

Applied Dynamical Systems
LTCC Examination 2009
Examination question

1. Consider the asymmetric Bernoulli shift

$$A(x) := \begin{cases} ax & , \quad 0 \leq x < 1/2 \\ bx + 1 - b & , \quad 1/2 \leq x \leq 1 \end{cases} \quad , \quad a, b > 2 \quad ,$$

which defines an open system with an escape region in the middle where points leave the unit interval.

- (a) Sketch the map and the first two steps in the construction of its fractal repeller \mathcal{R}_A .
- (b) Calculate the escape rate $\gamma(\mathcal{R}_A)$.
- (c) Calculate the Ljapunov exponent $\lambda(\mathcal{R}_A)$.
- (d) Calculate the KS-entropy $h_{KS}(\mathcal{R}_A)$.
- (e) By using these results, verify the escape rate formula for this map.