

NEW TECHNIQUE FOR OBSERVING SLOW TRANSIENTS ON CATHODE RAY OSCILLOSCOPE

*M.H.L.C. Hettiarachchi and I.A. Premaratne**

Department of Electrical and Computer Engineering, The Open University of Sri Lanka

Electronic circuit testing is one of the most important areas in electronics design and fault diagnosis. Among the widely used testing methods, signal analysis using the oscilloscope is the major technique for time and frequency related circuitry. The two types of oscilloscopes available have different features. Since the analog oscilloscope display works as a continuous sweep tracing of a waveform, it cannot trace transient conditions in signals. A stable waveform plot in the screen requires a steady waveform. Therefore, transient signals cannot be monitored with regular analog oscilloscopes. The digital counterpart has the ability to record waveform data and plot them at a later time. Therefore, transient signals can be monitored only with expensive digital oscilloscopes. In this research, a new concept is introduced to display the aforementioned transient signals on analog oscilloscope which can be produced at a lower cost. The proposed system can record waveform data external to the oscilloscope and regenerate a waveform with the same shape of the transient signal repeating continuously. Since the same cycle is repeating, the analog oscilloscope can display it as a regular repeating waveform; in fact, the shape of one cycle is similar in shape with the transient signal. The designed system is an intermediate device connected between the test probe and the oscilloscope. Data is acquired via an analog to digital converter and stored in a memory. After the acquisition, the data is processed and sent to digital to analog converter sequentially. The same data set is repeated to obtain the signal. The new device has been tested with resistor – capacitor and resistor – inductor, first order circuit excitations, to plot the transient waveform of voltage variation. The results show that, the system can be used with circuit testing and further improvements to data acquisition rate and storage memory expansion can develop the system to be used with complex signals such as those in motor drives and inverters.

Keywords: Slow-transients, oscilloscope, signal analysis

**Corresponding author: email- iapre@ou.ac.lk*