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Title: Real-analyticity of the pressure function for products of matrices under irreducibility

Abstract: The regularity of the pressure function (also known as the generalized Lyapunov exponent) plays an important role in various fields, e.g. in statistical mechanics or multifractal analysis. Pressure function s->k(s) is known to be differentiable on (0,∞) under (weak) irreducibility assumption, and analytic under an additional assumption of contractivity (a.k.a. purification). We claim the latter assumption can be lifted, i.e. irreducibility alone is sufficient for the analyticity of pressure.
The proof consists in constructing an operator G(s) for which k(s) is a simple eigenvalue and spectral radius. The key step then is to show that a related Markov operator Q(s) is quasi-compact: this guarantees that k(s) is an isolated eigenvalue of G(s) and the analyticity of s -> k(s) follows by holomorphic functional calculus. I will discuss how to prove the quasi-compactness of Q(s) via Doeblin-Fortet inequality, using methods recently developed in the context of quantum trajectories. Joint work with T. Benoist, A. Hautecoeur, C. Pellegrini.