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Computing Quasiperiodic Orbits

Quasiperiodic orbits occur in many dynamical systems, sometimes isolated and sometimes nested like the rings of an onion. By definition, a one-dimensional quasiperiodic orbit must have a change of variables that converts it into a pure rotation $\theta \rightarrow \theta + r\theta \pmod{1}$ (measuring angles as fractions of a full rotation). We produce the change of variables and argue that they are real analytic (based on high precision arithmetic) in all the cases we examine. Examples include quasi-periodic orbits in the restricted circular three-body problem; the standard map; and a periodically forced Van der Pol equation and an example of a two-dimensional quasiperiodic orbit.

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