JPG To PDF - Unregistered
If you want to remove this text, Please register

JPG To PDF - Unregistered
If you want to remove this text, Please register

JPG To PDF - Unregistered
If you want to remove this text, Please register

Basrah J. Science, A, Vol.18, No.1, 77-84, 2000

STUDY OF THE BEHAVIOR OF NONLINEAR RESONATOR DRIVEN BY EXTERNAL FORCE

C. A. Emshary
Dept. of Physics, College of Education, University of Basrah
Basrah, IRAQ

ABSTRACT: The study of a series circuit consisted of a linear resistor, an inductor, and a conventional diode shows nonlinear behavior in voltage drops and current of the circuit and diode capacitance. During the range of frequency under which circuit behave randomly it is not possible to measure V_R, V_L, V_D, & C_D.

1. INTRODUCTION

The optical bistable device has been shown to exhibit period doublings and chaos [1,2] while chaotic behavior was also reported for the response of a driven nonlinear oscillator [3-5] composed of a resistor, an inductor and a varactor diode. We report an ordinary diode source displaying chaotic behavior.

Chaotic behavior in electrical circuits with series connection of a linear resister, a linear inductor, and a junction p-n diode and nonautonomous, driven by a sinusoidal voltage source, have been detected. No real evidence is available on the behavior of each part of these circuits under vast range of frequency up to 10^6Hz. Informations of voltage difference on each part and current passing through circuit and sensing the occurrence of chaos phenomena is not available too. These circuits are able to show very strange unexpected behavior even under the effect of low voltages (<30 volts).

In this article we study the effect of frequency of external source (force) applied, on v.d. on each part, current and capacitance of the diode.

2. EXPERIMENTALS AND RESULTS

Resonator used in this study comprised a diode type 1N 4007, an inductor of (2-5) mH in inductance and a resistor of variable resistance, and a signal generator type SS 0603 ($10-10^6$)Hz. It generates sine and square waves (0-15) volts. Current in the