

## Open Systems with Many Holes and Riemann Hypotheses

Leonid Bunimovich\*

School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332 USA

\* Electronic Address: [bunimovh@math.gatech.edu](mailto:bunimovh@math.gatech.edu)

The theory of open dynamical systems is essentially less developed than the one of open systems. Clearly, it is (much) harder to study dynamics of open systems than the closed ones. Such studies of closed systems are always based on a knowledge of dynamics of the correspondent closed system. We claim that, in turn, the dynamics of open systems can provide a useful information about the dynamics of a closed system which one gets by patching all the “holes” in an open system. In a sense, by varying a number of holes and their placement one can try to look through them into an internal dynamics of a closed system. This approach already produced some useful formulas that could be of interest to the experimentalists. It seems to be generally a quite challenging problem though as, seemingly the simplest problem of this type, namely a comparison of escape rates from a circular billiard with one and with two opposite holes turned out to be equivalent to the Riemann hypotheses.