Question 10.27, Astro Assignment 1

Effy Oommen John

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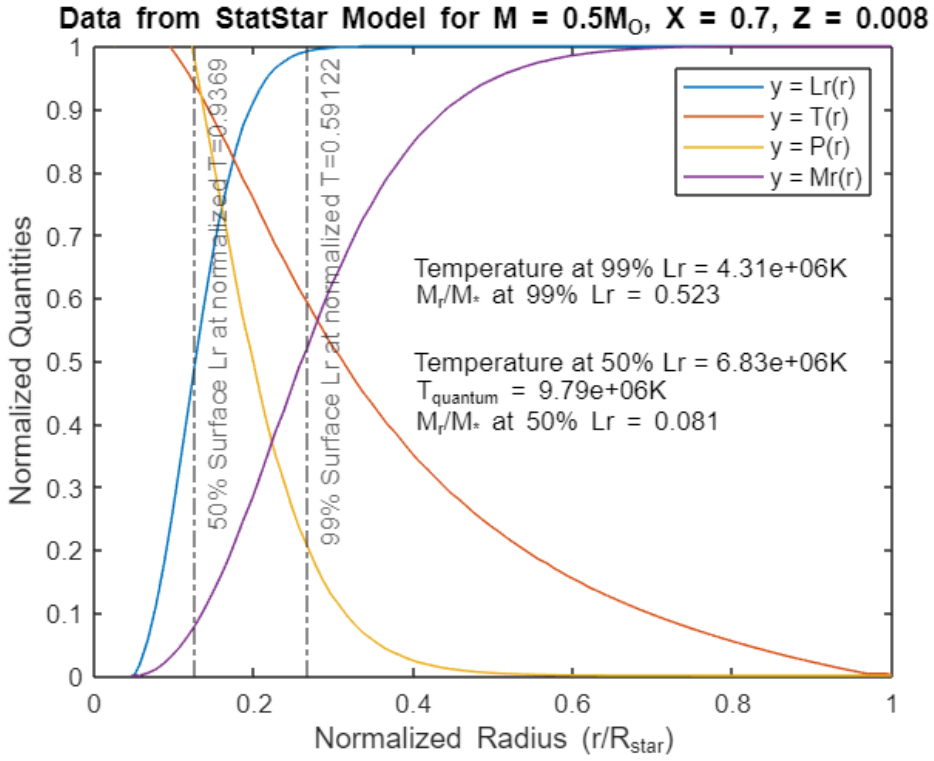
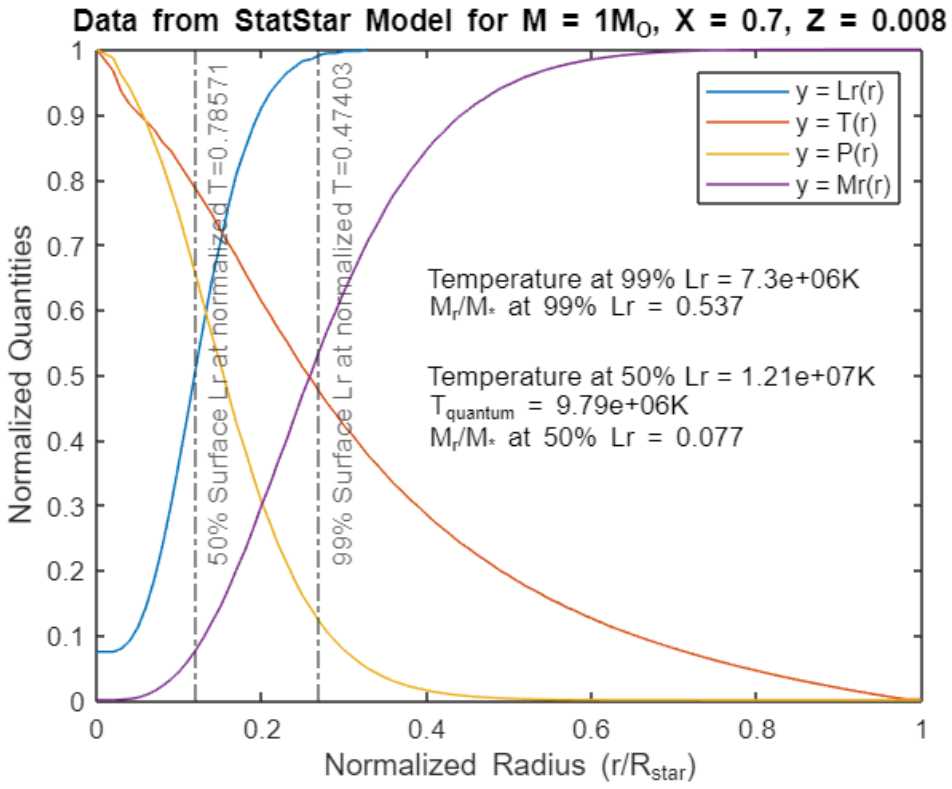
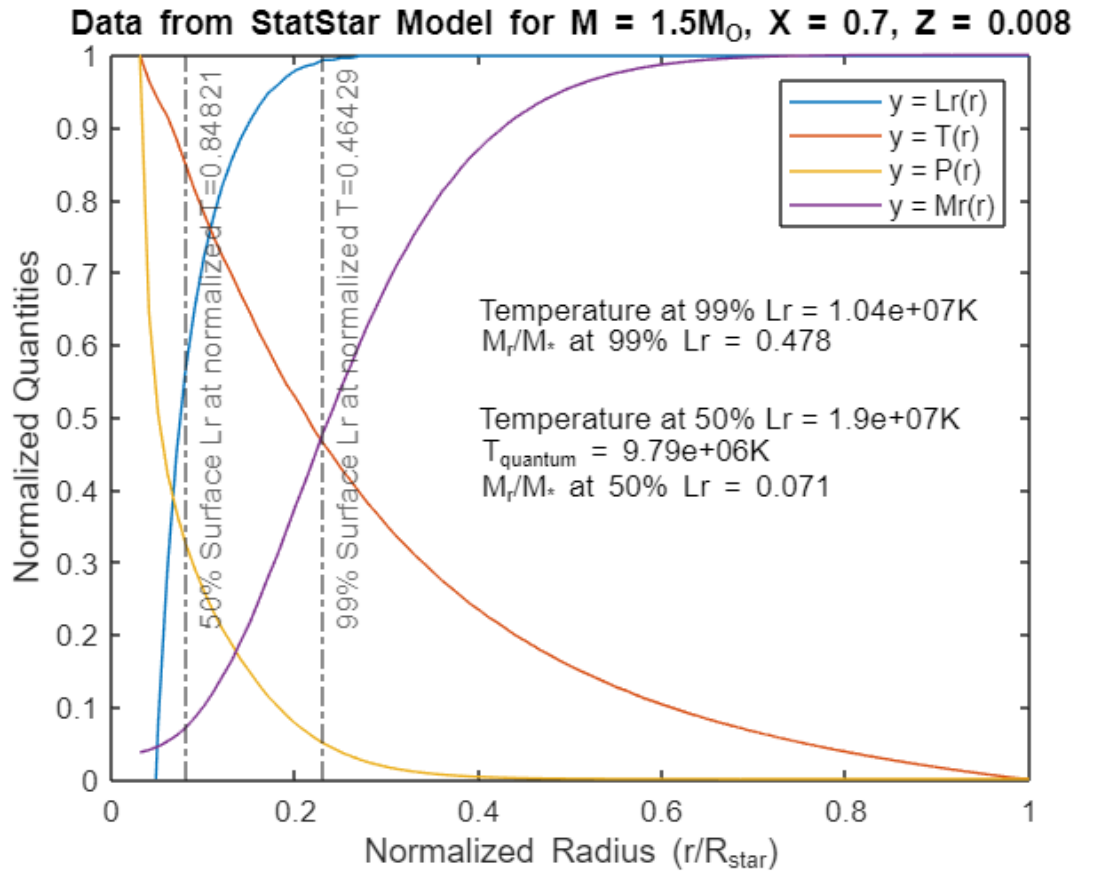
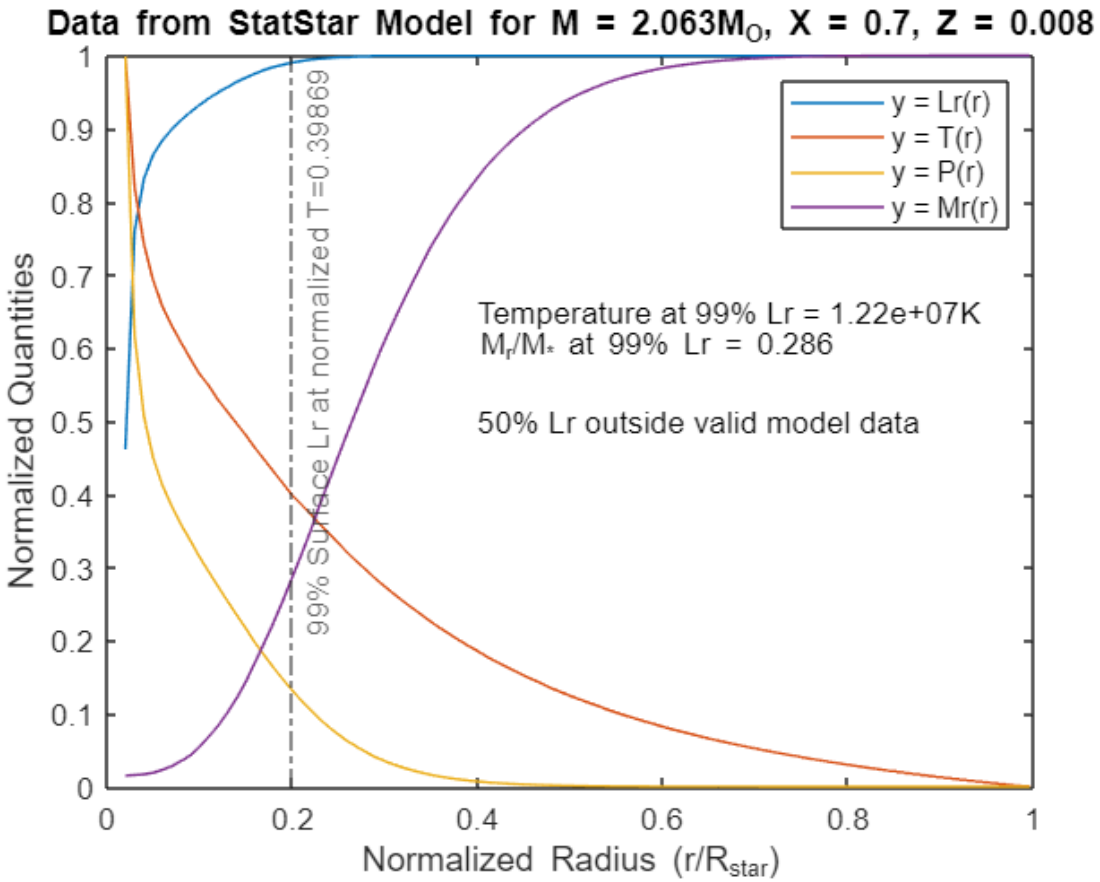
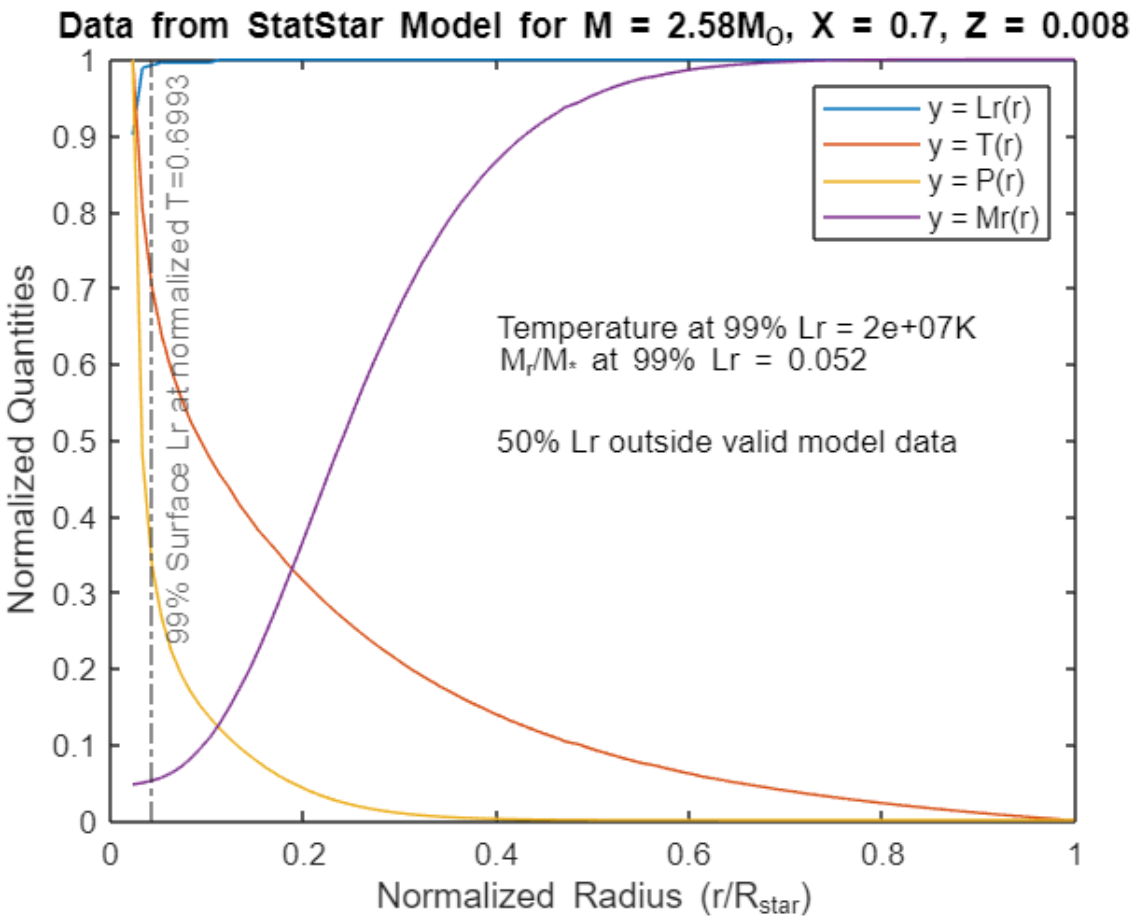
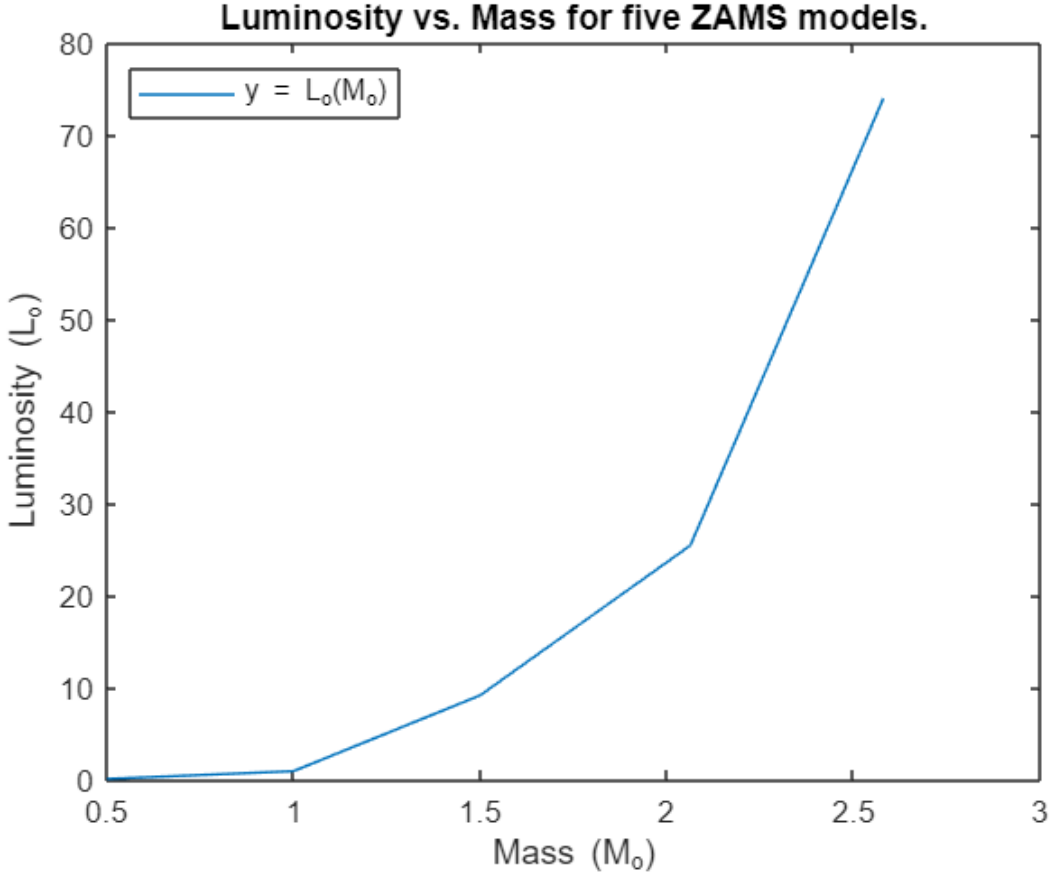


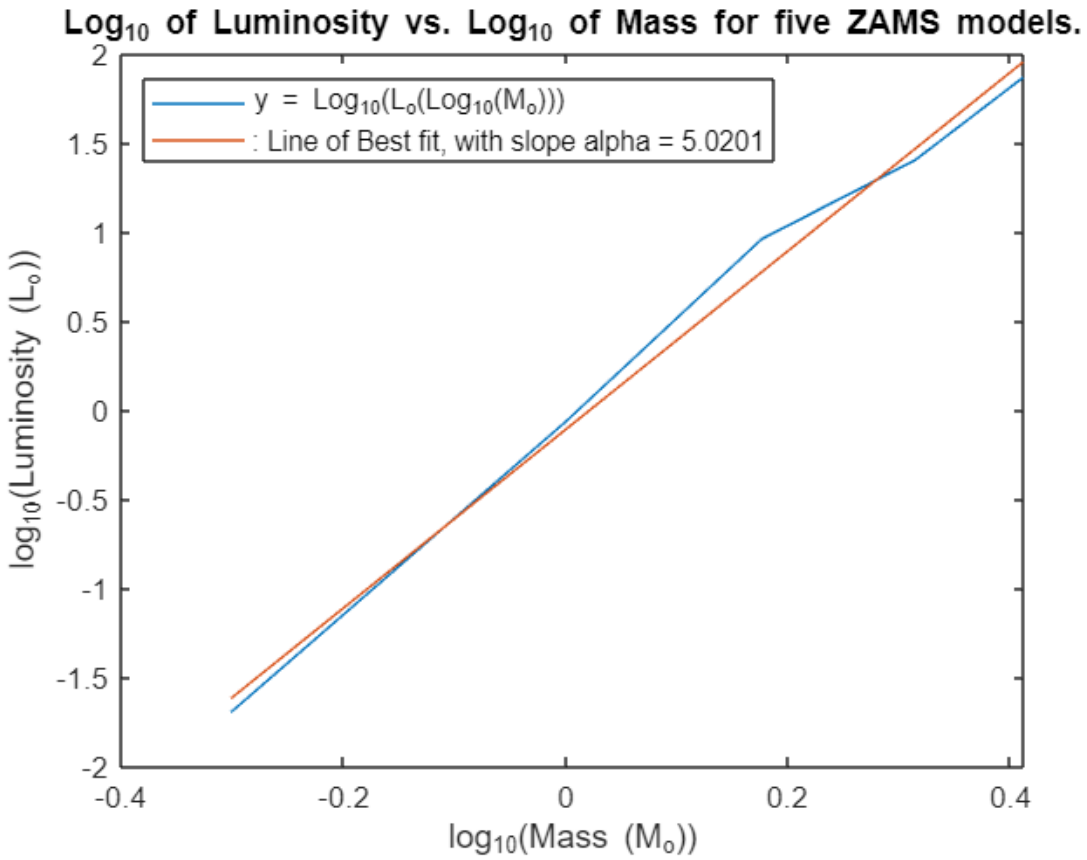



Data from StatStar Model for M = 1.5M$_O$, X = 0.7, Z = 0.008
y = Lr(r)
y = T(r)
y = P(r)
y = Mr(r)
50% Surface Lr at normalized T=0.84821
99% Surface Lr at normalized T=0.46429
Temperature at 99% Lr = 1.04e+07K
M$_r$/M$_*$ at 99% Lr = 0.478
Temperature at 50% Lr = 1.9e+07K
T$_{quantum}$ = 9.79e+06K
M$_r$/M$_*$ at 50% Lr = 0.071
Normalized Quantities
Normalized Radius (r/R$_{star}$)


Data from StatStar Model for M = 2.063M$_O$, X = 0.7, Z = 0.008
y = Lr(r)
y = T(r)
y = P(r)
y = Mr(r)
99% Surface Lr at normalized T=0.39869
Temperature at 99% Lr = 1.22e+07K
M$_r$/M$_*$ at 99% Lr = 0.286
50% Lr outside valid model data
Normalized Quantities
Normalized Radius (r/R$_{star}$)


Data from StatStar Model for M = 2.58M$_O$, X = 0.7, Z = 0.008
y = Lr(r)
y = T(r)
y = P(r)
y = Mr(r)
99% Surface Lr at normalized T=0.6993
Temperature at 99% Lr = 2e+07K
M$_r$/M$_*$ at 99% Lr = 0.052
50% Lr outside valid model data
Normalized Quantities
Normalized Radius (r/R$_{star}$)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0.2
0.4
0.6
0.8


Luminosity vs. Mass for five ZAMS models.
y = L$_o$(M$_o$)
Luminosity (L$_o$)
Mass (M$_o$)
0
10
20
30
40
50
60
70
80
0.5
1
1.5
2
2.5
3



The above graphs are my solution for 10.27. For part b, yes, my calculated values of T at 50% of L_r match the rough estimate calculations to a reasonable degree of error. My MATLAB code that I used for the question, and all other related files, including the models generated will be available at the link below:

https://github.com/EffyJohn/AstronomyCourse