Products of Random Matrices in the (max,+) Algebra

We consider the recursive equation "$x(n+1) = A(n) \otimes x(n)$" where $x(n+1)$ and $x(n)$ are $\mathbb{R}^k$-valued vectors and $A(n)$ is an irreducible random matrix of size $k \times k$. The matrix-vector multiplication in the (max,+) algebra is defined by $(A(n) \otimes x(n))_i = \max_j(A_{ij}(n) + x_j(n))$. This type of equation can be used to represent the evolution of Stochastic Event Graphs which include cyclic Jackson Networks, some manufacturing models and models with general blocking (such as Kanban). Let us assume that the sequence $\{A(n),\ n \in \mathbb{N}\}$ is i.i.d or more generally stationary and ergodic. The main result of the paper states that the system couples in finite time with a unique stationary regime if and only if there exists a set of matrices $\mathcal{C}$ such that $P\{A(0) \in \mathcal{C}\} > 0$ and the matrices $C \in \mathcal{C}$ have a unique periodic regime.

Produits de Matrices Aléatoires dans l'Algèbre (max,+)

On étudie les systèmes (max,+) linéaires stochastiques. Le problème considéré est celui de la stabilité de tels systèmes. Les résultats proposés permettent de compléter les résultats obtenus par Baccelli et Cohen.