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```
%%%%%%%%%%%%%%%%%%%%%%%%%%%
%  ASEN 3113: Homework 8
%  Author: Caleb Bristol
%
%  Date: 13 April, 2022
%%%%%%%%%%%%%%%%%%%%%%%%%%%

clc
clear
close all;
```

Chapter 21: Problem 21

Given

```
T_sun = 5870; %[K]
lambda = 0.01:0.01:1000; %[um]
```

Emissive Power Function

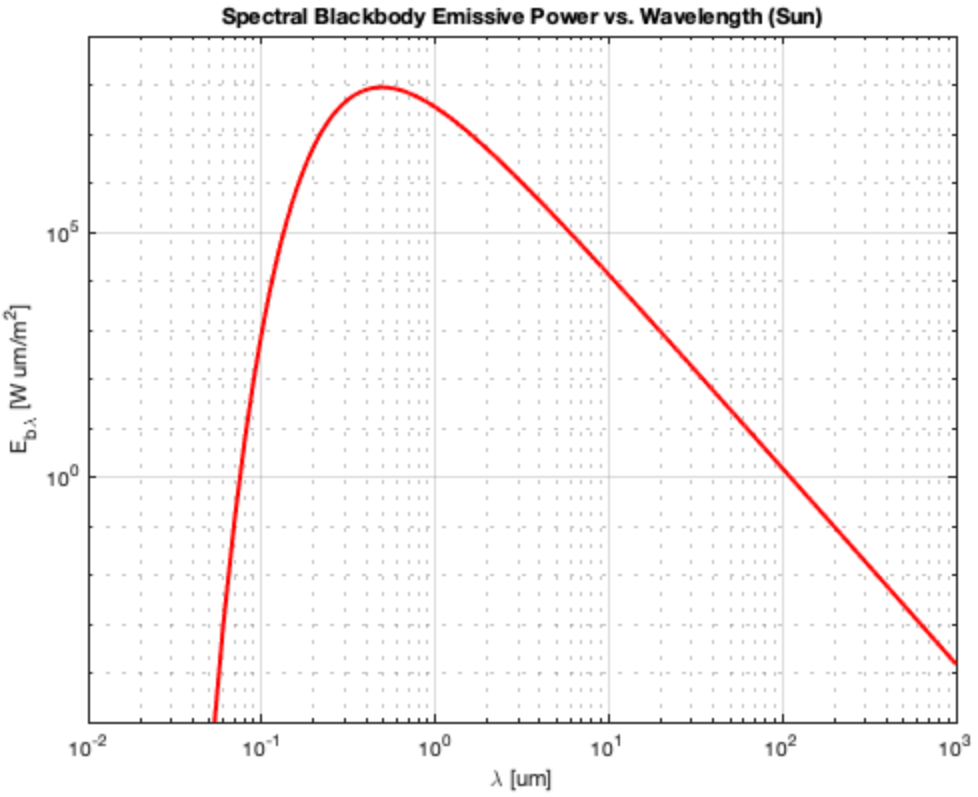
Utilizing Planck's Law

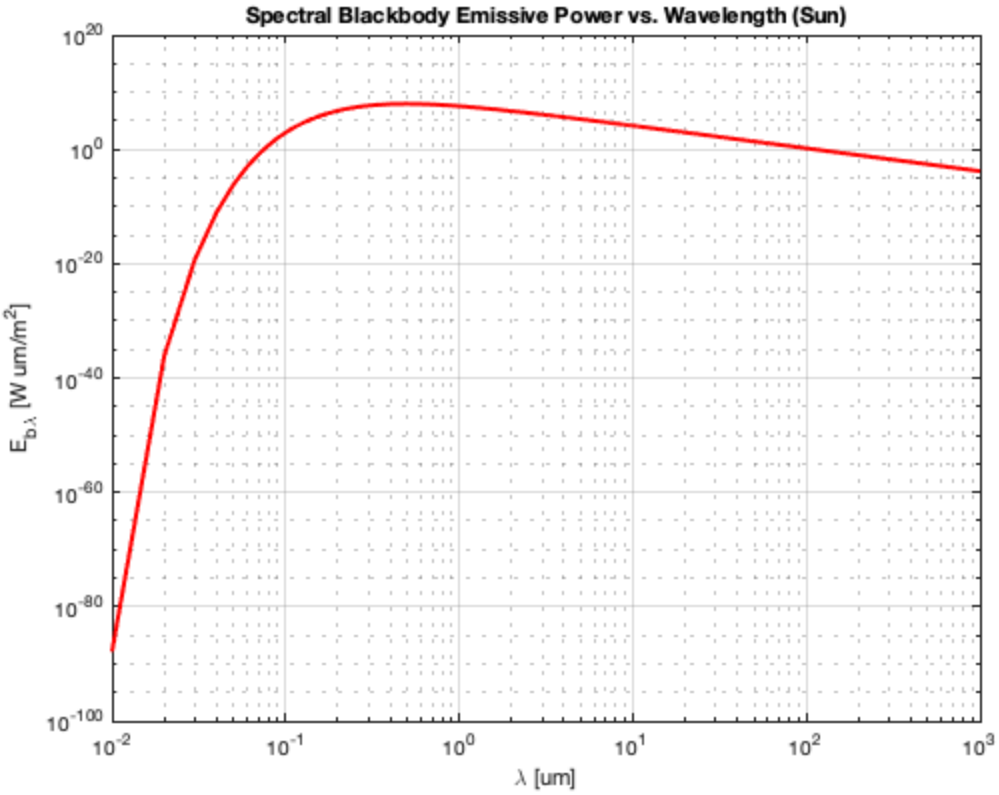
```
C_1 = 3.74177e08; %[W um^4/m^2]
C_2 = 1.43878e04; %[um K]

E_b_lambda = @(lambda,T) C_1./(lambda.^5.*(exp(C_2./
(lambda.*T))-1));
```

Plotting

```
figure()
plot(lambda,E_b_lambda(lambda,T_sun),'r','LineWidth',2); hold on
title('Spectral Blackbody Emissive Power vs. Wavelength (Sun)')
xlabel('\lambda [um]')
ylabel('E_b_\lambda [W um/m^2]')
xlim([0.01 1000])
ylim([10e-06 10e08])
```

```
set(gca,'YScale','log')
set(gca,'XScale','log')
grid on; grid minor;
hold off

figure()
plot(lambda,E_b_lambda(lambda,T_sun),'r','LineWidth',2); hold on
title('Spectral Blackbody Emissive Power vs. Wavelength (Sun)')
xlabel('\lambda [um]')
ylabel('E_b_\lambda [W um/m^2]')
xlim([0.01 1000])
set(gca,'YScale','log')
set(gca,'XScale','log')
grid on; grid minor;
hold off
```





Discussion

The plot is almost entirely linear when viewed with linear axis scaling. When put in logarithmic scaling, it appears as a much smoother curve, though much more level than the respective figure shown in the textbook. The textbook cuts off the bottom end of the scale significantly, so it hides the fact that there is almost no short wavelength waves leaving the sun (though that is implied), and there is still a substantial amount of waves coming from the infrared regions. However, there is a significant amount of radiation coming through the visible spectrum, and it is exponentially higher than that around the rest of the spectrum.

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