

Order Statistic Filters

Suppose that X is a real-valued variable for a population and that $X = \{X_1, X_2, \dots, X_n\}$ are the observed values of a sample of size n corresponding to this variable.

In statistics, the k^{th} **order statistic** of a statistical sample is equal to its k^{th} -smallest value (usually denoted as $X_{(k)}$).

Thus

$$X_{(1)} \leq X_{(2)} \leq \dots X_{(n-1)} \leq X_{(n)}$$

$$X_{(1)} = \min\{X_1, X_2, \dots, X_n\}$$

$$X_{(n)} = \max\{X_1, X_2, \dots, X_n\}$$

$$\text{median} = X_{(k)}; k = \frac{(n+1)}{2}$$