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Dependence of switching path distributions on relative noise intensities for a two-dimensional model of electrical conduction in a tunnel diode circuit[1] PAUL H. DANNENBERG, J.C. NEU, S.W. TEITSWORTH, Duke University — The incorporation of negative differential resistance elements such as tunnel diodes into electronic circuits often leads to bistability, i.e., distinct coexisting states of current for a given applied voltage. Such systems are generally far-from-equilibrium and non-gradient. We discuss a model of electrical conduction in a tunnel diode circuit in the form of a two-dimensional dynamical system, and use a geometric minimum action method (gMAM) [1] to study the dependence of the most probable escape paths (MPEPs) and associated actions on the ratio of the noise amplitudes associated with the two variables. We find that the MPEP follows the time-reversed path (i.e., a saddle-node trajectory) for a unique value of noise amplitude ratio; however, in general, MPEPs follow distinct paths that vary significantly as the noise amplitude ratio is varied. Additionally, we find good agreement between the computed MPEPs and actions and numerically generated switching path distributions and mean first-passage times, respectively.

[1] M. Heymann and E. Vanden-Eijnden, Phys. Rev. Lett. **100**, 140601 (2008).

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