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## Controlling chaos-forced van der Pol equation

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Nonlinear systems are typically linearized to permit linear feedback control design, but in some systems, the nonlinearities are so strong that their performance is called chaotic and linear control designs can be rendered ineffective. One famous example is the van der Pol equation of oscillatory circuits. This study investigates the control design for the forced van der Pol equation using simulations of various control designs for iterated initial conditions. The results of the study highlight that even optimal linear, time-invariant control is unable to control the nonlinear van der Pol equation, but idealized nonlinear feedforward control performs quite well after an initial transient effect of the initial conditions. The key novelty is the hint that idealized nonlinear feedforward control is generalizable as a first step, design benchmark.

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