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Erratum

On the Spectra of Randomly Perturbed Expanding Maps

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The authors wish to point out an error in Sublemma 6 in Sect. 5 of [1]. The claims in Theorems 3 and 3′ have been revised accordingly; a correct version is given below. Other results in [1] are not affected.

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i) Revised Statement of Results in Sect. 5.C

Section 5 of [1] is about piecewise C^2 expanding mixing maps f of the interval. The number Θ below refers to $\Theta = \lim_{n\to\infty} \sup(1/|(f^n)'|^{1/n})$. These maps are randmoly perturbed by taking convolution with a kernel θ_ε, and the resulting Markov chain is denoted χ^ε. The piecewise statements of Theorems 3 and 3′ should read as follows:

Theorem 3. *Let $f: I \to I$ be as described in Sect.* 5.A *of* [1], *with a unique absolutely continuous invariant probability measure $\mu_0 = \rho_0\, dm$, and let χ^ε be a small random perturbation of f of the type described in Sect.* 5.B *with invariant probabilty measure $\rho_\varepsilon\, dm$. We assume also that f has no periodic turning points. Then*

(1) *The dynamical system (f, μ_0) is stochastically stable under χ^ε in $L^1(dm)$, i.e., $|\rho_\varepsilon - \rho_0|_1$ tends to* 0 *as $\varepsilon \to 0$.*

Let $\tau_0 < 1$ and $\tau_\varepsilon < 1$ be the rates of decay of correlations for f and χ^ε respectively for test functions in BV. Then:

(2) $\limsup_{\varepsilon\to 0} \tau_\varepsilon \leqq \sqrt{\tau_0}$.

Theorem 3′. *Let f and χ^ε be as in Theorem* 3, *except that we do not require that f has no periodic turning points. Then*

(1) $|\rho_\varepsilon - \rho_0|_1$ *tends to* 0 *as $\varepsilon \to 0$ if $2 < 1/\tau_0 \leqq 1/\Theta$;*
(2) $\limsup_{\varepsilon\to 0} \tau_\varepsilon \leqq \sqrt{2\tau_0}$.

If θ_ε is symmetric, the factor "2" in both (1) *and* (2) *may be replaced by* "3/2".

Section 5.D is unchanged.

ii) Revised Version of Section 5.E

We follow the notation introduced at the beginning of 5.E, except that we consider only the situation where

$$\Sigma_0 = \{1\} \quad \text{and} \quad \Sigma_{1,0} = \emptyset.$$

That is to say, the reader should read 5.E with $\kappa_0 = 1$, $\kappa_{11} = \kappa_1 = \tau_0$, etc.

Sublemma 6, which is problematic in [1], is valid in this more limited setting because $\pi_0 \varphi = \rho_0 \cdot \int \varphi \, dm$. Lemmas 1′ and 3′, which use Sublemma 6, are also correct under the present assumptions. We take this opportunity to add "$X_0^\varepsilon \to X_0$", which had been inadvertently left out in [1], to the conclusion of Lemma 3′.

To Prove Theorem 3, one applies Lemma 9, 1′ and 3′ with κ close to (and slightly bigger than) $\sqrt{\tau_0}$. To prove Theorem 3′, take κ close to $\sqrt{\tau_0/2}$ (or $\sqrt{\tau_0/(3/2)}$ if θ_ε is symmetric).

References

1. Baladi, V., Young, L.-S.: On the spectra of randomly perturbed expanding maps, Commun. Math. Phys. **156**, 355–385 (1993).

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