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DS3500

Justfication for each variable's estimated distribution

R*
- Distribution estimate: uniform, min=1.5, max=3.0
- The estimate given was a range from 1.5 to 3, and there is probably an equal chance (uniform distribution) for each rate. There are no assumptions that a certain value is more likely, so I made it uniform.

fp
- Distribution estimate: discrete, p(1) = 1.0
- All starts in the universe will have a planet, which is a rule, according to wikipedia
- https://en.wikipedia.org/wiki/Drake_equation

ne
- Distribution estimate: normal, mean=3, sd=1
- The range given was 1-5, which has a mean of 3. If the variable is normally distributed with a standard deviation of 1, 95% of the time, planets will have 1-5 stars. Also, I thought intuitively most planets will form with around 3 planets able to support life. For example, even though our solar system only has Earth in a habitable zone, Mars is close and actually has ice (frozen water). So therefore most stars would have around 2, likely slightly more, habitable planets.

f1
- Distribution estimate: discrete, p(1) = 1.0
- Given a habitable planet, at some point conditions will allow some sort of life to form. Also, according to a Guardian Article, scientists published in an astrophysics journal that f1 is most likely 1 because on a habitable planet, at some point evolution would occur
- https://www.theguardian.com/science/2020/jun/15/scientists-say-most-likely-number-of-contactable-alien-civilisations-is-36

fi
- Distribution estimate: normal, mean=0.75, sd=0.5
- Reading around, it seems like there are many different guesses for f1, therefore I thought it would be best to make it a normal distribution. Since human life developed on Earth, f1 is probably on the higher end of the spectrum, and most planets that have life will at some point develop intelligent life. However, to represent the wide range of guesses I made the standard deviation relatively high.

fc
- Distribution estimate: normal, mean=.95, sd=0.05

- Based on a study from Cambridge, they guessed that most intelligent life, based on our own, would develop ways to release signals into space, so fc would be close to 1. Therefore, I gave it a normal distribution with a mean of .95 and a small standard deviation, just to factor in the possibility that not all civilizations would develop this technology.
- https://www.cambridge.org/core/books/abs/drake-equation/fraction-of-civilizations-that-develop-a-technology-that-releases-detectable-signs-of-their-existence-into-space-fc-1961-to-the-present/3B18044AD7E7D9F83053D59E0BCEF74A

L

- Distribution estimate: normal, mean=500, sd=300
- There is not much agreement on the value of L. We have had the ability to communicate into space for around 50 years, which, I think, would be on the low end for intelligent civizilizations. Most advanced civilizations would have this for a while longer, I thought the mean might be about 500 years, and then after that, just like our civilization might due to global warming, other civilizations would be wiped out (or maybe they just decide to stop communicating). Though, because of how unknown this value is, I choose to make the standard deviation very high.

Final Estimates for N:

Expected Value = 2447.94
Standard Deviation = 2892.93