Theoretical Power Production

Define latitude of the solar panelsand decleration of the sun

```
lat = 42 + 17/60;
dec = 23.50;
```

Convertion from degrees to radians

```
lat = lat * pi/180;
dec= deg2rad(dec);
```

```
t = 5.5:0.25:20;
LST = t - 1 + 14.6/60;
```

Determine the amaount of solar irridiance on the solar panels

$_{panel} = $_{inc}\sin(\alpha),

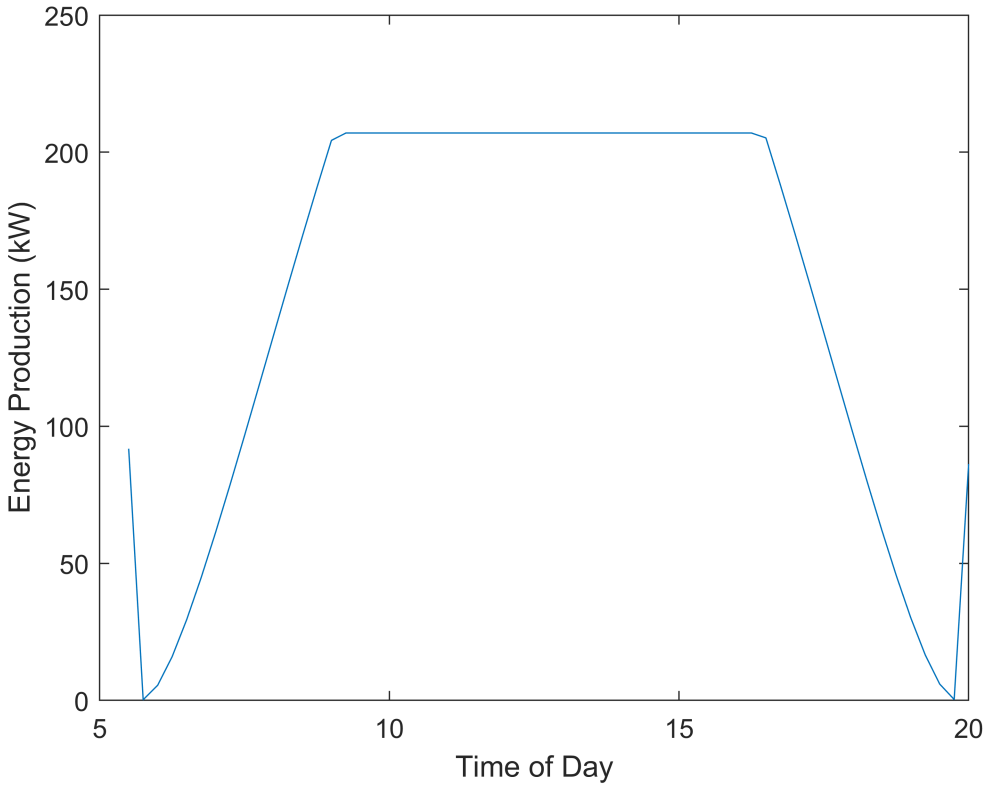
```
sunangle = sin(dec)*sin(lat)+ cos(dec)*cosd(15*(LST-12));
S_inc = 1.4883*0.7.^(sunangle.^-0.678);
```

Calculate the final theoretical production for entire solar panel array

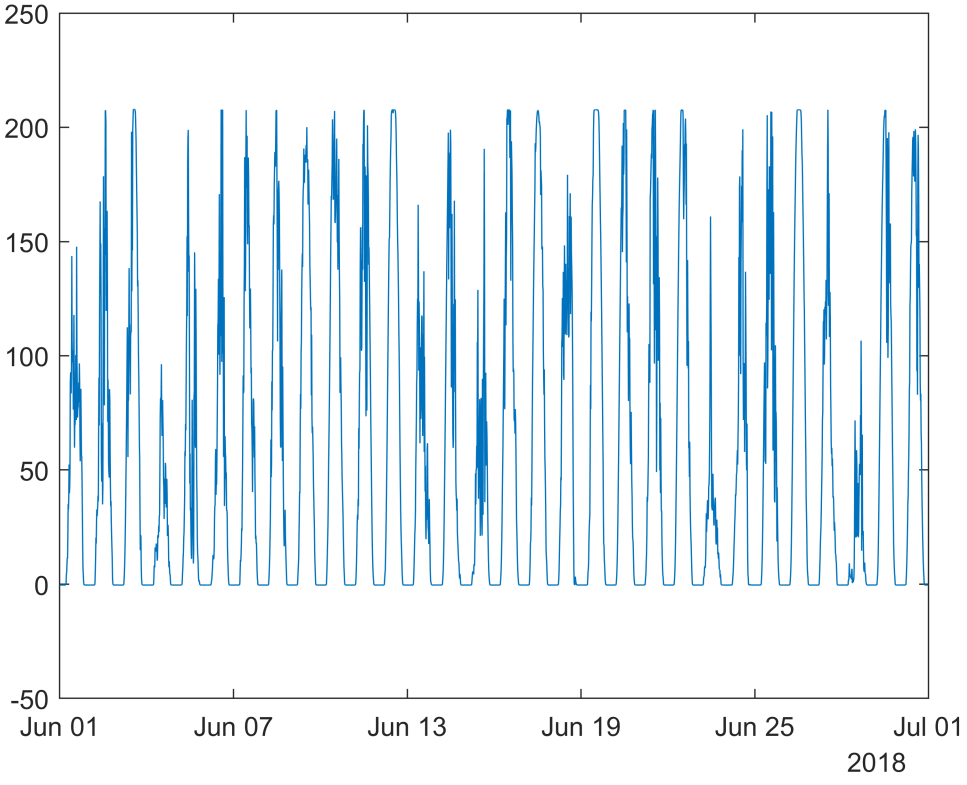
```
production_theory = min(270 *S_inc.*sunangle,207);
plot(t,production_theory);
```

```
Warning: Imaginary parts of complex X and/or Y arguments ignored.
```

```
xlabel('Time of Day');
ylabel('Energy Production (kW)');
```




```
plot(Production.Timestamp,Production.AH3);
```



```
June2018= reshape(Production.AH3,96,30 )
```

```
June2018 = 96×30
   -0.3625   -0.3618   -0.3614   -0.3722   -0.3610   -0.3744   -0.3718   -0.3749 ···
   -0.3647   -0.3653   -0.3717   -0.3680   -0.3638   -0.3762   -0.3716   -0.3752
   -0.3635   -0.3630   -0.3671   -0.3726   -0.3708   -0.3683   -0.3725   -0.3710
   -0.3612   -0.3666   -0.3735   -0.3700   -0.3679   -0.3736   -0.3728   -0.3668
   -0.3649   -0.3632   -0.3687   -0.3611   -0.3674   -0.3659   -0.3692   -0.3664
   -0.3642   -0.3755   -0.3689   -0.3648   -0.3744   -0.3577   -0.3650   -0.3670
   -0.3652   -0.3636   -0.3772   -0.3713   -0.3695   -0.3718   -0.3643   -0.3680
   -0.3661   -0.3685   -0.3730   -0.3672   -0.3601   -0.3659   -0.3705   -0.3710
   -0.3657   -0.3676   -0.3739   -0.3717   -0.3706   -0.3731   -0.3662   -0.3706
   -0.3654   -0.3725   -0.3766   -0.3688   -0.3753   -0.3729   -0.3670   -0.3624
      ⋮
```

```
dayofInterest = June2018(:,26);
tfullday = 0:0.25:23.75;
plot(tfullday,dayofInterest,t,production_theory)
```

```
Warning: Imaginary parts of complex X and/or Y arguments ignored.
```