HARMONIC MOMENTS AND LARGE DEVIATIONS FOR SUPERCRITICAL BRANCHING PROCESSES WITH IMMIGRATION

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Abstract: Let Z_n be a supercritical branching processes with immigration, we study the convergence rates of the harmonic moments of Z_n , namely, $E(Z_n^{?r}|Zn > 0)$, $r > 0$, extending the previous results for non-immigration cases in literatures. As a by-product, the large deviations for Z_{n+1}/Z_n are also studied. We can see that there is a phase transition in converging rates depending on the generating functions of both branching and immigration.