

PHYS 304 HW 0

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1. EQUATION

My favorite equation is the Drake Equation.

$$N = R_* \cdot f_P \cdot n_e \cdot f_l \cdot f_i \cdot f_c \cdot L \quad (1)$$

2. EXPLANATION

The Drake Equation is less of an equation than it is a probabilistic argument. It was proposed by Dr. Frank Drake at the Green Bank Observatory as a way to estimate the number of intelligent, communicative extraterrestrial societies present in the Milky Way. The equation

is not thought of as having an absolute value, but rather it serves as a summary of all of the factors astronomers must consider when exploring the idea of intelligent extraterrestrial life. The factors considered are; the average rate of star formation in the Milky Way (R_*), the fraction of those stars that have planets (f_P), the number of those planets that can potentially support life (n_e), the fraction of those habitable planets that actually develop life (f_l), the fraction of those planets that develop intelligent civilizations (f_i), the fraction of those civilizations that develop the technology necessary to make themselves known (f_c), and the length of time those civilizations spend releasing detectable signals (L).

for future assignments,
always include an external
citation

Computational Physics/Astrophysics, Winter 2023:

Grading Rubrics ¹

Haverford College, Prof. Daniel Grin

For coding assignments, roughly 25 points will be available per problem.

1. Does the program complete without crashing in a reasonable time frame? If yes, up to +3 points. *n/a*
2. Does the program use the exact program files given (if given), and produce an answer in the specified format? If yes, +1 points *n/a*
3. Does the code follow the problem specifications (i.e numerical method; output requested etc.) Up to +2 points *n/a*
4. Is the answer correct? Up to +4 points *n/a*
5. Is the code readable? Up to +2 points *n/a*
 - . 5.1. Are variables named reasonably?
 - . 5.2. Are the user-functions and imports used?
 - . 5.3. Are units explained (if necessary)?
 - . 5.4. Are algorithms found on the internet/book/etc. properly attributed?

¹ Inspired by rubric of D. Narayanan, U. Florida, and C. Cooksey, U. Hawaii

7
7

6. Is the code well documented? +3points *n/a*
- . 6.1. Is the code author named?
 - . 6.2. Are the functions described and ambiguous variables defined?
 - . 6.3. Is the code functionality (i.e. can I run it easily enough?) documented?
7. LaTeX writeup (up to 10 points)
- . Are key figures and numbers from the problem given? (3 points) *n/a*
 - . Is a brief explanation of physical context given? (2 points) *2/2*
 - . If relevant, are helpful analytic scalings or known solutions given? (1 point) *1/1*
 - . Are 3-4 key equations listed (preferably the ones solved in the programming assignment) and algorithms named? (2 points) *2/2*
 - . Are collaborators clearly acknowledged? (1 point) *1/1*
 - . Are any outside references appropriately cited? (1 point) *1/1*

Note, even if (1), (2), (3), or (4) are not correct, one can still obtain many points via (5), (6), and (7).