

Fluke 8508A Multimeter introduction in capacitance measurement by indirect method

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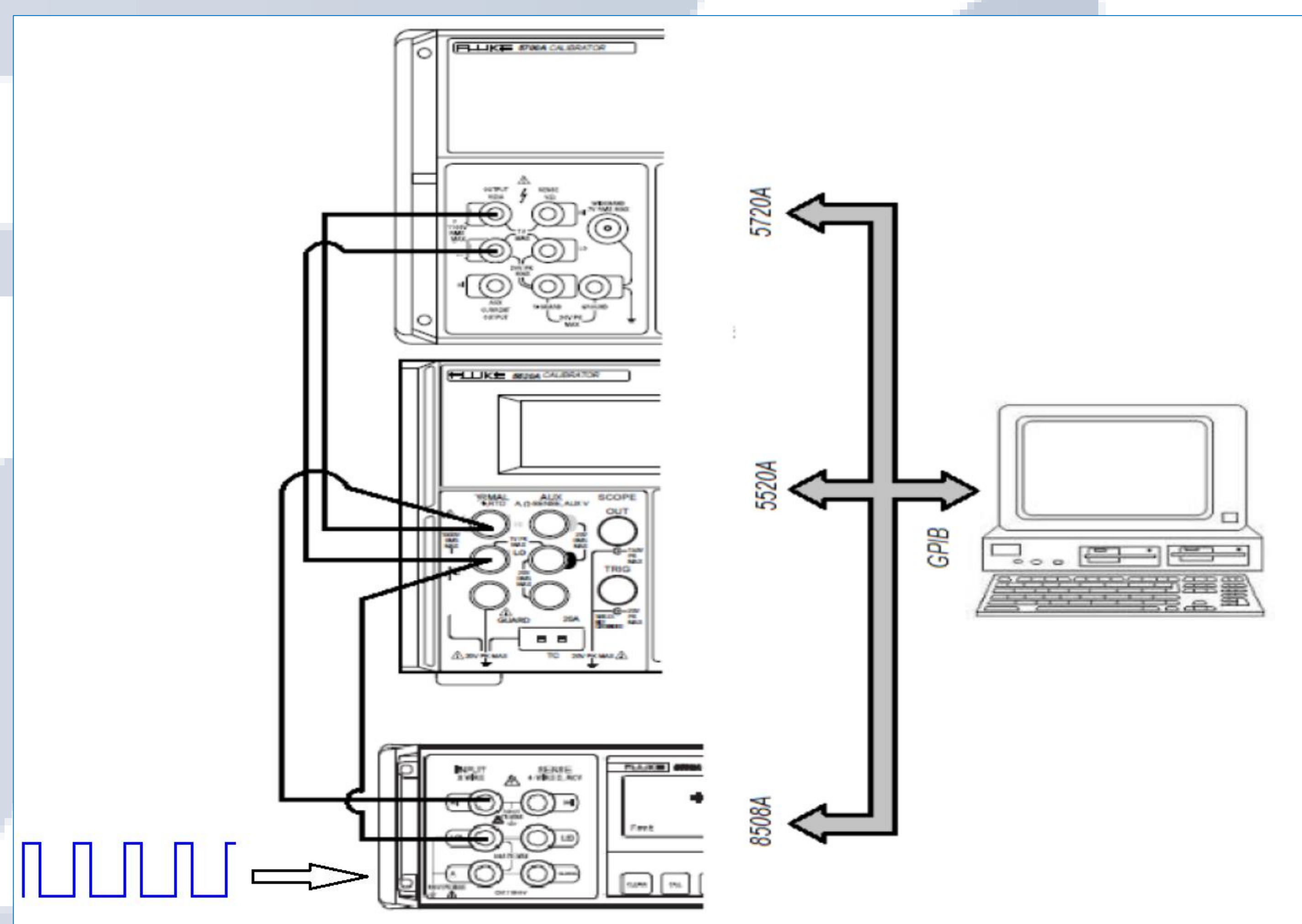
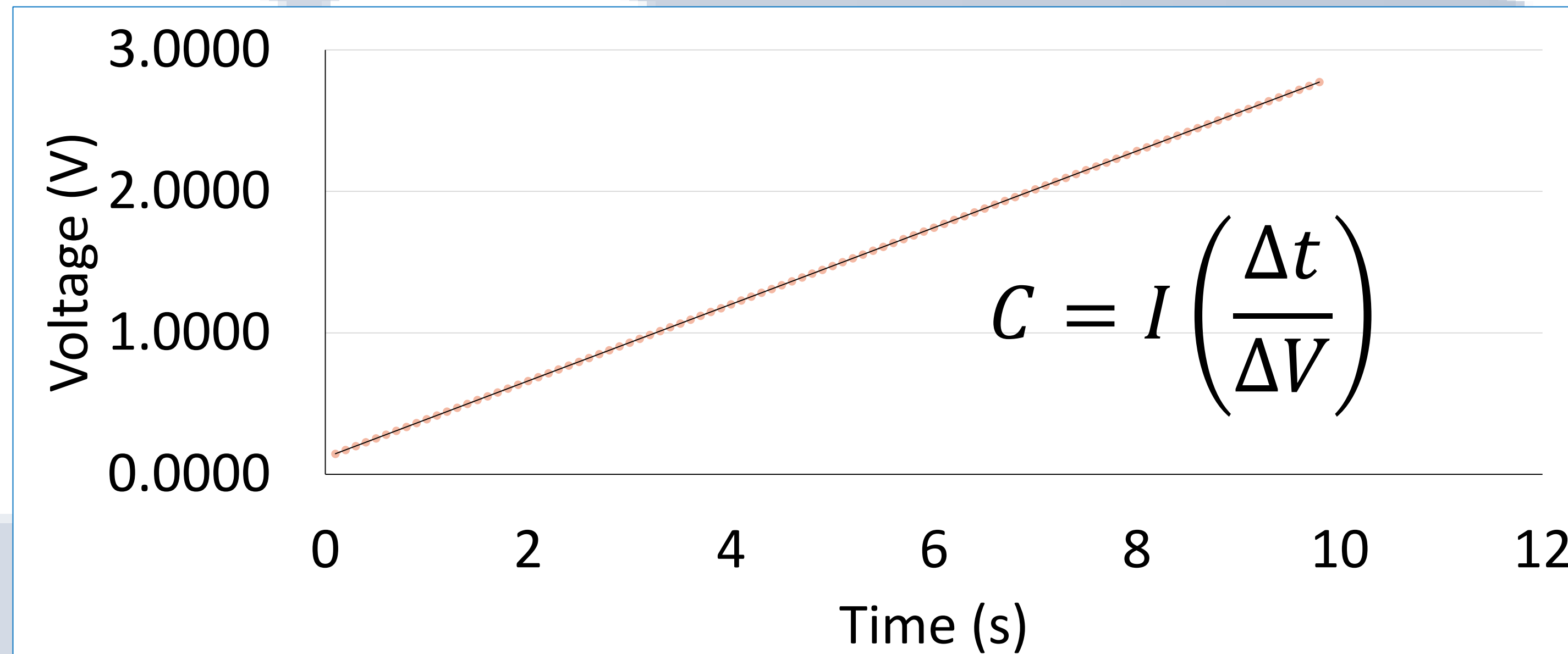
Introduction

Capacitance measurement using indirect method is carried out by measuring the capacitor voltage change due to the capacitor charging effect, when a constant current is applied for a known time interval.

Implementation

Tests were performed using three different DMMs (HP 3458A, Agilent 3458A, Fluke 8508A) for voltage measurements on the capacitor. To use Fluke 8508A are required specialized functions and an external signal acting like trigger source.

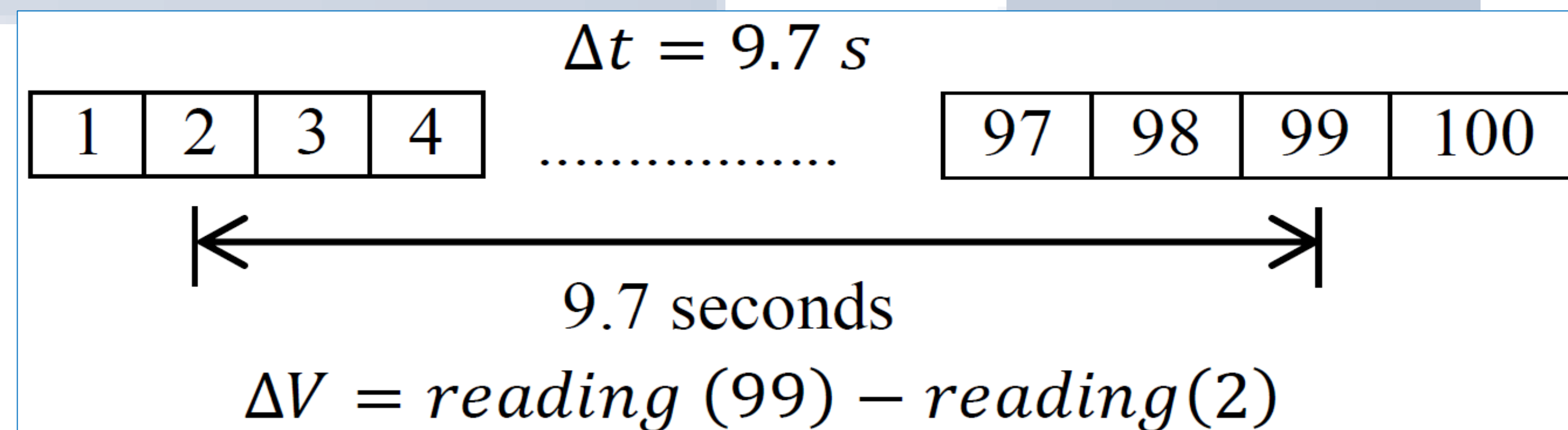
In the study, capacitance value was found by two methods. First method is to take the voltage difference (ΔV), considering only the second and penultimate reading from array data. Second method is to find ($\Delta t / \Delta V$) as the slope that result of a linear regression by least square method, considering all elements from array since second to penultimate reading.



Results

The largest difference found between capacitance values obtained by the two methods (C1 and C2) was $16 \mu\text{F}/\text{F}$.

Great compatibility between capacitance values from Agilent 3458A and Fluke 8508A was obtained, but these results have a big difference with those obtained by using HP 3458A Multimeter.



Conclusion

Capacitance measurement by indirect method allows good uncertainty evaluation with regard to the Capacitance Synthesizer specifications.

This study validates the use of DMM Fluke 8508A in performing this method.

Capacitance measurement by indirect method using DMM Fluke 8508A allows reducing uncertainty by up to $73 \mu\text{F}/\text{F}$, with respect to the use of DMM HP 3458A or Agilent 3458A.

