Chaos is a universal phenomenon, exhibited by complex systems. Although it seems to be random, it is not stochastic, but deterministic. Since almost all processes in nature are nonlinear, complex (chaotic) phenomena are the norm. Thus, one can realize the significance of applied chaos theory in all fields of science, engineering, economy and social sciences. Since nonlinear circuit behavior has attracted the interest of the scientific and engineering community, during the last decades, numerous circuits have been presented. Next to that, experimental study and verification of chaotic phenomena, utilizing nonlinear circuits, have been portrayed. Moreover, applications of chaotic operating nonlinear circuits have appeared, mainly in the area of secure communications or ultra-wideband data transmission.

In this lecture, an introduction to chaos and its features will be provided, together with applied chaos theory examples utilizing nonlinear circuits. Emphasis will be given on digital chaotic circuits and chaotic synchronization since this kind of circuits seems to have a potential in applications on secure communications.

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