STA 3000, Problem Set 6. Due in class March 24.

1. Do exercise 2 in chapter 5. Note that the definition of $g(\theta)$ would be better written as $g(\theta) = 1 - \exp(-a\theta)$. Here, a is some known positive constant. Hint: Use the Rao-Blackwell theorem, after thinking of $g(\theta)$ as the probability of something.

2. Do exercise 15 in chapter 5. Note that the integer r is greater than or equal to zero.

3. The last question on the last test concerned a situation in which we modeled X_1 and X_2 as being IID from the Uniform$(\phi, \phi+\psi)$ distribution, with $\psi \in (0, \infty)$. We found that for any α in $(0, 1)$, the test that rejects when $(X_{(2)} - X_{(1)})/X_{(2)} < \alpha$ is a UMPU level α test of $H : \phi = 0$ versus $A : \phi > 0$.

   (a) Use a collection of tests similar to this one to derive a coefficient $1 - \alpha$ lower confidence limit for ϕ (which we will allow to be any real number for this problem).

   (b) Compare this confidence limit with one or more possible Bayesian approaches to this problem, based on not-very-informative priors.