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BREATHING IN A CLASS OF SWITCHED LINEAR SYSTEMS WITH COMPLEX EIGENVALUES

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The phenomenon of breathing or intermittent operation in a class of piece-wise continuous systems is studied as well as its relation with system parameters. The class of systems under study comprises a continuous time subsystem and a switching rule that induces an oscillatory path by switching alternately between stable and unstable conditions. It is shown that although regular and chaotic phases evolves irregularly for a given system, their average behavior is surprisingly regular with respect to a bifurcation parameter. It is found that the phenomenon of breathing share some structural characteristics with intermittency; *i.e.* existence of a critical exponent. However, for switched systems, many critical exponents may be required. Bifurcation maps and other analysis tools allow us to gain insight into the origin of breathing. An electronic circuit is proposed to observe experimentally the phenomenon under study. In this way, the piece-wise continuous system is implemented by switching alternately between two RC linear circuits. The electronic implementation of the system has the feature of being very simple and easy to reproduce.

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