

**ACOUSTICS2008/894**  
**Interaction of a pair of complex dynamical systems under impact conditions**

Joseph Vignola, John Judge and John McCoy  
Catholic University, 620 Michigan Ave, Washington, DC 20064, USA

An important class of complex dynamical systems has members that are comprised of a dominant simple system, made complex by attaching a large number of significantly less massive subsystems. The response of such systems to a simple forcing that acts on the dominant system has received considerable attention. A simple forcing is understood here to be represented by a time series that has very limited support when represented in either temporal or spectral space. Little attention has been paid to the response of such systems to a complex forcing, understood to be one represented by a time series that has extended support when represented in both temporal and spectral spaces. In the reported study, the interaction of two systems drawn from the described class, under impact conditions are investigated. Significantly, the action of each system on the other during the time interval of their contact is represented by an interaction force that is complex in the sense described. The investigation is accomplished via numerical simulation, physical experiments and analysis.