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FINDINGS

Chaos theory highlights that the tiny change makes the most prominent change - buttery flapping its wings may bring storm in some part of the world. The present thesis entitled "Synchronization Techniques and Chaotic Dynamical Systems" is divided into six chapters.

Beginning with the history of the subject glorifying the contributions of mathematicians and scientists to it, various tools for studying the chaotic systems and their synchronization have been discussed. The changing dynamics of the first, second and third Approximations of the Exponential Chaotic System and their Synchronization have been studied and its dynamics with its first, second and third approximate systems has been compared. Next dislocated hybrid synchronization method based on
tracking control and parameter estimation adaptive technique between integer and fractional order chaotic systems have been studied. Dislocation scheme increases the possibilities of synchronization and is most useful in secure communication because of anti-attack resistance. Then the study of fractional version of the tumour model with its

thorough dynamical analysis such as equilibrium points and their stability, maximal Lyapunov exponent, Kaplan-Yorke dimension, dynamics for varying fractional order etc. Controlling chaos has been studied about its equilibrium points using adaptive sliding mode control technique.

Next a novelchaoticsystem has been developed and the system has been synchronized in dislocated phase and anti-phase synchronization considering uncertainties and disturbances designing controllers based on active control technique.

In the last the system analysis, synchronization based on active control and adaptive sliding mode control is achieved between two parallel master systems and six slave systems. Estimation of bounds for disturbances and uncertainties has been done by using adaptive sliding mode technique. Comparison with some published literature is also made and application in secure communication is illustrated based on synchronization.