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AVERAGE

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Abstract

The program constructs an average transient of repetitively evoked events input through one of the analogue channels. The average transient is displayed with a calibration.

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This program constructs an average transient of repetitively evoked events input through one of the analogue channels. The average transient is displayed with a calibration.

Description

The program consists of a preliminary question-and-answer routine and sample, average and display procedures which can be re-run without re-entering variables through the question-and-answer.

Starting AVERAGE

The program is self-starting when loaded by LAP6. Alternatively, the start address of the whole program is 400. The sample and average routines start at 20.

Use

Two signals from the experiment are required - the one which is to be averaged and a trigger signal to indicate the onset of the event to be averaged. One useful method is to take the signals from the display oscilloscope, using the rising edge of the +gate out as a trigger. The channels into which these signals are input are indicated by the user in the first question-and-answer display.

The trig. signal must exceed ± 1 volt to start the averaging process; a short program loop waits for $\Delta 377$ to be present at the trigger input. The process starts within 33 μ sec. of the trigger signal reading start level.

To the second question-and-display, a calibration voltage may be input to the channel selected for input of the transient. This calibration will be displayed together with a label; the label (e.g. 10 mV., 50 mgm.) should be entered. If no calibration is required, type EOL.

When a calibration is required it must be input as requested by subsequent displays. DC calibration levels are required.

The program will now wait for a trigger signal and commence averaging.

Overflow

In order not to enter into the average transient samples distorted in shape because the input voltage exceeded ± 1 volt (the digital response therefore flattening out at this level) the program tests for $\Delta 377$ in the binary samples. If one is detected, OVERFLOW is typed on the teletype, and the offending sample is displayed. Averaging cannot be resumed, but the average transient to date can be displayed as follows:-

STOP
0641 in LEFT SWITCHES)
DO) (UMB 1)
RESUME

Control during averaging

Between each sweep the current average transient is displayed. The next trigger signal cannot be accepted until this display is terminated. The length of time for which this display appears is controlled by KNOB 1. It is best to turn this knob fully anticlockwise (given no display), and to advance it during averaging so that it does not interfere with the rate of processing of sweeps.

In order to maximise the size of the average response, it may be necessary to amplify preliminary electrical effects (such as stimulus artifacts) so that they exceed 41 v. The program tests for such non-linearity, but the position of KNOB 3 is used to derive the first point on the line to be checked. Turning this knob clockwise gradually omits checking the sample, starts from the left as displayed on the scope.

Averaging may be restarted at any time by pressing START 20.

Terminating averaging

Raise SENSE SWITCH O. The average transient is displayed, together with the labelled calibration (vertical position controlled by KNOB 5), and the number of sweeps which have constituted that transient (vertical position controlled by KNOB 5), and the number of sweeps which have constituted that transient (vertical position controlled by KNOB 7).

Re-run

Re-run with the same channels, rate of sampling and calibration by depressing SENSE SWITCH O and pressing START 20. Re-run, re-entering parameters by pressing START 400.

Acknowledgments

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C. M. Malpus,

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