

INTERFACING ELECTRONIC FOR MEASUREMENT,  
SIGNAL PROCESSING AND WIRELESS  
COMMUNICATION



Edited by

Sheroz Khan, International Islamic University Malaysia

AHM Zahirul Alam, International Islamic University Malaysia

Anis Nurashikin Nordin, International Islamic University Malaysia



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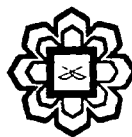
# **INTERFACING ELECTRONIC FOR MEASUREMENT, SIGNAL PROCESSING AND WIRELESS COMMUNICATION**

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## Chapter 14

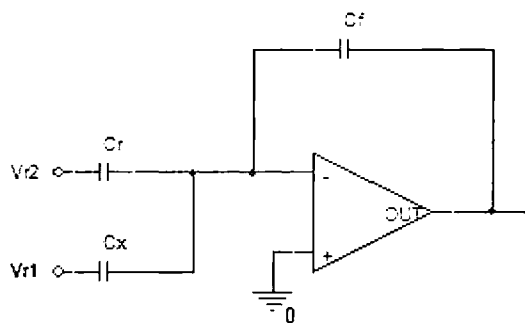
# DESIGN OF CAPACITIVE MEASURING SYSTEM FOR HIGH FREQUENCY BAND TRANSDUCER

NURUL ARFAH BINTI CHE MUSTAPHA, AHM ZAHIRUL ALAM, SHEROZ KHAN

Capacitance-to-voltage conversion (CVC) is a simple and attractive method for accurately measuring very low value capacitance variations over a wide range of capacitance changes, leading to almost linear relationship between the capacitance variations and the resulting voltage fluctuations obtained. Another added advantage of this technique lies in its simple implementation in MOS technology (Krummenacher, 1985). Also, this technique bypasses the usage of the conventional analog-to-digital converter, as the signal obtained is already digital, thus reducing the hardware cost by saving an important stage in the whole process (Chiang, Wang, & Huang, 2008). The resulting output signal is digital which can be easily transmitted, received and processed even by systems including wireless sensor networks. To meet such expectations, the  $0.13 \mu\text{m}$  CMOS technology transducer is used.

### 14.1. CVC BLOCK DIAGRAM

Converter circuit used in this design uses a basic inverting principle as shown in Fig. 14.1 where capacitance  $C_f$  is the feedback circuit, and both capacitance  $C_f$  and  $C_x$  are at the inverting input of the Op-amp.



**Fig. 14.1:** Schematic of a Basic CVC (Sedra & Smith, 2004)