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A LASOTA – YORKE TYPE INEQUALITY FOR POSITION DEPENDENT RANDOM MAPS OF ONE DIMENSIONAL PIECEWISE EXPANDING $\mathcal{C}^{1,1}$ TRANSFORMATIONS

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Abstract. We consider position dependent random maps of piecewise expanding $\mathcal{C}^{1,1}$ transformations on $[0,1]$ into itself and prove a stronger Lasota–Yorke type inequality. We prove the existence of absolutely continuous invariant measures for position dependent random maps using the stronger Lasota–Yorke inequality. Our results are generalization of results of Eslami and Góra in [3] of single piecewise expanding $\mathcal{C}^{1,1}$ maps to results of position dependent random maps.

Keywords. Position dependent random random maps; Lasota–Yorke type inequality; The Frobenius–Perron operator; Absolutely continuous invariant measures; Piecewise expanding $\mathcal{C}^{1,1}$ transformations;

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References

[1] W. Bahsoun, and P. Góra, *Position Dependent Random Maps in One and Higher Dimensions*, Studia Math., 166, (2005) 271-286.

[2] A. Boyarsky, and P. Góra, *Laws of Chaos. Invariant measures and Dynamical Systems in One Dimensions*, Probability and its applications, Birkhaüser., Boston, MA, 1997.

[3] P. Eslami, and P. Góra, *Stronger Lasota-Yorke inequality for one dimensional piecewise expanding maps*, Proc. Amer. Math. Soc. 141, no. 12, (2013) 4249-4260.

[4] G. Froyland, *Ulam's method for random interval maps*, Nonlinearity, 12, (1999) 1029-1052.

[5] P. Góra, and A. Boyarsky, *Absolutely continuous invariant measures for random maps with position dependent probabilities*, Math. Anal. and Appl. 278, (2003) 225-242.

[6] M. Jabloński, and P. Góra, *A general existence theorem for absolutely continuous invariant measures on bounded and unbounded intervals*, NonlinearWorld 3, (1996) 183-200.

[7] A. Lasota, and J. A. Yorke, *On the existence of invariant measures for piecewise monotonic transformations*, Trans. Amer. Math. Soc. 186 , (1973) 481-488.

[8] S. Pelikan, *Invariant densities for random maps of the interval*, Proc. Amer. Math. Soc. 281, (1984) 813-825.

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