Emergence and suppression of chaos in coupled starlike networks of damped driven pendula

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The emergence and suppression of chaos in a complex network of driven damped pendula which consists of two starlike networks coupled by a single link is investigated in the case where only the two hubs are subject to impulse-induced control. We found distinct chaos-control scenarios depending upon whether the connectivity strategy between the starlike networks is hub to hub, hub to leave or leave to leave. We provide an explanation of their underlying physical mechanisms as well as the main characteristics of such chaos-control scenarios. Our findings may be seen as a contribution to an intermediate step to the long-term goal of controlling chaos in scale-free networks of damped-driven nonlinear systems.

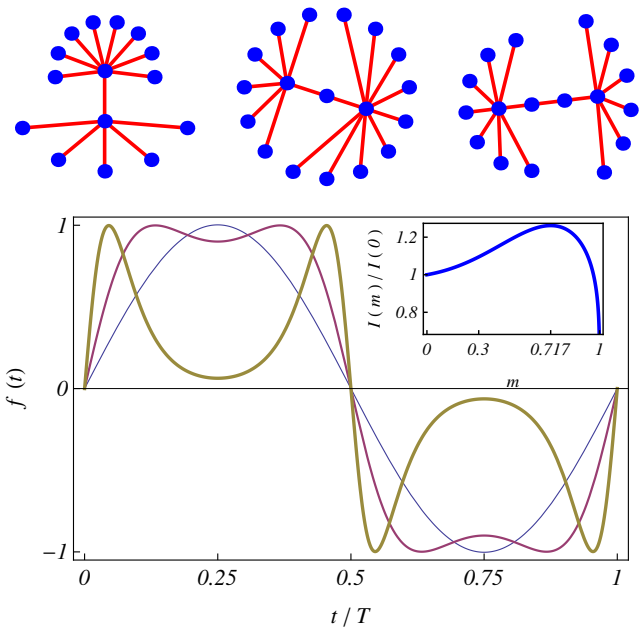

Fig. 1. Top: Schematic representations of three examples of networks of networks, each of which consists of two starlike networks connected by a single interlink: hub-to-hub, hub-to-leave, and leave-to-leave, respectively, from left to right. Bottom: Parametric excitation function $f(t) = N(m)sn[4K(m)t/T; m]dn[4K(m)t/T; m]$ vs t/T for m = 0 (thin line), m = 0.717 (medium line), and m = 0.999 (thick line). The inset shows the normalized impulse vs the shape parameter.

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