

i.e. there are no intermodular links. This means that modules are isolated and can be seen as independent classic RBNs, with different attractors of different lengths. However, the MRBN will consider different combinations of the same modular attractors as different attractors. This can be better understood with an example. Let us have a small MRBN $M = 2, N = 3, K = 2, L = 0$. Since modules have no interaction ($L = 0$), this MRBN is equivalent to two separate classical RBNs. Let us assume that the first module has a point attractor: $001 \rightarrow 001$ and an attractor of period 2: $000 \rightarrow 111 \rightarrow 000$; and the second module has a point attractor: $000 \rightarrow 000$ and an attractor of period 3: $100 \rightarrow 010 \rightarrow 001 \rightarrow 100$. Thus, the combinations of these RBN attractors will yield four attractors in the MRBN:

1. The two point attractors: $001000 \rightarrow 001000$.
2. The first point attractor and the period three attractor: $001100 \rightarrow 001010 \rightarrow 001001 \rightarrow 001100$.
3. The period two attractor and the second point attractor: $000000 \rightarrow 111000 \rightarrow 000000$.
4. The period two and period three attractors: $000100 \rightarrow 111010 \rightarrow 000001 \rightarrow 111100 \rightarrow 000010 \rightarrow 111001 \rightarrow 000100$.

Considering that in RBNs A grows algebraically with N [16], MRBNs with several modules M and $\kappa = 1$ will tend to have much more attractors on average than a RBN with the same N_T and K_T . This is because the MRBN will have as different attractors all the possible combinations of all modular attractors. As intermodular links L are added and κ decreases, changes in the states of nodes which have L links as outputs might perturb and even destroy attractors. When κ is minimal, the organization of the MRBN is more similar to a classical RBN, since there are less restrictions on where to assign links (in general (for $M > 2$), there are more possible intermodular links ($M \cdot (M - 1) \cdot N^2$) than possible intramodular links ($M \cdot N^2$)).

The A results for cases 4, 5, and 1 are compared in Figure 6. It can be seen that μ is also relevant for A . More modules (low μ) imply more potential combinations of modular attractors, which implies a higher A for MRBNs. Case 4, which is equivalent to a classic RBN has a maximum