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*Lyapunov exponents*

Lyapunov exponents of linear cocycles and smooth dynamical systems describe the system's behavior at the exponential level. The theory has its roots in Lyapunov's pioneer work on stability of differential equations and, over the last half century, or so, has grown into a very active research field whose applications permeate extend to such fields as spectral theory and number theory. Some of the outstanding issues are: existence of non-vanishing exponents, simplicity of the Lyapunov spectrum, dependence of the exponents on the underlying system.

We will discuss these issues in the elementary setting of products of 2-by-2 matrices, either random or driven by a deterministic system such as a circle rotation. Whenever possible, our emphasis will be on explicit examples. The student is expected to have some basic knowledge of measure theory, but prior contact with dynamics or ergodic theory is not a requisite.