Practice Assignment 3: Equations

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Objective

Your goal with this assignment is to derive (in detail and all critical steps) the posterior predictive probability mass function $p(x^{new}|x_1, \dots, x_n)$ when you have n independent observations from a Poisson(λ) distribution and λ is assumed to follow a $gamma(a, b)$ distribution prior to observing any data. Then also give the posterior density and posterior predictive probability mass function if $a = 0.01$ and $b = 0.01$, and lastly if the prior is instead λ^{-1} (the limit as $a, b \to 0$). Be sure to identify any identifiable distributions to arrive at.

Details

While the above derivations are all over the internet most likely, try to do it yourself and compare to your classmates first before going online to check it there.

All that said, **the real goal of this assignment is equation typing practice**. So a lot of the marks will go to the following:

1. Time yourself as you do this assignment. If you have to do it in stages then time all the stages and add the times together.
2. Once you're done with everything, make a new document and type all the equations again, timing yourself from zero again. See if you can do it in less than a quarter of the time that you did the first time, which should be easy since the thinking is already done.
3. Make sure you include these times in your submission.

Tip: the key word is *typing*, not clicking. The less you use the mouse the faster you will be in the long run. Also note that the solution is about a page (max 2), including references, so don't spend hours on this.