H.3 Cardioid Billiard

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http://www.physik.uni-ulm.de/theo/qc/baec/baecker.html

1. Poincaré section
2. billiard map
3. conjugate points (optional)
4. symbolic dynamics a) stable-unstable mainfolds,
   b) partition line, 2 symbols
5. binary interpretation
6. plot long orbit, show pruned area
7. approximate grammars, Markov graphs
8. estimate topological entropy
9. periodic orbits (perhaps by Kai Hansen's method,
   `http://www.nbi.dk/ predrag/QCcourse/orbits.ps.gz`)
10. a) Lyapunov by numerical averging
    b) Lyapunov by cycling
11. Fredholm determinant zeros vs. published eigenvalues

References

[H.1] A. Bdcker and H.R. Dullin, *"Symbolic dynamics and periodic orbits for the cardioid billiard"*, DESY report 95-198, chao-dyn 9511004 (1995)

[H.2] H. Bruus and N.D. Whelan, *"Edge diffraction, trace formulae and the cardioid billiard"*, *Nonlinearity* **9**, 1023 (1996), chao-dyn/9509005.

[H.3] A. Bdcker, F. Steiner and P. Stifter, *"Spectral statistics in the quantized cardioid billiard"*, *Phys. Rev.* **E 52**, 2463 (1995), DESY report 94-213, chao-dyn 9412007 (1994)