

Cumulant-Generating Function

$$\log \Phi(t) = \kappa_1 (it) + \kappa_2 \frac{(it)^2}{2!} + \dots + \kappa_n \frac{(it)^n}{n!}$$

κ cumulants = semi-invariants

NEYMAN + PEARSON

$$f(x, \theta_0) = f_0(x)$$

$$f(x, \theta_1) = f_1(x)$$

$$H_0: \theta = \theta_0$$

$$H_1: \theta = \theta_1$$

for a given critical region W

α error 1st kind reject true H_0

β error 2nd kind accept wrong H_0

α : size of the critical region

$1 - \beta$: power of the test

$$\frac{f_1(x_1) f_0(x_2) \dots f_0(x_n)}{f_0(x_1) f_0(x_2) \dots f_0(x_n)} \geq k$$

$$\frac{f_1(x_1) f_0(x_2) \dots f_0(x_n)}{f_0(x_1) f_0(x_2) \dots f_0(x_n)}$$

(Bye)
 k depending on α

defines a most powerful
critical region