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Baker and **M. Kidwell**. *On the stability of orbits in a two-dimensional model of the cardiac cell.*

We study a two-dimensional dynamical system introduced by Baker and Kline to model the connection between membrane currents, action potential duration, and cardiac rhythm. These continuous, piecewise analytic, plane systems have dynamical portraits significantly richer than their one dimensional (Collet Eckmann) counterparts.

Our principal results give the existence and stability properties of escalator orbits (analogue to the one-dimensional family), the co-existence of stable orbits for fixed values of the period parameter, existence of bunny-ears orbits (purely two-dimensional phenomena). We consider the latter results our most important, owing to conjectures that such period parameter values produce arrhythmia. (Received January 19, 2007)