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Research Article

Chaotic Behavior in a Switched Dynamical System

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Abstract

We present a numerical study of an example of piecewise linear systems that constitute a class of hybrid systems. Precisely, we study the chaotic dynamics of the voltage-mode controlled buck converter circuit in an open loop. By considering the voltage input as a bifurcation parameter, we observe that the obtained simulations show that the buck converter is prone to have subharmonic behavior and chaos. We also present the corresponding bifurcation diagram. Our modeling techniques are based on the new French native modeler and simulator for hybrid systems called Scicos (Scilab connected object simulator) which is a Scilab (scientific laboratory) package. The followed approach takes into account the hybrid nature of the circuit.