

# Fine properties of the Pitman estimators in small samples

Abram Kagan  
Department of Mathematics, University of Maryland  
College Park, MD 20742  
E-mail: amk@math.umd.edu

## Abstract

Let observations  $X_1, \dots, X_n$  be obtained in the setup of direct measurements,

$$X_i = \theta + \epsilon_i, \quad i = 1, \dots, n$$

with  $\theta$  as a parameter and iid errors  $\epsilon_i$ . Some properties of the Pitman estimators  $t_n$  of  $\theta$  (i. e., best equivariant estimators with respect to the quadratic loss function) related to the Stam classical inequality for the Fisher information about  $\theta$  (for independent  $X, Y$ ,  $1/I(X + Y) \geq 1/I(X) + 1/I(Y)$ ) are studied. Among these properties are

$$1/\text{var}(t_{m+n}) \geq 1/\text{var}(t_m) + 1/\text{var}(t_n)$$

and

$$n\text{var}(t_n) \searrow.$$

Also it will be shown that the Stam inequality is a simple corollary of additivity, monotonicity and reparametrization rule for the Fisher information.