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ADVANCED ECONOMETRIC THEORY
EXERCISES 7

UNBIASED AND INVARIANT TESTS

1. Define the following notions:

   (a) unbiased test;

   (b) α-similar test;

   (c) test with Neyman α-structure.

2. Prove that a uniformly most powerful test with level α is necessarily unbiased.

3. Let $(\Upsilon, (P_\theta : \theta \in \Theta))$ be a parametric model. If $\varphi(y)$ is a test of the hypothesis $H_0 : \theta \in \Theta_0$, where $\Theta_0 \subseteq \Theta$, and if $E_\theta \varphi(y)$ is a continuous function of θ, show the following property: if φ is an unbiased test with level α, the test φ is α-similar on the frontier of Θ_0.

4. Explain how invariant tests can reduce the number of nuisance parameters in a test problem.