Short Summary to find UMVUE of $g(\theta)$

Regularity conditions

Throughout this course, (1) and (3) are often assumed to be true, so we only need to check (2)

→ Supp(X) depends on θ

$\{x: f(x)>0$ or $p(x)>0\}$

Yes: (2) is violated

No: (2) is NOT violated

No

Check if

$$\frac{\partial}{\partial\theta}\ln f_{\underline{X}}(\underline{x}|\theta)=A(\theta,n)[T(\underline{X})-g(\theta)]$$

Yes

$T(\underline{X})$ is the UMVUE of $g(\theta)$ by Thm 1

No

Yes

See if the distrib. of X belongs to an exponential family.

Yes

$\sum_{i=1}^{n} d(X_i)$ is CS

No

Find a sufficient statistic, say S, by Factorization Thm.

Check if S is complete

Yes

Find the UMVUE of $g(\theta)$ by

(i) Guessing

(ii) Solving for $h(CS)$ in $E(h(CS))=g(\theta)$

(iii) Finding any unbiased estimator, say T', of $g(\theta)$, and then evaluating $E(T'|CS)$