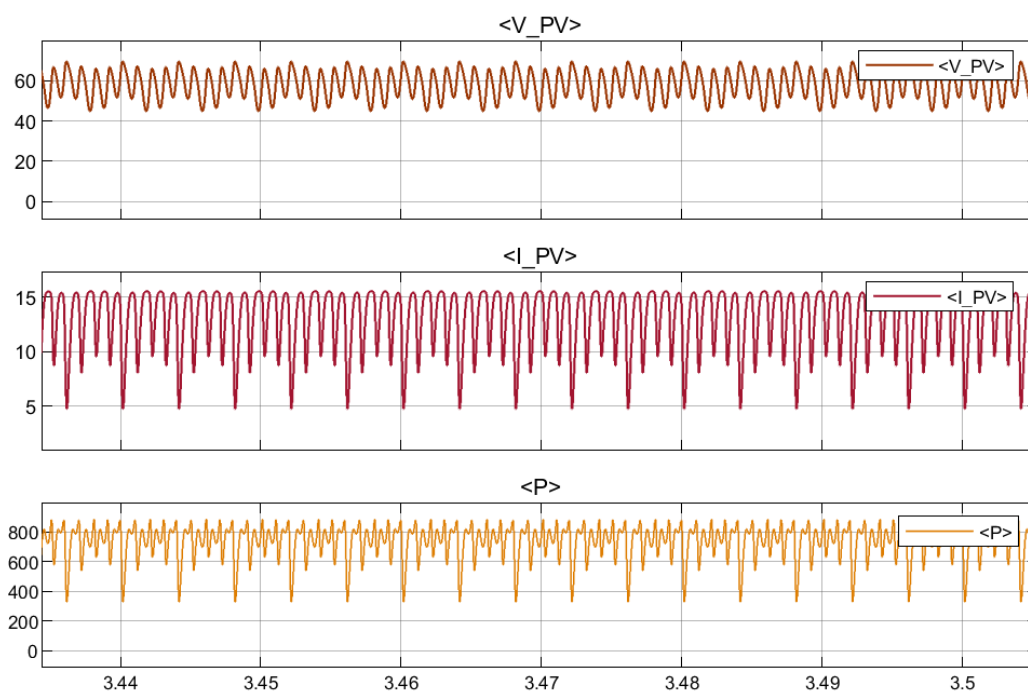


Fig.10.3: Voltage, current, and power waveform of PV array

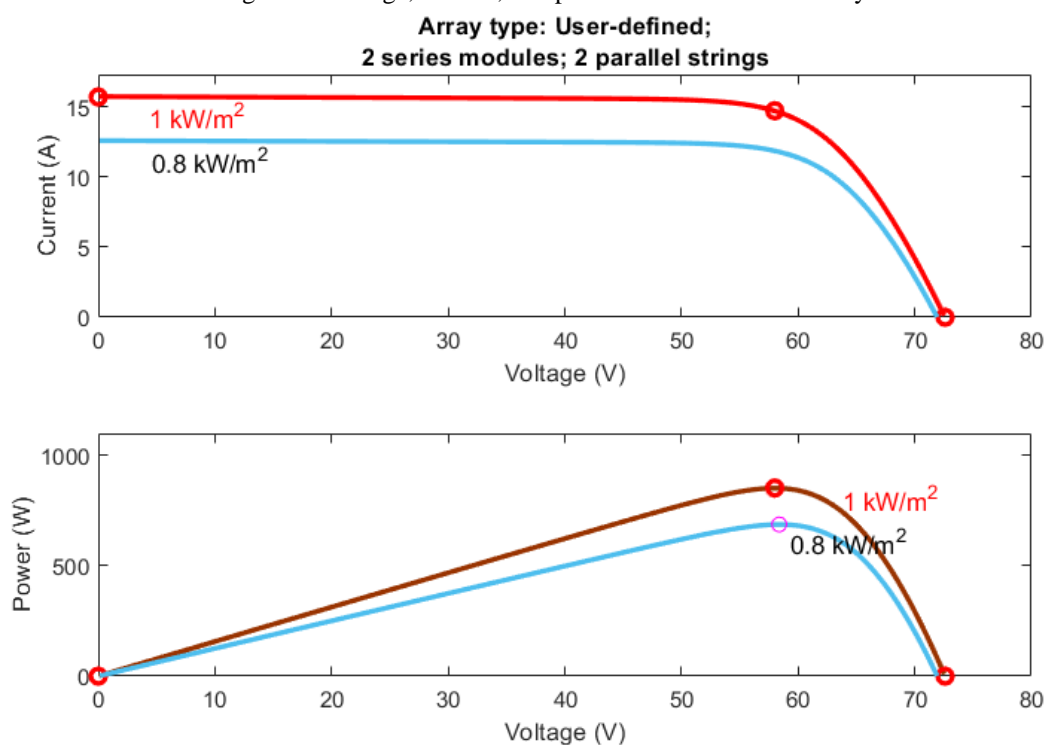


Fig.10.4: I-V and P-V characteristics of defined PV array at 25° Celsius and specified irradiances

MATLAB Code

```
function Dn = fcn(Vn,In)
delta = 0.001;
Dmax = 0.9;
Dmin = 0.05;
persistent Po if isempty(Po); Po = 100; end
persistent Vo if isempty(Vo); Vo = 10; end
persistent Do if isempty(Do); Do = 0.5; end
Pn = Vn*In;
```

```

dp = Pn-Po;
dv = Vn-Vo;
if ((dp/dv)>0)
    Dn = Do-delta;
elseif ((dp/dv)<0)
    Dn = Do+delta;
else
    Dn = Do;
end
Do=Dn;
Po=Pn;
Vo=Vn;
if Dn>Dmax
    Dn = Dmax;
elseif Dn<Dmin
    Dn = Dmin;
else Dn = Dn
end
y = Dn;
end

```

10.5 Discussion & Conclusion

This experiment thoroughly investigated to analyze a Photovoltaic system for Maximum Power Point Tracking (MPPT). Here, we used a solar PV array for analysis. For this system, we utilized connection and value of parameters of the PV array according to our desired preference. This ensured a better characteristics curve for both I-V and P-V. Thus, desired output was observed and the simulation was a success.