# Hiding multiple images in coupled lattices of hyper fractional maps

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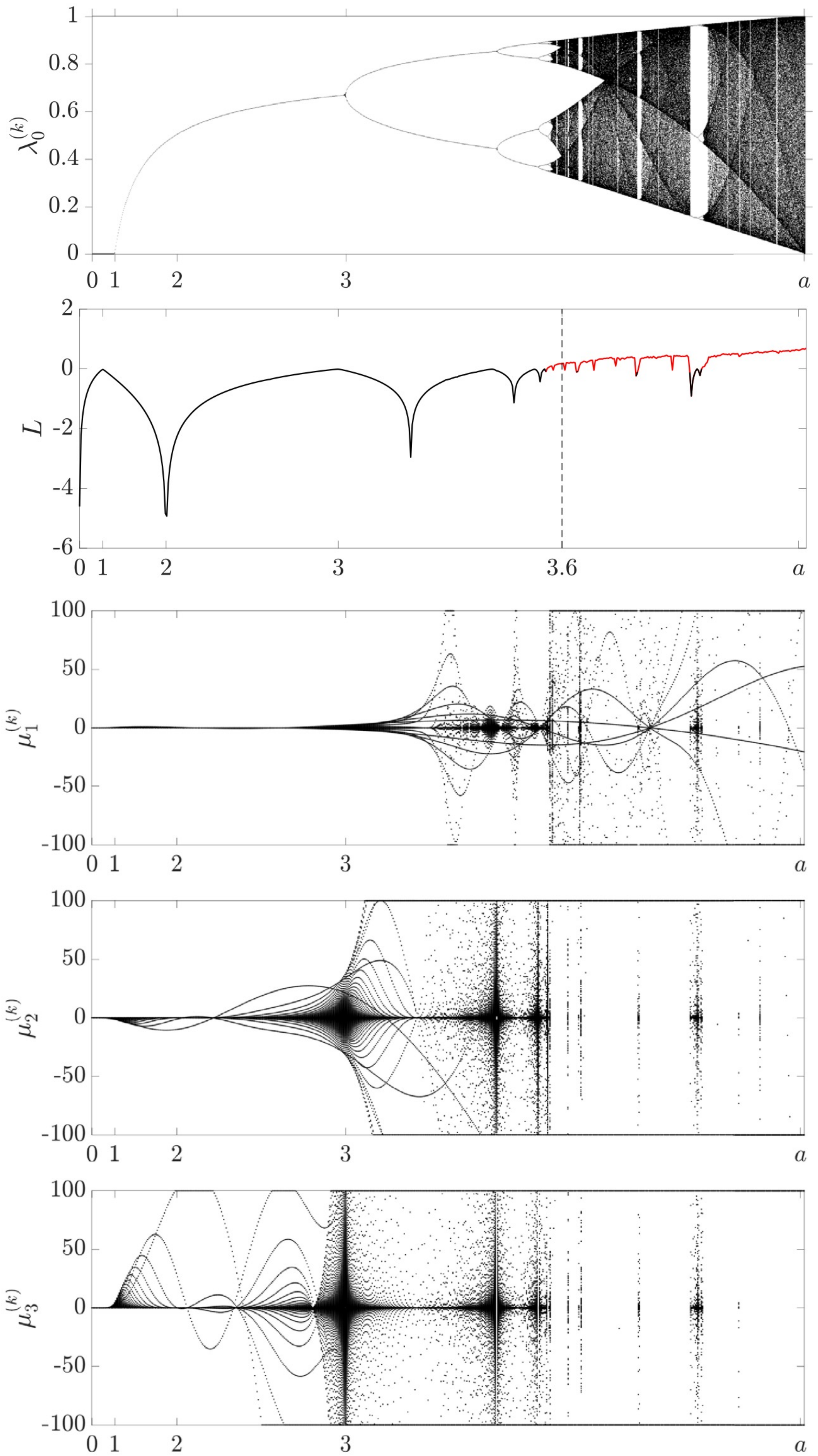
$$x_k = x_0 + \sum_{j=1}^{k} G_{j-1}\ \left(a\,x_{k-j}\left(1 - x_{k-j}\right) - x_{k-j}\right). \quad G_0 = 1,\ G_j = \left(1 - \frac{1-\nu}{j}\right) G_{j-1}$$

The fraction logistic map

$\nu \to 1$

$$x_{k+1} = a\,x_k\left(1 - x_k\right)$$

The logistic map

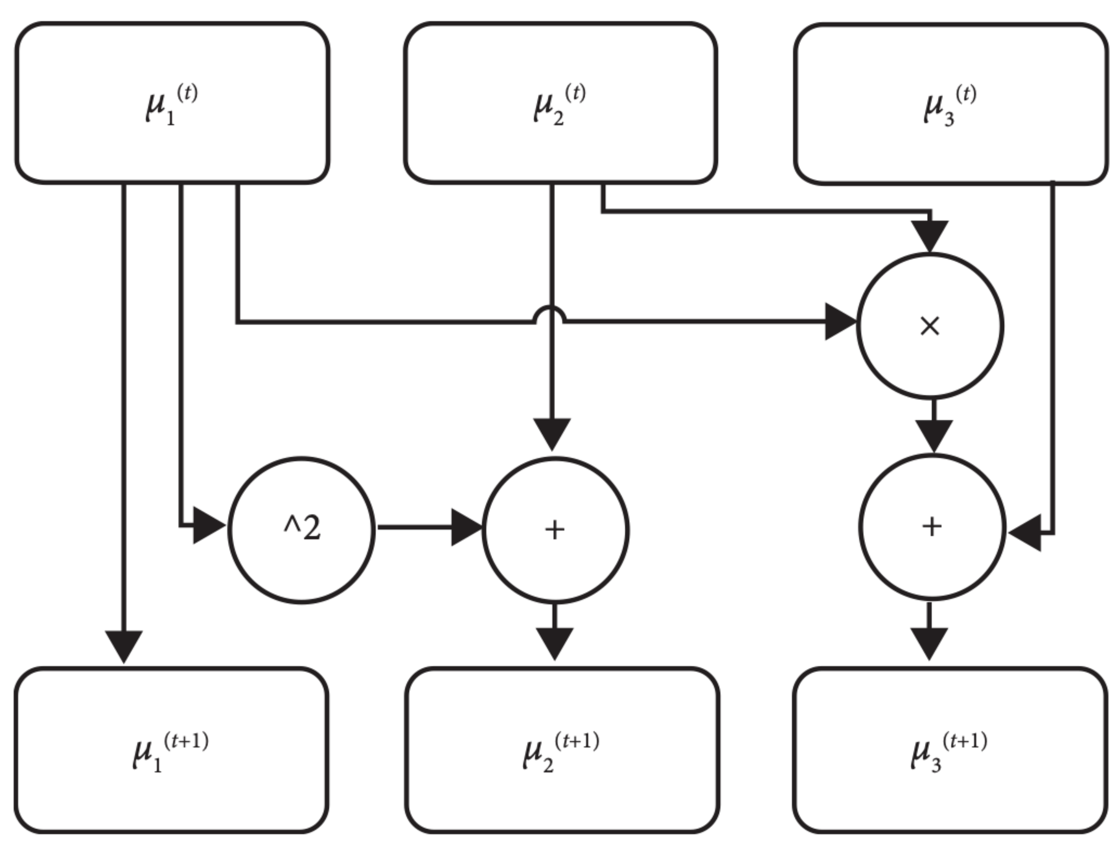


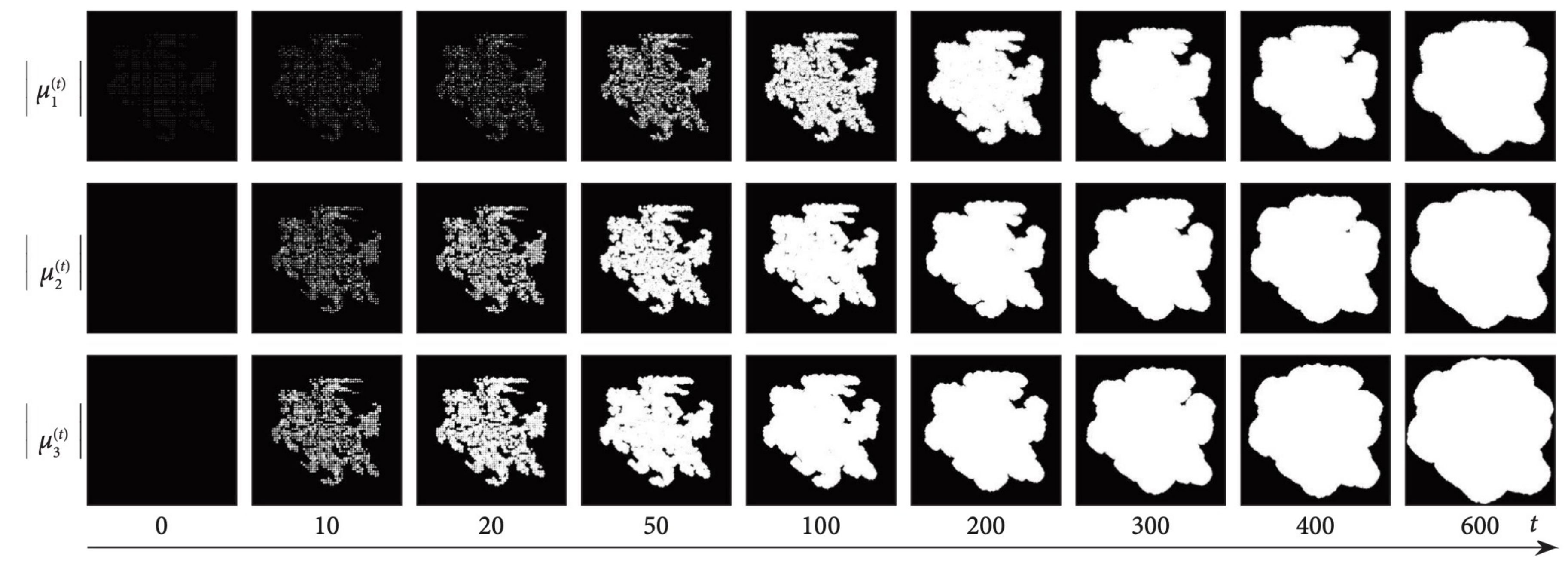

***Definition.*** Hyper CML is a 2D CML such that as follows:
(1) Each scalar discrete node is replaced by an n-dimensional square matrix of discrete variables;
(2) The size of the matrix n is the same for each node;
(3) The divergence code for each nodal matrix is maximal;
(4) The nilpotent of each nodal matrix is the same (note that this condition does not require the recurrent eigenvalue of the nodal matrix to be the same at each node).

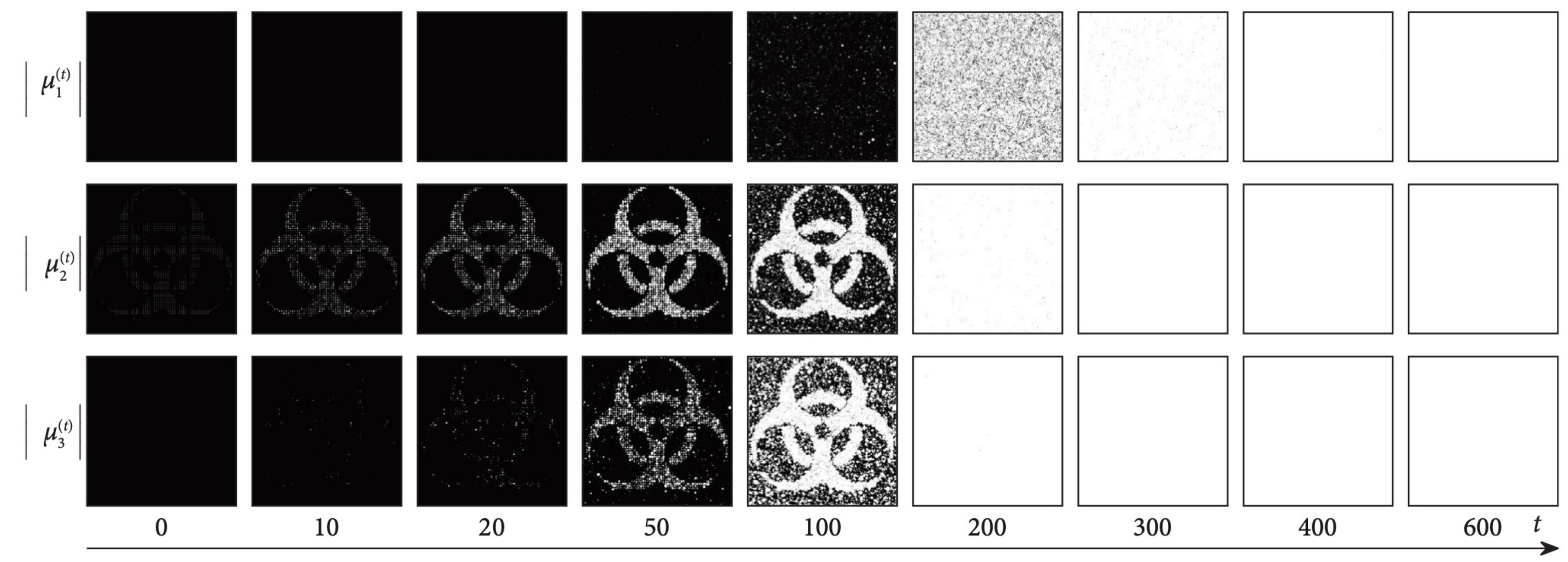
$$\mathbf{X}^{(0)} = \lambda_0^{(0)}\mathbf{I} + \mu_1^{(0)}\mathbf{N}_1 + \mu_2^{(0)}\mathbf{N}_2 + \mu_3^{(0)}\mathbf{N}_3,$$

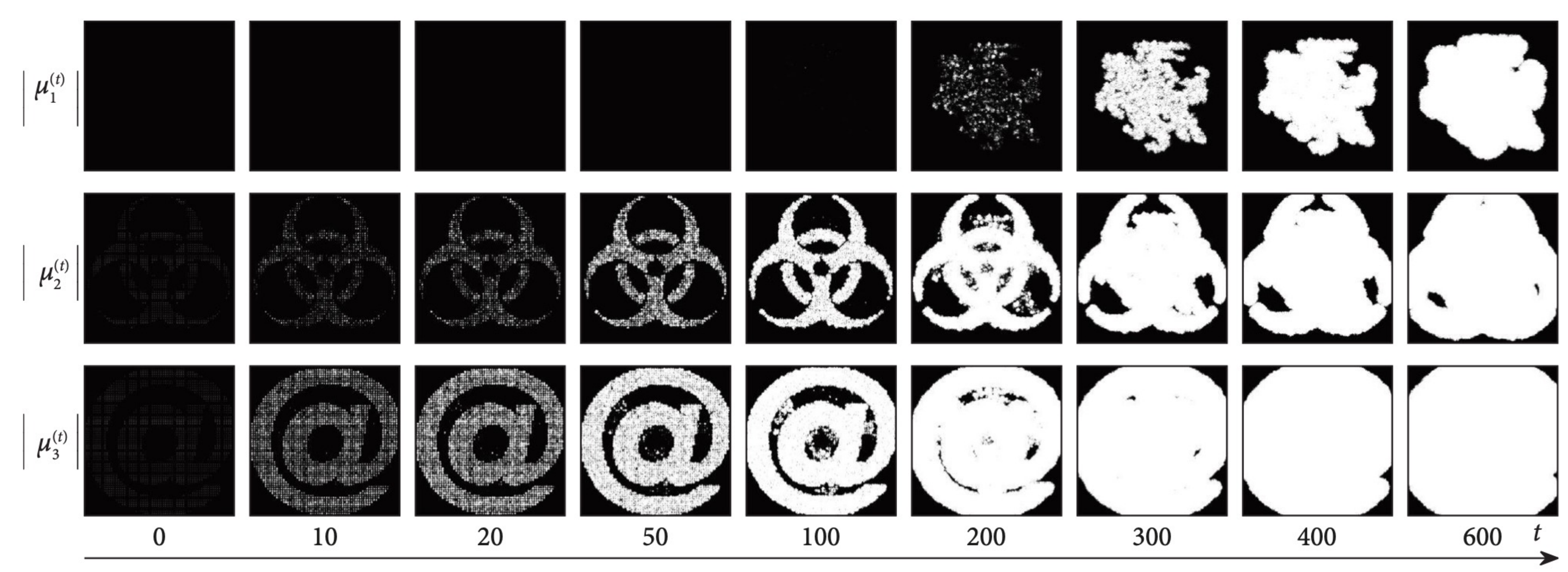
$$\mathbf{N}_1 = \mathbf{T}\begin{bmatrix}0&1&0&0\\0&0&1&0\\0&0&0&1\\0&0&0&0\end{bmatrix}\mathbf{T}^{-1},\ \mathbf{N}_2 = \mathbf{T}\begin{bmatrix}0&0&1&0\\0&0&0&1\\0&0&0&0\\0&0&0&0\end{bmatrix}\mathbf{T}^{-1},\ \mathbf{N}_3 = \mathbf{T}\begin{bmatrix}0&0&0&1\\0&0&0&0\\0&0&0&0\\0&0&0&0\end{bmatrix}\mathbf{T}^{-1}$$

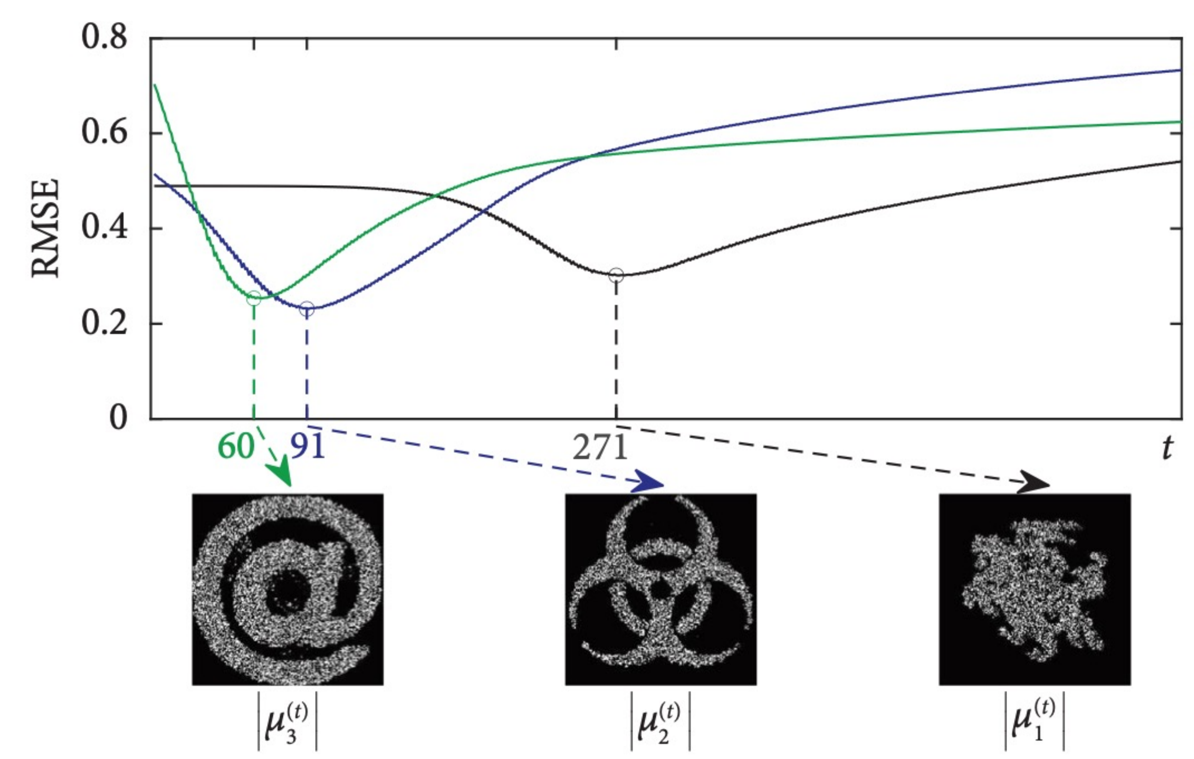
$$\begin{cases} \lambda_0^{(k)} = \lambda_0^{(0)} + \sum_{j=1}^{k} G_{j-1}\left(a\lambda_0^{(k-j)}\left(1-\lambda_0^{(k-j)}\right) - \lambda_0^{(k-j)}\right); \\ \mu^{(k)} = \mu^{(0)} + \sum_{j=1}^{k} G_{j-1}\left(\mu^{(k-j)}a\left(1-2\lambda_0^{(k-j)}\right) - \mu^{(k-j)}\right); \end{cases}$$




J.Ragulskiene et al. Hyper coupled map lattices for hiding multiple images. **Complexity** (2023) vol.2023, art.ID 8831078.