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DYNAMICS OF MAPS WITH MEMORY

We consider a map of the unit square which is not 1–1, defined as follows: $x_{n+1} = M_\alpha(x_{n-1}, x_n) = \tau(\alpha \cdot x_n + (1-\alpha) \cdot x_{n-1})$, where τ is a one-dimensional map on $I = [0,1]$ and $0 < \alpha < 1$ determines how much memory is being used. We let τ to be the symmetric tent map. To study the dynamics of M_α, we consider the two-dimensional map

$$G_\alpha : [x_{n-1}, x_n] \mapsto [x_n, \tau(\alpha \cdot x_n + (1-\alpha) \cdot x_{n-1})].$$

The map G_α for $\alpha \in (0, 3/4]$ studied in our paper is shown to have various properties depending on the α applying Tsujii's result. For $\alpha \in (3/4, 1)$ the map G_α admits a singular Sinai-Ruelle-Bowen measure in another paper, we do this by applying Rychlik's results for the Lozi map. Unlike the Lozi map, the maps G_α are not invertible.