1. Incorporating physical boundaries into confidence intervals is mostly a problem that phages classicalists over the Bayesians. In the paper they use the example of the Particle Data Group’s attempt to measure the mass of the electron neutrino. Using the classical approach they essentially arrived at a negative value for the measurement of a mass, in fact the confidence interval was entirely in the negative range. The issue is that with classicalist approach, prior information cannot be incorporated and in the construction of the intervals one can only be sure that some percentage of the intervals will contain the true value of the measured quantity. On the other hand the Bayesian approach has issues of its own. Most importantly, the choice of the prior, namely in which quantity should the prior be uniform. Since this choice determines the upper limited calculated.
2. For the construction of classical confidence intervals:
   1. Find n greater than n\_0 (measured n) such that 16% of the values lie underneath the probability curve of n\_0 given the true value.
   2. Find n less than n\_0 (measured n) such that 16% of the values lie underneath the probability curve of n\_0 given the true value.
   3. You can also use the likelihood function. Taking the difference of negative log likelihood and finding values greater and less than the measured value which satisfy:

-2ln L(n\_0|mu\_1) = -2 ln L(n\_0|mu\_hat) +1

1. The probability density of mu\_t (true value) given some set of measurements (n\_0) can be integrated and the areas under used to construct confidence intervals in a way analogous to the classical method. The only tricky part is in the choice of the prior on which the probability density of mu\_t (true value) given some set of measurements (n\_0) depends. Of course there are some variations on can use, depending on the length of interval one judges to be reasonable
2. Jeffrey’s suggest a 1/mu\_t in the absence of any knowledge about the true value mu\_t. Two reasons for this.
   1. 1/mu\_t is invariant under changes of power of the parameter being estimated. So essentially there is no need for changes as the power of the parameter is varied.
   2. Allows for consistency for two experimenters measuring the same process but using differing standards for the passage of time.
3. So by drawback what we really seem to be talking about is the issue of coverage, specifically if one believes that it is important (classicalists) of if one believes that it isn’t necessary (Bayesians). The classical and Bayesian approaches look similar when deriving upper limits on mu\_t and using a uniform Bayesian prior. However, if 1/mu\_t is used as a prior frequentist coverage is not satisfied. Conversely, for lower limits on mu\_t, the 1/mu\_t selection for a Bayesian prior does give frequentist coverage but the uniform prior does not.
4. Well it seems best to take a Bayesian approach as commented in the paper since the classicalist approach yields a value for R\_t that seems to suggest greater certainty in a clearly more uncertain measurement.