

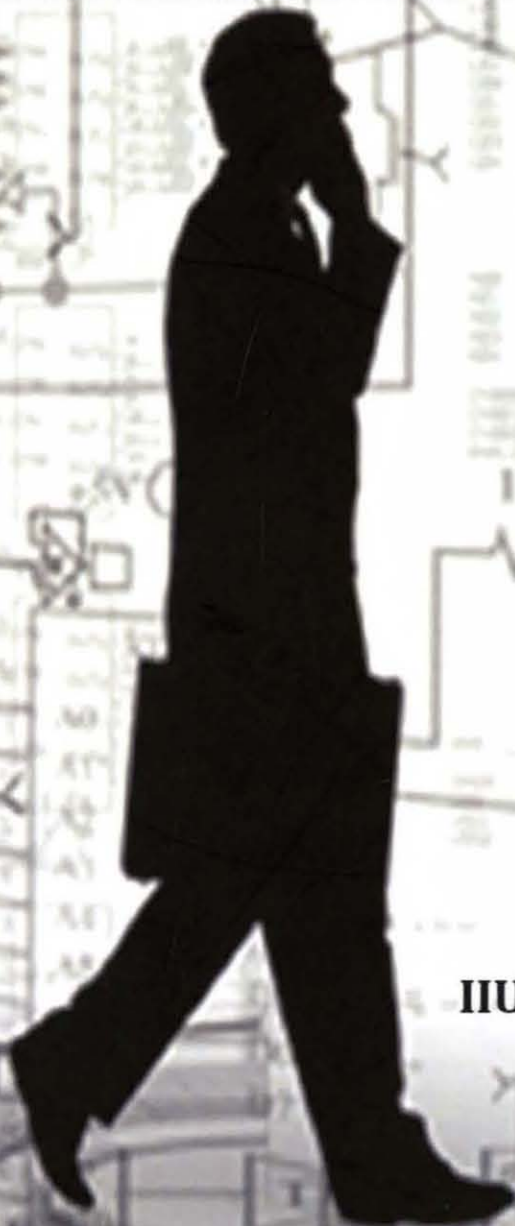
PRINCIPLES OF TRANSDUCER DEVICES AND COMPONENTS

Edited by

Sheroz Khan, International Islamic University Malaysia

Jalel Chebil, International Islamic University Malaysia

Othman O Khalifa, International Islamic University Malaysia



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Chapter 1

RC CIRCUIT RESPONSE

ATIKA ARSHAD, RUMANA TASNIM, SHEROZ KHAN, AHM ZAHIRUL ALAM

1.0 INTRODUCTION

RC circuit consists of a resistor and a capacitor which are connected in series. This chapter focuses on how the voltage develops (or shrinks) with a constant voltage source, V , is turned on (or off). Generally speaking, a capacitor accumulates charge for a current flow in, and obviously current flow out of a capacitor results into charge depletion. The current flow into an uncharged capacitor is maximum, equal to V/R at the instant in time when the circuit is closed, alternatively we can say that an uncharged capacitor acts like a short circuit at $t=0$. However, current flow drops exponentially to reach zero when capacitor gets fully charged to act like an open circuit. Capacitor unlike a resistor from an electrical view point shows more complex current-voltage relation. Also, besides being a charge storage element, capacitor is like a delay element too with a time constant given by $\tau = RC$.

1.1 CAPACITORS

Capacitor is a device that basically is made of two parallel conducting plates, each of area, A , separated by insulation of thickness, d , as shown in Fig. 1.1. It is a charge storing device, and accordingly it is capable to store energy in the field between the two plates.

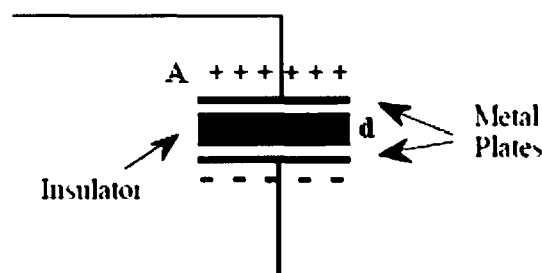


Fig. 1.1: A Simple Capacitor Circuit