Erratum

Erratum to: Equilibrium States for Interval Maps: Potentials with $\sup \varphi - \inf \varphi < h_{top}(f)$

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This is a correction to the proof of Lemma 4:

Lemma 4. Assume that f is a C^3 multimodal map with non-flat critical points, take $\alpha \in (0, 1]$ and let $\ell_{\max} := \max\{\ell_c : c \in \text{Crit}\}$. Then there exists $K = K(\#\text{Crit}, \ell_{\max}, \alpha)$ such that if

$$\liminf_n |Df^n(f(c))| \geq K \quad \text{for all } c \in \text{Crit},$$

then formula (8) of the original paper, i.e.,

$$\sup_i \sum_{k=0}^{\tau_i-1} |f^k(X_i)|^\alpha < \infty \tag{8}$$

holds for every inducing scheme obtained as in Proposition 1 on a sufficiently small neighbourhood of Crit.

Clearly, if $\liminf_n |Df^n(f(c))| \rightarrow \infty$ then (8) holds for all $\alpha > 0$ simultaneously.

Proof. This proof is a correction after Rivera-Letelier and Shen drew our attention to a dubious part in the earlier proof. We will use Theorem A in [RS] to fix the gap. This theorem, translated to our notation, says that for every $\beta > 0$, there is $K = K(\#\text{Crit}, \ell_{\max}, \beta)$ and $\rho > 0$ such that if $\min_{c \in \text{Crit}} \liminf_n |Df^n(f(c))| \geq K$, then for every interval J of length $|J| < \rho$ each component of $f^{-n}(J)$ has length $\leq n^{-\beta}$. To give one intermediate step, the condition on the derivatives along critical order implies that f satisfies a backward contraction property with constant r , see [BRSS, Theorem 3], which is then

used in [RS, Theorem A], assuming $r = r(\beta) > 1$ is sufficiently large, to show that the components of $f^{-n}(J)$ have length $\leq n^{-\beta}$.

To apply this for our case, we take $\beta > 1/\alpha$ and induce on a set X of length $< \rho$ and then for each partition element X_i , the image $f^k(X_i)$ is a component of the $\tau_i - k^{\text{th}}$ preimage of X , and therefore has length $\leq (\tau_i - k)^{-\beta}$. This gives $\sum_{k=0}^{\tau_i-1} |f^k(X_i)|^\alpha \leq \sum_{k=1}^{\tau_i} k^{-\alpha\beta} < \infty$ uniformly over all X_i . Hence formula (8) holds. $\square$

References

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- [RS] Rivera-Letelier, J., Shen, W.: *Statistical properties of one-dimensional maps under weak hyperbolicity assumptions*. <http://arxiv.org/abs/1004.0230v1> [math.Ds], 2010

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