Student Self-Assessment & Check list

AST3310 Home Exam #2

This word-document is like the document used to grade your home exam. We want you to:

* Check that you have met the requirements you are graded on.
* Write where each point giving task is answered in your delivery
(can in some cases be naturally split over multiple locations).
* Evaluate and write how many points you think you will score on each task.
* Export it as a pdf and submit it with the project.

| # | Requirements | Where is it done? | Score | Max score |
| --- | --- | --- | --- | --- |
| *Ex*  | *Abstract**To get all the points, you must …* | *Page 1, col 1, line 1* | *3* | *5* |
| S1 | **Sanity check:*** For the tables and ex 5.1:
	+ Calculate numbers with your code.
	+ Print given sanity values, calculated values, and relative errors to screen.
	+ Check that rel. errors are smaller than a tolerance. If not, write a warning.
* Plot cross section and temperature gradients. Check with eyes.
 |       |       | 15 |
| C1 | **Code readability:*** Easy and clear how to run the code.
* Not unnecessarily long (1000+ lines is too much)
* Descriptive function and variable names (e.g. f\_con for convective energy flux)
* Well commented means neither 0 comments nor more comments than lines of code.
	+ Fewer comments are needed in a well written code.
 |       |       | 10 |
| R1 | **Report question 1: Governing equations*** Write and describe all 5 governing equations correctly.
	+ What are the parameters?
	+ What does the equation say/mean?
 |       |       | 5 |
| R2 | **Report question 2: Mean molecular weight*** Describe how to get μ, preferably with an equation.
	+ Do not du unnecessary simplifications (to metals).
	+ Remember the difference between He-3 and He-4.
* Calculate a number (close to 0.6) and put it in the report.
 |       |       | 5 |
| R3 | **Report question 3: Do exercises 5.11-5.13*** Derive the three equations.
* Explain your steps, especially if you make assumptions, neglect terms, or omit unphysical solutions.
 |       |       | 10 |
| R4 | **Report question 4: Parameter scan*** Make all parameter scans ($R\_{0}, T\_{0}, ρ\_{0},P\_{0}, L\_{0}$).
	+ Minimum 3 sims per scan, incl. base condition
	+ Plot results and put them in the report
* Comment on impact of changing the different parameters, and if some give similar effects.
 |       |       | 10 |
| R5 | **Report question 5: Best model*** Write clearly which parameters were changed in your best model. Give all the numbers $m\_{0}, r\_{0}, L\_{0}, ρ\_{0}, T\_{0}$ in units of $ M\_{☉}, R\_{☉}, L\_{☉}, \overbar{ρ}, K$, respectively.
* Write clearly if the goals were met. They are:
	+ $L, m, r$ all going down to within 5% of $L\_{0}, m\_{0}, r\_{0}$.
	+ Core reaching out to at least 10% of $r\_{0}$.
	+ Continuous convection zone of at least 15% of $r\_{0}$, close to the surface
 |       |       | 5 |
| R6 | **Report question 6a: Plot main parameters*** Plot $m, T, L, ρ, P$ as requested (normalized to relevant constants and with logarithmic y-scale for $ρ$ and $P$).
	+ Make sure the legends and labels are readable.
* Describe the plots in the text.
* Comment if something looks unphysical.
 |       |       | 5 |
| R7 | **Report question 6b: Plot relative energy fluxes*** Plot $F\_{CON}/F\_{TOT}$ and $F\_{RAD}/F\_{TOT}$ ($F\_{TOT}=F\_{CON}+F\_{RAD}$).
* Describe the plot in the text.
* Discuss what the plots mean, e.g. which energy transport mechanism dominates where.
 |       |       | 5 |
| R8 | **Report question 6c: Plot relative energy production*** Plot $ε\_{X}/ε$ where X is PPI, PPII, PPIII, CNO and $ε$ is the total energy produced at a given $r$. Include $ε(r)/ε\_{max}$.
* Describe the plot in the text.
* Compare it to the temperature plot in project 1 and comment on which chain/cycle dominate at which $T$.
 |       |       | 5 |
| R9 | **Report question 6d: Plot temperature gradients*** Plot $∇^{\*},∇\_{stable},∇\_{ad}$ with logarithmic y-scale.
* Describe the plot in the text.
* Discuss the physics of the plot, e.g. where is the plasma convectively unstable?
 |       |       | 5 |
| R10 | **Report question 6e: Plot cross-section*** Plot the cross-section of your best model.
* Discuss the plot in the text.
* Discuss differences/similarities to the real Sun, e.g. how correct is the width of the core and convection zone.
	+ This requires finding relevant number for the real Sun.
 |       |       | 5 |
| R11 | **Report question 7: Report and reflection*** Make a well-written report of max 10 pages, that includes introduction, theory, results, discussion, conclusion, and reflection.
	+ The reflection on what you have learned should be a separate section after the conclusion.
* Fill in and hand in this check-list with the project.
 | (everywhere) |       | 15 |
| Total score (sum of points) |       | 100 |
| Which grade do you think you deserve? (A-F) |       | A |

*The following is meant for us to evaluate the effect of this self-assessment form:*

Has this form given you a better understanding of what was required by the exam?

|  |
| --- |
| [ ] Yes, a lot [ ] Yes, a little [ ] No [ ] Do not know/wish to answer |

Did this form remind you of something you had forgotten to do?

|  |
| --- |
| [ ] Yes, a lot [ ] Yes, a little [ ] No [ ] Do not know/wish to answer |

Did this form make you rethink and change something you had already done?

|  |
| --- |
| [ ] Yes, a lot [ ] Yes, a little [ ] No [ ] Do not know/wish to answer |

Any other comments about either the project or the home exam?

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| --- |
|       |

Any other comments about this self-assessment form?

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