

Stat 543 Assignment 3 (due Friday February 4, 2005)
Sufficiency, Minimal Sufficiency, Exponential Families

1. Required Problems: 1.5.11, 1.5.16, 1.6.2, 1.6.5, 1.6.6, 1.6.34
2. (Required) For the set-up of problem 1.6.34, drop assumption (i) so that this becomes a 2 parameter problem. Identify a minimal sufficient statistic here (argue that it is minimal sufficient and describe it in simple terms).
3. Optional (not required, but recommended): Suppose that $\Theta^* \subset \Theta$. Prove or give a counter-example for each of the following (where you need a counter-example, a simple discrete one with finite parameter space like the example Vardeman used to illustrate the Dynkin-Lehmann-Scheffé Theorem will be fine):
 - (a) $T(X)$ is sufficient for $\theta \in \Theta \implies T(X)$ is sufficient for $\theta \in \Theta^*$
 - (b) $T(X)$ is sufficient for $\theta \in \Theta^* \implies T(X)$ is sufficient for $\theta \in \Theta$
 - (c) Suppose that $T(X)$ is sufficient for $\theta \in \Theta$
 - i) $T(X)$ is minimal sufficient for $\theta \in \Theta \implies T(X)$ is minimal sufficient for $\theta \in \Theta^*$
 - ii) $T(X)$ is minimal sufficient for $\theta \in \Theta^* \implies T(X)$ is minimal sufficient for $\theta \in \Theta$
4. Optional (not required, but recommended): Problems 1.5.12, 1.6.15, 1.6.22