

# MEASUREMENT TECHNIQUES

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*Measurement uncertainty in the process of determining the time taken for a stroboscopic oscilloscope to transfer a signal from a digital source to the screen.**Key words:* *stroboscopically, nonparametric test, statistics, characteristics*

A thoroughly tested mechanism is required for monitoring signal amplitude and time parameters, of which the most important is the pulse-edge length, since without this one cannot handle the measurement tasks related to transmitting and receiving information by current electronic devices in communications, navigation, radar, and telemetry.

There is now very little electronic equipment (EE) that does not use pulsed or digital signals. The differences in working conditions are related to the extensive range of measuring instruments (MI) in the pulsed-oscilloscope group. Oscilloscopes are most widely used in monitoring technical state, technical servicing, and EE repair. There is a persistent tendency for the specifications to tighten as regards the accuracy of amplitude-time parameter measurements.

The existing system for transmitting the unit of pulsed voltage is designed on the hierarchical principle and is defined by a test scheme [1]. This system employs a secondary standard, from which the unit is transferred by pulsed voltages to working standards.

Measurements of pulse edge length on the standard are realizations of a random process. It is assumed a priori that the process is stationary. The need for the assumption of invariance for processing measurements is explained by the following.

Statistical models for processing measurements are usually devised for sample data belonging to an invariant process. Any violation of that assumption of invariance leads to incorrect estimates for the metrological characteristics (MC) of the standard.

An essential condition for measurements on the standard is that it should be in the static (steady) state. Working experience shows that the error in estimating its MC increases by a substantial factor if one does not know how to determine correctly the point of transition from the standard equipment from the dynamic (transient) mode to the static one. An example of this is the stabilization of BSC-10 measurements after an appropriate warm-up time, which is standardized in the technical documentation. For example, the warm-up time for the K2-75 working standard of pulse voltage constitutes 30 min.

This implies that the invariance assumption is important in estimating the MC of the standard from measurements. As that assumption is made a priori, during the measurement processing one estimates these characteristics in particular in