12-meter Measuring System

ADIOS as a data taker

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1. Experiment

I carried out a simple test to compare my DVM (Data Precision 3500) with ADIOS as a voltage measurer. Both were set on the 10-volt range and the Apple II ADIOS TEST program was used to:

(a) Insert a steady DC voltage of from 1 volt to 9.95 volts into ADIOS A_{in};

(b) Print out approximately ten values as measured by ADIOS.

The voltage inserted was also read on the DVM. The fixed voltage mode was used, and the 10 values were read and printed by the Apple at each step.

2. Results

The detailed results are available as print-out. However, the following results can be noted as showing that the ADIOS system looks OK. (1 mV is equivalent to 1.27 μm of depth sensor movement, so errors of less than 1 mV are OK).

(a) ADIOS reading scatter

Taking the readings in blocks, I derived the 1σ scatter for a single reading, in mV. The biggest value was 0.21 mV, but the mean value was $(0.077 \pm .047)$ mV. This is fine.

(b) Compare DVM and ADIOS

let   y = DVM reading in mV

       x = ADIOS reading in mV

then, fitting

$$y = A + B * x \qquad (1)$$

over the range + 1000 mV to + 9950 mV gave:

$$A = (-8.05 \pm .135) \text{ mV}$$

$$B = 1.00005487 \pm 2.4 \times 10^{-5}$$

The differences Δy = (y from (1) − actual y) showed some slight curvature in the points fitted to (1). However, the mean Δy was − .048 mV and the RMS of Δy was 0.35 mV. All this is OK.

(c) Longer term stability

The tests only took 80 minutes in a laboratory environment. There is some evidence of a drift of about 1 mV (probably in ADIOS) after switching it on, but no further drifts > 0.1 mV over 80 minutes. I shall look again at this, but since I plan to let the warehouse ambient vary quite a lot I shall probably put my ADIOS into a JP temperature-controlled box. I have one available.

3. Thanks

It looks as if the Apple II and the builders of ADIOS should both be thanked.