

# Polynomial birth-death distribution approximation in Wasserstein distance

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The polynomial birth-death (PBD) distribution on non-negative integers introduced in Brown & Xia (2001) is the equilibrium distribution of the birth-death process with birth rates  $\{\alpha_i\}$  and death rates  $\{\beta_i\}$ , where  $\alpha_i \geq 0$  and  $\beta_i \geq 0$  are polynomial functions of  $i$ . The family unifies many well-known distributions such as Poisson, negative binomial and binomial. In this talk, I'll explain how a nice coupling of various birth-death processes starting at different states can be constructed to estimate Stein's factors for the PBD approximation in terms of the Wasserstein distance. Examples will be presented to demonstrate that these estimates are nearly optimal. This talk is based on a joint work with Fuxi Zhang.