Statistics 567
Final Exam
December 9, 1995
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Name: _____

This exam is open book and open notes.

1. How can the Weibull plot be used in the context of the proportional hazards model in life-data regression?

2. An engineer requires a system reliability of .95 for the three year warranty period. The system is a series system of four major subsystems. The reliabilities of the first, second, and third subsystems are respectively .99, .99, and .98 for the three-year period. How low can the reliability of the fourth subsystem go and still meet the system reliability objective? Use first the exact approach and then an approximate method .

3. A system has three independent subsystems each with an exponential life length with rate λ. There is only one repairperson. The repair time distribution is exponential with rate μ. Draw the state diagram and derive the state equations one would use to calculate the steady state unavailability of this system.

4. An accelerated life tests was conducted at four different stress levels. You are considering the Weibull regression model presented on Page 76 of your textbook. Why would you want to compare this model to the one that assumes:
   a. A separate two-parameter Weibull distribution at each stress level.

   b. A common two-parameter Weibull distribution for all four stress levels

   c. How would you effect these comparisons? How many degrees of freedom would be associated with each comparison?

5. Why would one prefer likelihood ratio confidence intervals over confidence intervals based on standard errors? Present both standard and Bayesian arguments.

6. Discuss a concept mentioned in this course that you find particularly interesting or powerful.