Main theorems in the theory of Markov chains from Hopf algebras (in the sense of [Pan15]). This version: March 28, 2015. Curated by Amy Pang. Printer-friendly version, plus related summary tables, available at my website.

If you spot an error, or know of any other Markov chains built in a similar way, please let me know.

Defining map	any linear map	coproduct-then-product, Hopf powers		descent operators (convolutions-of-projections)
Reference	[Pan14]	[DPR14]	[Pan14]	[Pan15]
construction	Th. 3.1.1	Th. 3.4	Def. 4.3.1, Def. 4.3.4	Def. 3.1
diagonalisation	Prop. 3.2.1	Th. 3.15, Th. 3.16, Th. 3.19, Th. 3.20	Th. 2.5.1	Th. 4.2 (spectrum only), see separate table
stationary distribution	Prop. 3.3.1	Prop. 3.21, Prop. 3.23	Th. 4.5.1	Th. 4.5
time-reversal and reversibility	Th. 3.3.2		Th. 4.6.1, Th. 4.6.3	
strong lumping (projection)	Th. 3.4.1		Th. 4.7.1	Th. 4.1
weak lumping (projection)	forthcoming			
unidirectionality for free-commutative basis		Sec. 3.3	Sec. 5.1.2	
right eigenfunctions for free-commutative basis		Th. 3.19	Th. 5.1.9	
probability bounds from above eigenfunctions			Prop. 5.1.11, Prop. 5.1.14	
absorption probabilities and terminality of *QSym*		Prop. 3.25, Prop 3.26	Sec. 5.1.4	

References

[DPR14] P. Diaconis, C. Y. A. Pang, and A. Ram. Hopf algebras and Markov chains: two examples and a theory. *J. Algebraic Combin.*, 39(3):527–585, 2014.

[Pan14] C. Y. A. Pang. Hopf algebras and Markov chains. *ArXiv e-prints*, December 2014. A revised thesis.

[Pan15] C. Y. A. Pang. Card-shuffling via convolutions of projections on combinatorial Hopf algebras. In *27th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2015)*, Discrete Math. Theor. Comput. Sci. Proc., ??, pages ??–?? Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2015. available on Arxiv.