Characterization and Control of Chaos[1]

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Many non-linear deterministic systems have regimes of operation in which long-term predictions are not possible; they display Chaos. This talk will discuss ways in which the strength of such chaos is measured. We will proceed to discuss how small perturbations of the parameters of operation, chosen in clever ways, may force the system to behave in an essentially periodic fashion. Examples will be drawn from our own work in Taylor-Couette fluid flow in systems with hourglass geometry, as well as electronic circuits employing operational amplifiers. Experiments and simulations appropriate to the undergraduate laboratory will be illustrated.