

Passive network to measure distortion

IN the common form of distribution factor meter, negative feedback equalises the response to harmonics of an applied sine wave. This feedback has the undesirable effect of making the null adjustment more critical. Less ambitious distortion measurements of low impedance sources at 1kHz can be made with this passive circuit when used with an audio millivoltmeter. A high pass LC filter removes low frequency noise in the input signal and compensates for the loss of harmonic frequencies. It also contributes about 10dB to the rejection at 1kHz so that the null adjustments are less critical. If used for setting the bias and recording levels of a tape recorder, it is much less affected by transport speed variations than a conventional instrument. Dynamic range is large because only a small fraction of the input signal appears across the inductor.

If a higher input impedance is required, $23\text{k}\Omega$ at the fundamental reducing to $10\text{k}\Omega$ at the fifth harmonic, all inductance and resistance values can be increased by a factor ten and the capacitance values decreased also by a factor of ten. However, this will cause an insertion loss of around a dB after equalisation.

To set up, R_1 is adjusted to give the best null, then R_2 and C are adjusted to

equalise the responses at harmonic frequencies. The prototype used 2% metal oxide resistors and 5% polycarbonate capacitors. After three years use without adjustment the circuit has remained level to within $\pm 3\%$ over the first twelve harmonics and still measures t.h.d. to below 0.05%.

*J. B. Cole,
Guilden Sutton, Cheshire.*

