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Chapter 1

Introduction

Definition: A statiscal model is parametric if it can be determined using a set of parameters. A statiscal model that can not be adquately determined by a set of parameters is called a non-parametric model. Models that have both components are called semi-parametric.

Definition: A parametric model is identifiable if

$$\theta_1 \neq \theta_2 \implies P_{\theta_1} \neq P_{\theta_2} \tag{1.1}$$

Definition: A statistic is a function from sample space $\mathcal{X}$ to some spave of values, $\mathcal{T}$.

Definition: Any parametric model that either

1. All of P_θ are continuous with denisities $p(x, \theta)$
2. All of P_θ are discrete with frequency functions $p(x, \theta)$, and the support set $\{x_1, x_2, \ldots\} \equiv \{x \,|\, p(x, \theta) > 0\}$

are called regular parametric models.

Chapter 2

Problems

2.0.1

Let U be any random variable and V be any other non-negative random variable. Show that $U + V$ is stochastically larger then U, that is

$$F_{U+V}(t) \leq F_U(t), \quad \forall t \tag{2.1}$$

Proof. Let

$$A_1 = \{\omega \,|\, U + V \leq t\}, \quad A_2 = \{\omega \,|\, U \leq t\}$$

since $U + V \geq U$ then $A_1 \subset A_2$ and hence

$$\mathbb{P}(A_1) = F_{U+V}(t) \leq F_U(t) = \mathbb{P}(A_2)$$