n-TYPE MARKOV BRANCHING PROCESSES WITH IMMIGRATION

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Abstract: In this paper, we consider n-type Markov branching processes with immigration and resurrection. The uniqueness criteria are first established. Then, a new method is found and the explicit expression of extinction probability is successfully obtained in the absorption case, the mean extinction time is also given. The recurrence and ergodicity criteria are given if the state **0** is not absorptive. Finally, if the resurrection rates are same as the immigration rates, the branching property and decay property are discussed in detail, it is shown that the process is a superimposition of a n-type branching process and an immigration. The exact value of the decay parameter λ_Z is given for the irreducible class $\mathbf{Z}_+^n$. Moreover, the corresponding λ_Z-invariant measures/vectors and quasi-distributions are presented.